CITY OF VANCOUVER

# THE HEIGHTS DISTRICT PLAN

## PLANNED ACTION FINAL ENVIRONMENTAL IMPACT STATEMENT

CITY OF Vancouver WASHINGTON

July 10, 2020

Subject: City of Vancouver Heights District Plan Final Environmental Impact Statement

Dear Reader:

The City of Vancouver (City) is pleased to present the Final Environmental Impact Statement (Final EIS) for the Heights District Plan, and we wish to thank everyone who commented on the Draft Environmental Impact Statement (Draft EIS). Publication of this Final EIS follows more than a two year planning process, including a 120-day public comment period on the Draft EIS.

The Heights District Plan was initiated by the City of Vancouver in order to identify a community-based vision for the area, and to catalyze revitalization and private investment in central Vancouver. The Heights District is approximately 205 acres and includes the 63-acre Tower Mall Redevelopment Area, which includes the 12-acre site of the former Tower Mall that was acquired by the City in 2017. The Tower Mall Redevelopment Area is the focus of most of the redevelopment proposed in the Plan.

For the Tower Mall Redevelopment Area, three concept plans were prepared based on input received during an extensive neighborhood and stakeholder engagement process. The initial concepts consisted of the Promenade, the Loop, and the Grand Park. Based on community feedback, the concept plans were refined and a preferred concept called the Grand Loop was developed, which incorporated elements from all three concepts. The Grand Loop concept forms the basis of the Heights District Plan and is part of the Project Alternative evaluated in the EIS.

**State Environmental Policy Act and EIS Process**

The Washington State Environmental Policy Act (SEPA) requires local governments to consider impacts to the environment in their decision making. The SEPA process is intended to provide information to both agencies and the public through the identification and evaluation of environmental impacts and the development of mitigation measures to reduce adverse environmental impacts. The City, as the SEPA lead agency, determined that the Heights District Plan would be considered a planned action (explained further below) and therefore would require the preparation of an EIS.

SEPA requires that an EIS consider different alternatives, including the "proposed action" and a "no action" alternative (see WAC 197-11-440). For the Heights, the proposed action is the adoption of the Heights District Plan and the redevelopment that is anticipated to occur as a result of the plan. The three alternatives analyzed in the Heights District Plan EIS include the Project Alternative (adoption of the Heights District Plan), a No Action Base Alternative, and a No Action High Alternative. The City chose to analyze two no action alternatives (instead of one as required under SEPA) in order to reflect different potential development scenarios that could occur under the existing Comprehensive Plan and zoning designations given current market conditions.

The no action alternatives do not imply that no development will occur; rather, they evaluate what could happen if development/redevelopment occurred without adoption of the Heights District Plan. Development under either of the no action alternatives would not conform to an overarching vision for the area, such as is proposed in the Heights District Plan. The alternatives analyzed in the EIS are further described in Chapter 2 of the EIS, beginning on page 17. For additional details about the environmental review process, see the Introduction chapter of the EIS.

**Planned Actions**

The City is proposing that future development within the Heights District Plan be designated a "planned action" as defined under WAC 197-11-164. As a planned action, future development applications that are determined to be

consistent with the Heights District Plan would not be subject to further environmental review under SEPA. If a proposed development is not consistent with what is envisioned in the plan and analyzed in the EIS, additional environmental analysis under SEPA will be required.

**Draft EIS Comments and Revisions included in the Final EIS**

During the 120-day public comment period (January 22-May 22 2020), the City received over 60 public comments through a public comment survey form and via email to City staff. Comments received are included in the Final EIS (Chapter 4). All comments were reviewed, and responses are provided in the Final EIS. Where comments have resulted in revisions to the Draft EIS, such revisions are shown with underlines and strikethroughs in the Final EIS. The primary changes to the Heights District Plan that resulted from public comments include the following:

1. Removal of five church properties and the Veterans of Foreign Wars property from the proposed rezone area in the Heights District Plan. It is important to note that because these properties are still included in the Heights District boundary and individual property owners could request site-specific rezones in the future, the rezoning of these properties is still considered in the EIS analysis of impacts (Chapter 3, page 26). The analysis included in the EIS does not result in any zone change for these properties, it only analyzes the potential impacts of those zone changes should they be requested in the future by individual property owners or by other consideration.
2. Clarification regarding the forthcoming development standards and height restrictions in the proposed HX Zoning District. Additional details related to building heights and transitions to adjacent neighborhoods are included in the EIS on page 37.
3. The previously named "Neighborhood Gateway" sub-district was renamed "District Gateway." This change is reflected throughout the EIS.

**Next Steps**

Following publication of the Final EIS, the City Council will review and consider adoption of the Heights District Plan. The City Council review schedule for the Heights District Plan is:

- July 13: Council Workshop, 4:30pm
- July 20: Council Workshop, 5pm
- July 27: Council Workshop, 5pm
- August 3: Council First Reading, 6:30pm
- August 17: Council Public Hearing, 6:30pm

This schedule is subject to change and those interested should consult the Vancouver City Council Agenda webpage noted below.

**Public comments on the Heights District Plan will be accepted at the public hearing on August 17th. To submit comments on the plan or ask questions in advance of the hearing, contact Rebecca Kennedy, Long Range Planning Manager, at 360-487-7896 or Rebecca.Kennedy@cityofvancouver.us.**

If the plan is adopted, the City will then finalize implementing regulations, including the new HX Zoning District and a planned action ordinance. The implementation measures will require additional review and approval by both the Planning Commission and City Council. The schedule for these actions has not yet been established. For additional information about the Heights District Plan and EIS, please visit https://www.cityofvancouver.us/ced/page/heights-district-plan.

Thank you for your interest in the Heights District Plan and for your participation in the planning and environmental review process.

Sincerely,

Chad Eiken, Community and Economic Development Director
City of Vancouver
SEPA Responsible Official

# FACT SHEET

## Project Title
The Heights District Plan

## Proposed Action
The proposed action by the City of Vancouver (City) consists of the following elements.

1) **Adoption of a subarea plan for the Heights District to guide development;**
2) **Adoption of amendments to Title 20, Land Use and Development Code of the Vancouver Municipal Code (VMC), including uses within zoning categories and development of a new zone and plan district;**
3) **Adoption of zoning map amendments, including property rezones;**
4) **Adoption of an ordinance designating the Heights District Plan as a planned action for purposes of future permit review and State Environmental Policy Act (SEPA) compliance; and**
5) **Development of the Heights District consistent with adopted provisions.**

## Alternatives
For purposes of environmental review under SEPA, the environmental impact statement (EIS) considered three alternatives: a No Action Base Alternative, a No Action High Alternative, and a Project Alternative.

- **No Action Base Alternative assumes growth consistent with *Vancouver Comprehensive Plan 2011-2030* and the City's land use and development code with no redevelopment of existing underutilized parcels.**
- **No Action High Alternative assumes growth consistent with the *Vancouver Comprehensive Plan 2011-2030* and land use and development code with the redevelopment of 50 percent of the land area included in the Tower Mall Redevelopment Area.**
- **Project Alternative is based on an assumption that the Heights District Plan, the planned action ordinance, and the corresponding comprehensive plan and zoning amendments are adopted, resulting in growth and development consistent with the Heights District Plan.**

## Location
The Heights District encompasses an area of approximately 205 acres and is bounded generally by MacArthur Boulevard to the south and west, Mill Plain Boulevard to the north, and Andresen Road to the east (see Figure 1 in Chapter 1 of this EIS).

## Proponent
City of Vancouver

## Lead Agency
City of Vancouver

## Responsible Official
Chad Eiken, Director
Community & Economic Development, City of Vancouver

## EIS Contact Person
Rebecca Kennedy, Long Range Planning Manager
Community & Economic Development, City of Vancouver
(360) 487-7896
rebecca.kennedy@cityofvancouver.us

## Required Approvals
**City of Vancouver:** Subarea plan adoption, amendment of the comprehensive plan, revised development regulations and planned action ordinance

## EIS Authors and Principal Contributors

### *EIS Project Manager, Primary Authors – Land Use, Aesthetics, Light and Glare, Climate Change and Greenhouse Gas Emissions, Public Services and Utilities, Air, Water, and Plants and Animals*

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### *Transportation*

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Portland, OR 97204

### *Historic and Cultural Resources*

Archaeological Investigations Northwest (AINW)
3510 NE 122nd Avenue
Portland, OR 97230

## Location of Background Information

City of Vancouver, Community & Economic Development Department

## Prior Environmental Documents, Use of Existing Documents

These environmental documents are incorporated by reference for purposes of SEPA compliance:

- **Vancouver Comprehensive Plan 2011-2030, November 7, 2011**
- **Vancouver Comprehensive Plan SEPA Determination of Non Significance, July 13, 2011**
- **Vancouver Comprehensive Plan Draft and Final Environmental Impact Statements, 2004**

## Date of Draft EIS Issuance

January 22, 2020

## Draft EIS Public Comment Period

January 22, 2020 to May 20, 2020

## Date of Final EIS Issuance

July 10, 2020

## Availability of Final EIS

Hard copies are available for review at the City of Vancouver Permit Center, First Floor, 415 West 6th Street, Vancouver between 9 am and 4 pm Monday through Friday. At the time of publication, City offices are closed due to COVID-19. If you would like to review a hard copy of the FEIS, please contact Cayla Cothron at cayla.cothron@cityofvancouver.us or 360-487-7899 to make arrangements for review of the hard copy. Electronic copies are also available for review on the project website at https://www.cityofvancouver.us/ced/page/heights-district-plan or by email through request to Cayla Cothron.

# DISTRIBUTION LIST

The following parties have been provided a notice of availability of the Heights District Plan Final EIS.

## Federal Agencies
US Army Corps of Engineers – Southwest Washington Field Office

## State Agencies
Washington Department of Archaeology and Historic Preservation

Washington Department of Commerce

Washington Department of Ecology

Washington Department of Fish and Wildlife

Washington Department of Natural Resources

Washington Department of Transportation

## Local and Regional Agencies
Clark County Public Health

Clark County Community and Economic Development

Clark Public Utilities

Northwest Natural Gas

Port of Vancouver USA

Southwest Washington Clean Air Agency

Southwest Washington Regional Transportation Council

Vancouver School District

## City of Vancouver Departments
City Manager's Office

Community and Economic Development

Fire

Law

Parks and Recreation

Police

Public Works

## Community Stakeholders
Clark County Neighbors

Columbia Riverkeeper

Vancouver's Downtown Association

## Media
The Columbian

The Oregonian

## Interested Individuals, Property Owners, and Organizations
Interested parties included on the Heights District Plan project email list and those who provided scoping and Draft EIS comments

## Broader Community
Posting through the City's social media channels and on the Heights District Plan website:
www.cityofvancouver.us/ced/page/heights-district-plan

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| | |
|---|---|
| ADA | Americans with Disabilities Act |
| AINW | Archaeological Investigations Northwest, Inc. |
| BEERC | Bridgeview Education and Employment Resource Center |
| BGEPA | Bald and Golden Eagle Protection Act |
| BMP | best management practice |
| BRT | bus rapid transit |
| CAC | Community Advisory Committee |
| CC | Community Commercial (zoning district) |
| COM | Commercial and Mixed Use (zoning district) |
| CPTED | crime prevention through environmental design |
| CTR | Commute Trip Reduction |
| CWA | Clean Water Act |
| DAHP | Department of Archaeology and Historic Preservation |
| DEIS | draft environmental impact statement |
| DS | determination of significance |
| EIS | environmental impact statement |
| EMS | Emergency medical service |
| EPA | Environmental Protection Agency |
| ESA | Endangered Species Act |
| FEIS | final environmental impact statement |
| GEO | Governor's Executive Order |
| GHG | greenhouse gas |
| GMA | Growth Management Act |
| gpm | gallons per minute |
| GSP | General Sewer Plan |
| HCM | Highway Capacity Manual |
| HX | Heights Mixed Use (proposed zoning district) |
| IPaC | Information for Planning and Consultation database |
| IPCC | Intergovernmental Panel on Climate Change |
| LEED | Leadership in Energy and Environmental Design (U.S. Green Building Council [USGBC] Certification) |
| LID | low impact development |
| LOS | level of service |
| MBTA | Migratory Bird Treaty Act |
| MG | million gallons |
| MGD | million gallons per day |
| MTCO2e | metric tons of carbon dioxide |
| NA | not applicable |
| NAAQS | U.S. National Ambient Air Quality Standards |
| NC | Neighborhood Commercial (zoning district) |
| NHPA | National Historic Preservation Act of 1966 |
| NMFS | National Marine Fisheries Service (NOAA Fisheries) |
| NPDES | National Pollutant Discharge Elimination System |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| PHS | Priority Habitat and Species |
| P/OS | Parks and Open Space (zoning district) |
| PF | Public Facilities (zoning district) |
| PHS | priority habitats and species |

# ACRONYMS AND INITIALIZATIONS

| | |
|---|---|
| ppm | Parts per million |
| R-4 | Low-Density Residential (2.3 to 4.4 units/net acre) (zoning district) |
| R-6 | Low-Density Residential (4.5 to 5.8 units/net acre) (zoning district) |
| R-9 | Low-Density Residential (5.9 to 8.7 units/net acre) (zoning district) |
| RCW | Revised Code of Washington |
| RMA | riparian management areas |
| RTC | Regional Transportation Council |
| RTP | Regional Transportation Plan |
| SDWA | Safe Drinking Water Act |
| SEPA | State Environmental Policy Act |
| SIP | state implementation plans |
| SPA | special protection areas |
| SWCAA | Southwest Clean Air Agency |
| TAC | technical advisory committee |
| TDM | transportation demand management |
| UH | Urban High Density Residential (zoning district) |
| UL | Urban Low Density Residential (zoning district) |
| USDA-NRCS | U.S. Department of Agriculture Natural Resources Conservation Service |
| USFWS | U.S. Fish and Wildlife Service |
| USGCRP | U.S. Global Change Research Program |
| v/c | volume-demand-to-capacity ratio |
| VBLM | Vacant Buildable Land Model |
| VFD | Vancouver Fire Department |
| VHA | Vancouver Housing Authority |
| VMC | Vancouver Municipal Code |
| VMT | vehicle miles traveled |
| VPD | Vancouver Police Department |
| VPRD | Vancouver Parks and Recreation Department |
| VPS | Vancouver Public Schools |
| WAC | Washington Administrative Code |
| WDFW | Washington Department of Fish and Wildlife |
| WHR | Washington Heritage Register |
| WISAARD | Washington Information System for Architectural and Archaeological Records Data |
| WNHP | Washington Natural Heritage Program |
| WSDOT | Washington Department of Transportation |

CHAPTER 1

# SUMMARY



CITY OF Vancouver WASHINGTON

# Introduction

The City of Vancouver (City) proposes to adopt a subarea plan for the Heights District, an approximately 205-acre area in central Vancouver (see Figure 1). Development here began during World War II, and over time, a mature, treed neighborhood with few vacant lots has developed in what locals refer to as the Heights. Most of the land in the Heights is developed for single-family residential use, but there are some higher density uses. The main commercial uses are scattered along Mill Plain Boulevard, with small commercial pockets along Andresen Road, MacArthur Boulevard, and St. Helens Avenue. Large trees are characteristic of the residential streets and of the center islands in some arterials.

The Heights District is generally bounded by MacArthur Boulevard to the south and west, Mill Plain Boulevard to the north, and Andresen Road to the east. The plan envisions a vibrant, mixed-use urban neighborhood that provides a range of housing choices, accessible open spaces, and an integrated multimodal transportation system[1].

The Heights District Plan (plan) was conceived by the City to identify a long-range land use and transportation vision for the Heights District and catalyze revitalization and investment in central Vancouver. The plan includes the 63-acre Tower Mall Redevelopment Area (Redevelopment Area) that encompasses the former Tower Mall on a 12-acre site acquired by the City in 2018. The Tower Mall Redevelopment Area is the focus of most of the redevelopment proposed in the plan.

## Planning Process

The City's comprehensive plan, *Vancouver Comprehensive Plan 2011-2030* (Comprehensive Plan), identifies centers and corridors throughout the city where subarea planning has occurred or is planned. These areas are expected to contain a mixture of employment, housing, and cultural opportunities with the type and intensity of development dependent on the surrounding context. The Comprehensive Plan identified the area included in the Heights District Plan as the MacArthur/Mill Plain Center, and the Heights District Plan was prepared to fulfill the subarea planning goal identified in the Comprehensive Plan.

The development of the Heights District Plan included extensive community and stakeholder outreach over an approximately 2-year period. The initial outreach process established a vision and guiding principles which provided the framework for plan development. The visioning process was guided by a technical advisory committee (TAC) composed of representatives of City departments, and a community advisory committee (CAC) composed of representatives of public and nonprofit agencies and the surrounding neighborhoods and owners of local businesses who provided insights throughout the project. In addition to the two committees, the project included one-on-one interviews and focus groups that included owners of local businesses and properties, tenants, and representatives of places of worship, social service agencies, neighborhood associations, and developers.

[1] A multimodal transportation system accommodates several modes of transportation, such as motor vehicle, bicycle, pedestrian, and public transit.

# Summary

Outreach also included three community open houses and online surveys. The results of the visioning process, and an existing conditions analysis, were captured in the Heights District Plan Visioning and Analysis Summary (Appendix A).

For the Tower Mall Redevelopment Area, three concept plans were prepared and refined through the public and stakeholder engagement process described above. The concepts included the Promenade, the Loop, and the Grand Park (see Figure 2).

The Promenade concept provided a central civic space with an east-west orientation of buildings to optimize for solar gain. The Loop concept provided a pedestrian-focused greenway through the Redevelopment Area to link adjacent open spaces and provide connections to the surrounding neighborhoods. The Grand Park concept created a signature park through the center of the Redevelopment Area and concentrated density along Mill Plain Boulevard (see Figure 2).

*Figure 1. Vicinity Map*


The review of the concept plans through community and stakeholder engagement led to the development of a preferred redevelopment concept plan that is a hybrid of the original concepts and forms the basis for redevelopment within the area.

The final step in the plan development process was the preparation of an implementation strategy and phasing approach which outline the actions necessary to implement the plan. The final results of the planning process were captured in the Heights District Plan, which will be adopted as a subarea plan. Following subarea plan adoption, the City will prepare implementing regulations and development standards to be codified in the Vancouver Municipal Code (VMC) and a planned action ordinance to establish mitigation measures and conditions for future projects within the Heights District to qualify as planned actions.

*Figure 2. Concept Plans*


Concept 1: Promenade


Concept 2: The Loop


Concept 3: Grand Park

## Environmental Review Process

The State Environmental Policy Act (SEPA) requires all state agencies and local governments in Washington to consider impacts to environmental resources in decision making. The SEPA review process is intended to provide information to agencies and the public through the identification and evaluation of environmental impacts and the development of mitigation measures to reduce adverse environmental impacts.

The Heights District Plan Planned Action EIS (EIS) analyzes the potential environmental impacts resulting from the adoption of the Heights District Plan. The City, as the SEPA lead agency, determined that the subarea plan would be considered a planned action per RCW 43.21C.440 and, therefore, under RCW 43.21C.030 (2)(c), would require an EIS.

Per the requirements of WAC 197-11-360, the City published and issued a determination of significance (DS) and scoping notice on 1 October 2018. The scoping notice preliminarily identified the following elements of the environment for discussion in the EIS.

⇒ **Land Use**

⇒ **Transportation**

⇒ **Public Services and Utilities**

⇒ **Air**

⇒ **Groundwater**

⇒ **Plants and Animals**

During the scoping period, comments about the scope of the EIS were received at the second project open house on 6 October 2018, and afterward via mail and electronic mail. During the scoping comment period, which expired on 9 November 2018, 19 comments were received. They focused on concerns related to transportation, land use (including historic and cultural resources), public services, air, water, and plants and animals. The comments were consistent with the elements that had been preliminarily identified for study in the DS and scoping notice. Appendix B is a summary of the scoping comments.

Based on the scoping process, a DEIS was prepared that analyzed the environmental impacts on land use, transportation, public services and utilities, air, water(including groundwater), and plants and animals that could occur as a result of the following actions:

- **Adoption of City Comprehensive Plan amendments, including the incorporation of the Heights District Plan by reference.**
- **Adoption of amendments to VMC Title 20, Land Use and Development Code, including uses within zoning categories and development of a new zone and plan district.**
- **Adoption of design standards and guidelines for the Heights District.**
- **Adoption of zoning map amendments, including property rezones.**
- **Adoption of an ordinance designating the Heights District Plan as a planned action for purposes of future permit review and SEPA compliance.**
- **Future development undertaken consistent with the Heights District Plan.**

The DEIS was issued for public comment on January 22, 2020. The comment period closed on May 20, 2020. This FEIS includes the public and agency comments received, responses to all substantive comments, and text revisions to address comments where necessary.

## Final EIS Format

The FEIS includes five chapters.

- **Chapter 1: Summary presents a synopsis of the technical information in Chapters 2 and 3.**
- **Chapter 2: Alternatives details the three alternatives evaluated in the EIS.**
- **Chapter 3: Affected Environment, Significant Impacts, Mitigation Measures, and Unavoidable Impacts includes sections for each element of the environment evaluated in the EIS. Each section in Chapter 3 describes existing conditions, impacts associated with each alternative, mitigation measures for the Project Alternative, and identifies any significant unavoidable adverse impacts.**
- **Chapter 4: Draft EIS Comments and Responses includes all comments submitted on the DEIS and responses to all substantive comments.**
- **Chapter 5: References is a list of references used in the analysis and preparation of the EIS. In-text citations are used throughout the EIS to correspond to the reference list in Chapter 5.**

Changes from the DEIS to the FEIS that were made to address comments and/or reflect new information obtained by the City are shown in Chapters 2 and 3 with new text identified in underline and deleted text in ~~strikethrough~~ format. Edits to figures are identified with a red X through the original figure with the new figure immediately following. Minor revisions, such as spelling errors and typos are not in underline and strikethrough format. Revisions to Chapter 1, Summary, are also not in underline and strikethrough format for document readability and because it is a summary chapter.

## Planned Action

The City is proposing that future development within the Heights District be designated a planned action as defined under WAC 197-11-164. Future projects developing under the planned action will not require individual environmental review at the time of permit application if they are consistent with the range of alternatives and mitigation studied in this EIS. Cities and counties planning under the Growth Management Act (GMA) are given the authority to designate planned actions per RCW 43.21C.440. Planned actions, defined under RCW 43.21C.440 and WAC 197-11-164, are projects that:

- **Are designated planned actions by an adopted ordinance or resolution.**
- **Whose significant environmental impacts have been adequately addressed in an EIS prepared in conjunction with a comprehensive plan or subarea plan adopted under RCW 36.70A, or a master planned development or a phased project.**
- **Are subsequent to or are implementing projects for the plans listed above.**
- **Are located within an urban growth area, as defined in RCW 36.70A.030.**
- **Are not essential public facilities, as defined in RCW 36.70A.200.**
- **Are consistent with a comprehensive plan adopted under RCW 36.70A.**

To be designated a planned action, a future project within the Heights District Plan area will require review under VMC Section 20.790.530, Planned Action Review.

# Summary of Environmental Impacts, Mitigation, and Significant Unavoidable Adverse Impacts

This section contains a summary of the impacts and mitigation measures detailed in Chapter 3. As the Project Alternative is the only alternative requiring specific actions by the City, mitigation measures are only provided for the Project Alternative.

*Table 1. Summary of Impacts*

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Land Use** | | | |
| **No Action Base** | • An increase of 192 residential units and approximately 7,200 square feet of commercial development, which equate to approximately 478 more people and 19 new jobs in the Heights District.<br>• Inconsistent with Comprehensive Plan policies directing growth to urban centers and corridors. | NA | None |
| **No Action High** | • An increase of approximately 1,650 residential units and 62,000 square feet of commercial development, which would equate to approximately 4,113 more people and 161 new jobs.<br>• Inconsistent with Comprehensive Plan policies directing growth to urban centers and corridors<br>• Intensification of existing land use pattern<br>• Displacement of existing uses through redevelopment | NA | None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Project Alternative** | • At full buildout the Project Alternative would add 1800 residential units (4,482 people), 490-510 new jobs, 36,000 SF of institutional space, and 6.1 acres of parks and open spaces. Existing commercial space would be redeveloped, but an increase in commercial square footage is not anticipated.<br>• Intensification of existing land use pattern<br>• Displacement of existing uses through redevelopment<br>• Comprehensive plan map amendments resulting in conversion of 27 acres to commercial from residential, public facility, and open space designations<br>• Rezoning of approximately 70 acres to a new HX zone<br>• Uses within some existing buildings would become legal, non-conforming uses following the rezoning of properties | Mitigation Measures Designed into the Project<br>• Adoption and adherence to the standards included in a new HX zone and Heights Plan District to implement the Heights District Plan, including standards to address building height adjacent to residential zones.<br>• Adoption and adherence to the Heights District design standards and guidelines, which include standards to address building scale and mass, landscaping, lighting, and infrastructure design.<br>• Adherence to parking standards for the Heights Plan District and included within VMC 20.945, Parking and Loading.<br>Existing Regulations and Other Mitigation<br>• Legal non-conforming uses created by the adoption and implementation of the Heights District Plan are regulated under VMC 20.930, Nonconforming Situations.<br>• Adherence to the standards and provisions included in VMC 20.935, Off-Site Impacts. | None |
| **Aesthetics, Light and Glare** | | | |
| **No Action Alternatives (Base and High)** | • Retention of existing surface parking lots with little landscaping could result in light and glare impacts from on-site and off-site vehicles | NA | None |
| **Project Alternative** | • An increase in the density of man-made structures will change the visual character of the area<br>• An increase in light sources from buildings, streets, and pathway lighting | Mitigation Measures Designed into the Project<br>• Adoption and enforcement of the Heights District urban design standards and guidelines, including requirements for lighting that will provide a safe and comfortable environment and limit light pollution<br>• Incorporation of parking lot, street, and pathway landscaping will reduce light and glare impacts from vehicles | None |
| **Historic and Cultural Resources** | | | |
| **No Action Alternatives (Base and High)** | • No impacts anticipated given the level of prior disturbance | • NA | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Project Alternative** | • Potential impacts to archaeological resources could occur as a result of site disturbance on parcels not previously studied<br>• Redevelopment could impact the Vancouver Heights United Methodist Church, which was identified as potentially eligible for listing on the NRHP | Mitigation Measures Designed into the Project<br>• No specific measures are identified in the Project Alternative<br>Existing Regulations and Other Mitigation<br>• All development will be required to demonstrate consistency with VMC 17.39 and 20.710, as well as state requirements for the preservation of archaeological and historic resources<br>• Any future development that involves federal funding or permitting or state funding would require a cultural resource survey for archaeological and historic resources to comply with the NHPA and/or GEO 05-05<br>• The Archaeological and Historic Resources Report identified four resources within the Heights District as possibly eligible for listing in the NRHP. These include Park Hill Cemetery, Vancouver Heights United Methodist Church, McLoughlin Middle School, and George C. Marshall Elementary School. McLoughlin Middle School is scheduled for demolition and no additional work is recommended. Additional research is recommended for the other three resources to evaluate their historical significance and NRHP eligibility.<br>• Development on the four City-owned parcels (Tower Mall parcel, Water Station No. 5, Fire Station No. 3, or Vanco Golf Range) should follow the recommendations detailed in the mitigation measures included in the Historic and Cultural Resource section of Chapter 3. | |
| **Transportation** | | | |
| No Build Alternative (includes No Action Base and High, see the Transportation section for details) | • MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection operating over capacity (v/c ration > 1.2) and at LOS F in both the AM and PM peak hours<br>• Would not further the City's Complete Streets Policy<br>• Lack of pedestrian and ADA access and connectivity improvements | • NA | • None |
| Project Alternative | • Improved conditions at the MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection over the No Build Alternative<br>• E Mill Plain Boulevard and Garrison Road intersection is operating over capacity (v/c ratio of 1.14) in the PM peak, due to the low volume side street approach.<br>• N Andresen Road and NE 18th Street intersection operating over capacity in the AM peak (v/c ratio of 1.10) due to the northbound left-turn movement<br>• Improved transit access over the No Build Alternative<br>• Improved bicycle and pedestrian connectivity over the No Build Alternative<br>• Approximately 2,113 parking spaces are needed to support the proposed development based on current code standards | Mitigation Measures Designed into the Project<br>Motor Vehicle<br>• Convert existing stop-controlled intersections on MacArthur Boulevard at N Andresen Road and N Devine Road to single lane roundabouts.<br>• Convert existing stop-controlled intersection on MacArthur Boulevard/St Helens Avenue at N Lieser Road to a signalized intersection.<br>• Reduce N Andresen Road to one travel lane in each direction from just south of the Mill Plain Boulevard intersection to Highland Drive with protected bike facilities.<br>• Signal timing optimization along the E Mill Plain Boulevard corridor and at the N Andresen Road at NE 18th Street intersection. Signal timing optimization includes 110 second cycle length for the AM peak and a 120 second cycle length for the PM peak (or half cycle lengths), as well as adjustments to splits, offsets, and lead/lag phasing for protected left turns. | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| | | Transit<br>• Coordinate with C-TRAN to ensure sidewalk and crosswalk improvements provide safe and convenient access with future BRT stations on Mill Plain Boulevard, preliminarily planned near the intersections with Devine Road and Andresen Road.<br>• Ensure sidewalk widths near and adjacent to planned BRT stations are sufficient to accommodate platforms, station amenities, and pedestrian through travel.<br>• Where possible, align additional crosswalks with bus stops to improve pedestrian access to and from stops.<br>• Ensure ADA-compliant access to bus stops and stations throughout the Heights District.<br>Bicycle and Pedestrian<br>• Mill Plain Boulevard: Install buffered bike lanes and continuous sidewalks with street trees, pedestrian lighting, and site furnishings.<br>• MacArthur Boulevard: Install two-way protected bike facility and greenbelt with multiuse trail, lighting, and enhanced landscaping on the south side.<br>• Devine Road: Install two-way protected bike facility on the west side of Devine Road through the Redevelopment Area.<br>• Install buffered bike lanes on N Andresen Road between MacArthur Boulevard and Mill Plain Boulevard.<br>• Improve crosswalks along major arterials and add crosswalks and ADA curb ramps at key points within the Heights District.<br>• Provide landscaped pedestrian walkways and safe crosswalks to BRT stops and where feasible, weather protection.<br>• Increase access to Park Hill Cemetery and add pedestrian circulation improvements to create a more connected walkway network. Potential walkway connections include to Heights Shopping Center, Skyline Crest Apartments, Burdick Avenue/ Marshall Elementary School, Northcrest Community Church, and People's Church. Future connections would be identified in individual redevelopment projects.<br>• Improved crossings on Kansas Street at Andresen Road and Idaho Street at Devine Road, which will improve connections between neighborhoods and MLK Elementary.<br>• Improved safety and connectivity on Blandford Drive, which could include on or off-street bicycle facilities to connect the Heights District to the Lower Grand Employment Area, neighborhoods to the south, and the Columbia River.<br>• Improved bicycle facilities on Devine Road north of Mill Plain to connect the Heights District to existing bike facilities (including Burnt Bridge Creek Trail and Evergreen Boulevard).<br>• Improve existing pedestrian walkways connecting adjacent neighborhoods with the Heights District, add ADA curb ramps where missing, and increase visibility of walkways through wayfinding signage and landscape maintenance.<br>Parking<br>• The City will develop a Heights District shared use parking plan and require businesses within the Heights District to implement TDM techniques. | |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| | | Existing Regulations and Other Mitigation<br>Traffic<br>• Compliance with VMC 11.70.060, Transportation Concurrency, is required, including the submittal of trip generation reports for future projects.<br>• Payment of traffic impact fees in accordance with VMC 20.915.040<br>• Protected/permitted left turns (flashing yellow arrow) at the E Mill Plain Boulevard and Garrison Road and N Andresen Road and NE 18th Street intersections<br>Parking<br>• The City will actively manage the on-street parking system within the Heights District through time limits, metering, or other measures to ensure sufficient parking for visitors and guests.<br>• The City will monitor parking demand as development occurs within the Heights District to determine if there is spillover parking into adjacent residential neighborhoods. If it is determined that spillover parking is occurring, then additional measures would be introduced to reduce or eliminate spillover parking. Measures could include but are not limited to residential permit parking or time limits for on-street parking in affected areas. | |
| **Climate Change and Greenhouse Gas Emissions** | | | |
| **No Action Base** | • Net increase in GHG emissions of 2,678 MTCO2e per year<br>• Inconsistent with Comprehensive Plan goals and the state's campaign to reduce GHG emissions | • NA | • There is no standard significance threshold for GHG emissions in the SEPA rules (WAC 197-11-330). Scientific research and analysis tools sufficient to determine the climate change effects of GHG emissions at a local scale are not yet available and any conclusions would be speculative. While any level of GHG emissions contributes to climate change, the impact occurs |
| **No Action High** | • Net increase in GHG emissions of 21,777 MTCO2e per year<br>• Inconsistent with Comprehensive Plan goals and the state's campaign to reduce GHG emissions | • NA | |
| **Project Alternative** | • Net increase in GHG emissions of 24,006 MTCO2e per year<br>• Lowest annual emissions per capita and per job compared to the other alternatives<br>• Consistent with Comprehensive Plan goals and policies<br>• Consistent with state goals to reduce VMT | Mitigation Measures Designed into the Project<br>• Implementation of strategies to reduce GHG emissions from energy use such as: daylighting and green roofs, retaining mature trees and planting new trees to provide carbon sequestration, air purification, and cooling, and generating power on site (e.g., solar panels).<br>• Implementation of strategies to reduce VMT, such as increasing access to multi-modal transit options including improved access to BRT service and bicycle and pedestrian infrastructure improvements.<br>• Implementation of LID and LEED standards (or equivalent)<br>• The City will establish a Heights-specific TDM program to encourage developers to provide TDM strategies such as subsidized transit passes, bike parking, and shared use vehicles on site.<br>• Implementation of Heights District Plan policies L-1, L-3, L-6, C-3, C-5, S-2, S-4, S-6, S-8 (see the Climate Change and Greenhouse Gas Emissions section for policy text)<br>Existing Regulations and Other Mitigation<br>• Compliance with state energy code<br>• Compliance with Evergreen Sustainability Development Standard for affordable housing | |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| | | • Continued implementation of existing City initiatives and codes: CTR program, energy efficiency standards (VMC 17.09), landscaping (VMC 20.925), and tree, vegetation, and soil conservation standards (VMC 20.770) | only within the context of past and present emissions. |
| **Public Services and Utilities** | | | |
| **Fire and Emergency Medical Services** | | | |
| **No Action Base** | • Increased service calls for construction inspections and response to potential construction-related accidents | • NA | • None |
| **No Action High** | • Increased service calls for construction inspections and response to potential construction-related accidents<br>• Increase in population and employment may result in an increase in call volume | • NA | • None |
| **Project Alternative** | • Increased service calls for construction inspections and response to potential construction-related accidents<br>• Increase in population and employment may result in an increase in call volume<br>• Adoption of the subarea plan and coordinated planning efforts by the City could result in redevelopment at a pace that outpaces the growth of the VFD | Mitigation Measures Designed into the Project<br>• The Heights District Plan promotes compact growth and development within an existing urban framework, which could reduce growth in outlying areas of the City. This compact form of development close to existing VFD services could result in more efficient service delivery.<br>Existing Regulations and Other Mitigation<br>• Increases in population and employment resulting from the Heights District Plan will be reviewed annually as part of the VFD's annual performance evaluation. Any required staffing or equipment needs would be planned through the Department's capital facilities planning to offset potential impacts to fire and emergency service delivery, including response time.<br>• All new buildings constructed under the Heights District Plan would be constructed in compliance with the most current version of the International Fire Code, as adopted by the City under VMC 16.04. Most buildings, because of the size and type of construction, would include automatic fire sprinklers which reduce the size, spread, and severity of fires but do not negate the need for an emergency response or reduce the need for other types of emergency response. Adequate fire flow to serve new developments, emergency access standards, and required spacing standards for fire hydrants would be as required by the City's specific code requirements.<br>• Redevelopment of the Heights District Plan area will result in additional tax revenues, including construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VFD which would help offset the increase in demand for fire and emergency services.<br>• Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on site and coordination with the VFD to maintain proper emergency access during construction. | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Police** | | | |
| **No Action Base** | • Increase in demand for police services during construction, such as calls for service for construction vandalism or theft. | • NA | • None |
| **No Action High** | • Increase in demand for police services during construction, such as calls for service for construction vandalism or theft.<br>• Increase in call volume resulting from an increase in population and employment | • NA | • None |
| **Project Alternative** | • Increase in demand for police services during construction, such as calls for service for construction vandalism or theft.<br>• Increase in call volume resulting from an increase in population and employment.<br>• Adoption of the subarea plan and coordinated planning efforts by the City could result in redevelopment at a pace that outpaces the growth of the VPD.<br>• Safety may be improved in the Heights District over time as a result of a more consistent and increased level of activity in the area. | Mitigation Measures Designed into the Project<br>• The Heights District Plan promotes compact growth and development within an existing urban framework, which could reduce growth in outlying areas of the City. This compact form of development could result in a more efficient police service delivery.<br>• CPTED measures, such as orienting buildings towards the street and public spaces, providing public connections between buildings, and providing adequate lighting and visibility, will be used to help reduce criminal activity and calls for service.<br>Existing Regulations and Other Mitigation<br>• Upon full implementation of the 2017 funding package, the VPD will add 42 commissioned officers and 19 civilian staff. In addition to these increases, the VPD analyzes staffing, equipment, and facility needs through the City's strategic planning and biennial budgeting processes. Increases in employees and residents over the buildout period of the Heights District, as well as general growth in the City, would be assessed as part of this process and additional resources added as needed to offset impacts to police services.<br>• Redevelopment of the Heights District Plan area would result in additional tax revenues from construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VPD to help offset the increase in demand for police services.<br>• Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on the site and coordination with the VPD to maintain proper police access during construction. | • None |
| **Schools** | | | |
| **No Action Base** | • Potential increase in travel time for students and limited access to school sites due to construction-related road closures and traffic delays.<br>• Increase of approximately 47 students at full buildout. | • NA | • None |
| **No Action High** | • Potential increase in travel time for students and limited access to school sites due to construction-related road closures and traffic delays.<br>• Increase of approximately 404 students at full buildout. | • NA | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Project Alternative** | • Potential increase in travel time for students and limited access to school sites due to construction-related road closures and traffic delays.<br>• Increase of approximately 440 students at full buildout.<br>• Potential benefits to schools could result from the connectivity and safety improvements for all modes of travel and users included in the Heights District Plan. | Mitigation Measures Designed into the Project<br>• Connectivity and walkability improvements within an existing urban framework would improve access and safety for students attending schools within the Heights District.<br>Existing Regulations and Other Mitigation<br>• Increases in the student population resulting from the Heights District Plan will be reviewed annually. Additional capacity needs would be planned through VPS's capital facilities planning to ensure an adequate LOS at VPS facilities.<br>• New residential development in the Heights District would be required to pay school impact fees per unit in accordance with VMC Chapter 20.915.060 to help offset additional demand for services in the Heights District.<br>• Redevelopment of the Heights District Plan area will result in additional tax revenues, including construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VPS.<br>• Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on the site and coordination with the VPS. | • None |
| **Water Service** | | | |
| **No Action Base** | • Potential water pressure drops<br>• Peak hour water demand of 2,100 gpm | • NA | • None |
| **No Action High** | • Potential water pressure drops<br>• Peak hour water demand of 3,120 gpm | • NA | • None |
| **Project Alternative** | • Potential water pressure drops<br>• Peak hour water demand of 3,298 gpm (50 percent increase over existing conditions) | Mitigation Measures Designed into the Project<br>• The Heights District Plan encourages the development of buildings and infrastructure that exceed sustainability benchmarks required to achieve Leadership in Energy and Environmental Design (LEED) standards. All new publicly financed buildings are required to meet or exceed LEED Gold Certification. These sustainability standards will support water conservation and reduce the impacts to water demand.<br>Existing Regulations and Other Mitigation<br>• New water service connections will require payment of connection fees and system development charges to mitigate for development impacts to source, supply, and storage capacities.<br>• New development would be required to meet Department of Health and City municipal codes that would, at a minimum, maintain existing system performance.<br>• The City uses a hydraulic network model to evaluate capacity and make a determination of water availability. If there is a gap between what the existing system can provide and what a development needs, the developer is required to upgrade the existing system to meet demand. Upgrades may include replacing existing water mains when the existing system does not have sufficient fire flow capacity and/or the water mains are not sufficiently sized for the domestic and/or fire services needed for the development. Minimum 12-inch water mains and 8-inch on-site water lines would be required to support future development in the Heights District. Developers may also be required to install fire | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| | | hydrants. New development and redevelopment is required by the plumbing code to include efficient plumbing fixtures. This requirement would reduce the overall impact to water demand resulting from the Project Alternative.<br>• The following improvements are identified in the City's water system plan to address pressure deficiencies and balance system pressures regardless of development of the Heights District.<br>• Replace the transmission line in Blandford Drive with a new 30-inch-diameter transmission main.<br>• A new transmission line (T-27) paralleling Mill Plain to the north connecting Water Station No. 5 to 87th Avenue. | |
| **Sewer Service** | | | |
| **No Action Base** | • Peak hour sanitary demand of 1,750 gpm | • NA | • None |
| **No Action High** | • Peak hour sanitary demand of 2,600 gpm | • NA | • None |
| **Project Alternative** | • Peak hour sanitary demand of 2,748 gpm | Mitigation Measures Designed into the Project<br>• Implementation of greywater systems to collect gently-used water from bathroom sinks, showers, tubs, and washing machines for reuse as water for laundry and toilet flushing, as well as outdoor irrigation.<br>• Replacement of the 10-inch sewer in Devine Road with an 18-inch pipe to convey increased flow from the Heights District. This improvement is not identified within the City's General Sewer Plan, but is required due to increased flows resulting from development density.<br>Existing Regulations and Other Mitigation<br>• Adherence to City sewer codes<br>• Updates to the Capital Improvement Plan to include all improvements required for sewer service.<br>• Rehabilitation and structural strengthening (such as a cured-in place liner) of the existing trunk sewer located south across Mill Plain Blvd on the west end of the Redevelopment Area near the intersection of MacArthur Blvd and Mill Plain Blvd on parcel 37910109. The sewer was previously deeded to the City, but an easement will be required in conjunction with future development.<br>• Planned capacity expansion at the Marine Park Reclamation Facility. | • None |
| **Franchise Utilities** | | | |
| **All Alternatives** | • Future development under any of the studied alternatives would increase the demand on franchise utilities and project-specific improvements may be required. However, the existing utility infrastructure is sufficient to support future development and no significant capital improvements are anticipated. | Mitigation Measures Designed into the Project<br>• No specific measures are identified in the Project Alternative.<br>Existing Regulations and Other Mitigation<br>• Future development will be required to pay system development charges or installation fees for new electrical service. Additionally, the undergrounding of existing overhead power lines may be required for development proposals within the Heights District. | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Parks and Recreation** | | | |
| **No Action Base** | • The existing deficit of community park space would increase by approximately 1.4 acres. | • NA | • None |
| **No Action High** | • The existing deficit of community park space would increase by approximately 34.8 acres.<br>• A deficit of 3.6 acres of neighborhood park space | • NA | • None |
| **Project Alternative** | • The existing deficit of community park space within the Heights District service area would increase by approximately 36 acres. | Mitigation Measures Designed into the Project<br>• Development of a 1-acre civic park in the center of the Redevelopment Area that supports surrounding commercial and retail uses.<br>• Development of an approximately 1.5-acre neighborhood park spanning both sides of Devine Road.<br>• Development of a series of small pocket parks to support age-appropriate play areas, integrated into the residential areas of the Heights District.<br>• Development of the MacArthur Greenbelt as a corridor greenspace offering passive open space along the redesigned MacArthur Boulevard.<br>• Development of passive recreation and pedestrian amenities along different segments of The Loop throughout the Redevelopment Area.<br>• Development of enhanced connectivity to and from the Park Hill Cemetery and ongoing maintenance of the cemetery road network as open, public pathways for light recreation.<br>Existing Regulations and Other Mitigation<br>• Payment of park impact fees in accordance with VMC 20.915.050<br>• City pursuit of the following activities:<br>– Pursue the acquisition of additional parks and recreation lands when available.<br>– Redevelop David Douglas and Bagley Parks for community park amenities.<br>– Potential alternative park standards within the project boundaries to accommodate a more intense urban form and allow for smaller parks with a higher development standard.<br>– VPRD should continue to work closely with the City's Transportation Department to plan and create user-friendly pedestrian and bicycle systems and promote healthy lifestyle choices. | • None |
| **Air** | | | |
| **All Alternatives** | • Impacts to air quality would occur under any of the alternatives as the result of construction emissions (e.g., emissions associated with construction vehicles, equipment, and activities) or under operation. The demolition of existing structures would require the removal and disposal of building materials that could possibly contain asbestos and lead-based paint. While no large industrial or commercial uses are anticipated under any of the alternatives, each alternative would see an increase in vehicle emissions associated with increased traffic. | Mitigation Measures Designed into the Project<br>• Implementation of Heights District Plan policies L-1, L-3, L-6, C-3, C-5, S-4, S-6, (see the Air section for policy text)<br>Existing Regulations and Other Mitigation<br>• Adherence to existing regulations for regional air pollution control as incorporated into the SWCAA permitting program.<br>• Implementation of required BMPs to reduce emissions related to construction. | • None |

| Element of the Environment | Potential Impacts | Mitigation Measures | Unavoidable Adverse Impacts |
|---|---|---|---|
| **Water** | | | |
| **All Alternatives** | • Under any of the alternatives, stormwater infiltration from development of the plan area could increase interflow and groundwater base flows, and has the potential to pollute groundwater. Groundwater can be impacted during standard construction activities, such as excavation, grading, and placement of foundations. Contaminated soil and/or groundwater may be encountered during excavation when properties in the study area are redeveloped under any of the alternatives. One site within the subarea is listed on Ecology's Confirmed and Suspected Contaminated Sites List, while two others were previously listed but have received a No Further Action decision from Ecology (Ecology 2019). | Mitigation Measures Designed into the Project<br>• Development of the proposed MacArthur Greenbelt would provide a continuous stormwater feature.<br>• Implementation of low-water use landscapes and bioswales in civic spaces, parks, open spaces, and streets<br>• Implementation of Heights District Plan policies S-4, S-5, S-11 (see the Water section for policy text)<br>Existing Regulations and Other Mitigation<br>• Implementation of stormwater and erosion control BMPs<br>• Adherence to stormwater capture and conveyance requirements included in VMC 14.25 and 14.26.<br>• Additional site investigations to determine the potential for contamination to be present on the property.<br>• Additional site investigations of soil and groundwater to evaluate the type, concentration, and extent of contamination, if present.<br>• Cleanup of contamination sources (e.g. removal of underground storage tanks, excavation of contaminated soil) in accordance with Ecology's current guidelines and regulations.<br>• Handling and disposing of contaminated soil and groundwater according to local and state regulations. | • None |
| **Plants and Animals** | | | |
| **All Alternatives** | • No priority plant or animal species are known or likely to occur in the Heights District and therefore, no impacts are anticipated.<br>• There are no known heritage trees in the Heights District. If any are added to the inventory they will be protected per VMC 20.770.120. The Project Alternative is striving to incorporate and protect healthy mature trees. | Mitigation Measures Designed into the Project<br>While no impacts are anticipated and no mitigation is required, the following measures designed into the Project Alternative would have the potential to have a positive impact on priority species outside of the Heights District.<br>• Limit impervious surfacing<br>• Increase green infrastructure and reduce stormwater runoff<br>• Add new parks, open space, and community gardens<br>• Use native and adaptive plant species<br>Existing Regulations and Other Mitigation<br>• Protect and enhance urban tree canopy in accordance with VMC 20.770 | • None |

**Table Acronyms**

ADA = Americans with Disabilities Act
BRT = bus rapid transit
CPTED = crime prevention through environmental design
CTR = Commute Trip Reduction
GEO = Governor's Executive Order
GHG = greenhouse gas
gpm = gallons per minute
HX = The Heights zoning district
LEED = Leadership in Energy and Environmental Design
LID = low impact development
LOS = level of service
MTCO2e = metric tons of carbon dioxide
NA = Not applicable
NHPA = National Historic Preservation Act of 1966
NRHP = National Register of Historic Places
SEPA = State Environmental Policy Act
SWCAA = Southwest Clean Air Agency
TDM = transportation demand management
VFD = Vancouver Fire Department
VMC = Vancouver Municipal Code
VMT = Vehicle miles travelled
VPD = Vancouver Police Department
VPRD = Vancouver Parks and Recreation Department
VPS = Vancouver Public Schools
WAC = Washington Administrative Code

## Summary of Cumulative Impacts

The City's development review map (available at https://www.cityofvancouver.us/projects) was used to identify projects in review, approved, and under construction within approximately a 1/2 mile of the Heights District. A 1/2 mile radius is the area in which other development is proximate enough to the Heights District that potential impacts to traffic, utilities, visual character, and other environmental resources, could overlap. Projects were reviewed to determine whether they had the potential to contribute to cumulative impacts when potential impacts from the proposed action are combined with other nearby development. Proposals considered are identified in Table 2.

*Table 2. Development within 1/2 mile of the Heights District*

| Proposal | Project Status | Location |
|---|---|---|
| Creekside Plaza (two 12,000 SF light industrial buildings) | In Review | South of NE 18th St. and west of Andresen Rd. (parcel 29472014) |
| Garrison Development Townhomes (nine single-family lots with attached townhomes) | In Review | 915 N. Garrison Rd. |
| Homan Short Subdivision (subdivide two existing parcels into 8 single-family lots) | In Review | 807 SE Morgan Rd. |
| Liu Business Park (two light industrial buildings – 16,500 SF and 4,400 SF) | In Review | South of NE 18th St. and east of Devine Rd. (parcel 29400000) |
| Martin Luther King Jr. Elementary School (demolish and rebuild a 68,000 SF elementary school) | Under Construction | 4801 Idaho St. |
| McLoughlin Middle and Marshall Elementary Schools (replacement of existing schools with a new combined school) | Construction Completed in June 2020 | 5802 MacArthur Blvd. |
| Sunset Terrace (11 single-family lots) | In Review | 7016 SE Middle Way |
| Thunderbird Apartments (two apartment buildings with a total of 12 units) | In Review | 4601 E. 18th St. |
| Vancouver Housing Authority Bridgeview Education and Employment Resource Center (BEERC) (8,400 SF human services facility) | In Review | 500 Omaha Way |

Source: City 2019.

The projects in review and under construction or recently constructed within the Heights District (Martin Luther King Elementary School, McLoughlin Middle School, Marshall Elementary School, and the BEERC are assumed to be complete at full buildout of the plan and are part of the baseline environmental conditions within the Heights District.

The remaining projects included in Table 2 are either exempt from SEPA or will require individual SEPA review to assess potential impacts and provide recommended mitigation. Given the scale and number of development proposals within the project vicinity the proposed action together with other planned development is not anticipated to result in impacts different or greater than those otherwise identified in the effects analysis.

CHAPTER 2

# ALTERNATIVES



CITY OF Vancouver WASHINGTON

# Alternatives

The planned action EIS assesses the potential impacts associated with three alternatives. They are:

- **No Action Base Alternative, which assumes that neither the actions described in the Planning Process section nor any coordinated redevelopment in the area occur. Development and growth would occur consistent with existing policy and regulatory documents, including the City's Comprehensive Plan and its land use and development code.**
- **No Action High Alternative, which is the same as the No-Action Base Alternative, except that 50 percent of the land within the Tower Mall Redevelopment Area redevelops and growth occurs consistent with existing policy and regulatory documents, including the City's Comprehensive Plan and its land use and development code.**
- **Project Alternative, which assumes adoption of the Heights District Plan and implementing code amendments that result in growth consistent with the vision established in the plan.**

Table 3 summarizes the development totals proposed under each alternative and the sections that follow include further descriptions. The methodology and assumptions used to determine the development totals are discussed in Appendix C.

*Table 3. Summary of Alternatives*

| | No Action (Base) | No Action (High) | Project Alternative |
|---|---|---|---|
| Residential Units | 424 units | 1884 units | 2032 units[a] |
| Population[b] | 1056 people | 4691 people | 5060 |
| Commercial Square Footage (retail, office) | 440,700 SF | 361,581 SF | 308,000 SF |
| Hospitality | 0 | 0 | 83,000 SF (156 keys) |
| Jobs | 677 jobs | 737 jobs | 984 to 1004 jobs[c] |
| Institutional (churches, schools, community centers, and government services) | 583,000 SF[d] | 549,000 SF[e] | 482,000[f] |
| Parks and Open Space | Approximately 43 acres (Park Hill Cemetery) | Approximately 43 acres (Park Hill Cemetery) | Approximately 46.5 acres[g] |

a The Project Alternative includes 1800 new residential units and retains the existing 232 units.
b Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
c Includes 410 new jobs in the Redevelopment Area, 271 existing jobs outside the Redevelopment Area, 223 existing jobs in three schools in the subarea, and either 100 jobs if mixed-use areas redevelop with retail or 80 jobs if mixed-use areas redevelop with office.
d Based on building use analysis shown on page 45 of the Heights District Plan Visioning and Analysis Summary. Approximately 5,200 square feet removed to account for relocation of existing Fire Station 3, which the Vancouver Fire Department (VFD) plans to remove.
e Assumes the same square footage included in the No Action Base with the existing church (approximately 34,000 SF) in Tower Mall removed with redevelopment.
f Within the Redevelopment Area, the Institutional category includes 20,000 square feet of new church/multipurpose space, 16,000 square feet of new civic space, and existing City-owned property associated with the existing water facility. Outside the Redevelopment Area, the Institutional category includes existing schools and community centers identified within the areas assumed to have limited or no likelihood to redevelop. The existing churches and community spaces within areas identified as higher or low likelihood to redevelop are removed from the total, as it is assumed they will redevelop into multi-family over time.
g Includes 6.1 acres in the Redevelopment Area and 40.4 acres (Park Hill Cemetery minus 2.6 acres in the northwest corner adjacent to Mill Plain Boulevard identified for redevelopment) retained outside the Redevelopment Area.

## No Action Alternatives

A No Action Alternative is a required alternative under SEPA. The purpose of a No Action Alternative is to evaluate impacts that would occur without the proposed action to allow decision makers and the public to compare levels of environmental impacts of the alternative. In this case, "no action" is the anticipated redevelopment of the Heights District without a guiding subarea plan and under the existing zoning and development regulations currently in place. "No action" does not mean "no development" as property development would still occur in the Heights District without a subarea plan.

For the Heights District Plan EIS, two No Action Alternatives are considered in order to account for different levels of potential redevelopment within the plan boundaries. Under either No Action Alternative, the City would not adopt the Heights District Plan or new and revised implementation tools (zoning, design standards, building heights) for the Heights District. Both of the No Action Alternatives assume continued development of the Heights District based on the current zoning, land use designations, and development standards.

Under the No Action Alternatives, development throughout the Heights District would occur parcel-by-parcel. Individual property owners would propose to redevelop according to current land use and zoning designations, perceived market opportunities, and their individual goals for their properties. Because development under a No Action Alternative would not be part of an adopted subarea plan and planned action ordinance, future applicants would be required to comply with SEPA for each individual project. Any required mitigation would be decided project-by-project. Utility infrastructure and transportation improvements would occur as planned in existing City capital improvement and transportation plans and as necessary to support future development.

Anticipated development and assumptions for both No Action Alternatives are outlined below.

## No Action Base Alternative

The No Action Base Alternative would add 201 housing units, 19 jobs, and 7,196 square feet of commercial development. No new institutional uses or parks or open spaces are included in the No Action Base Alternative. The following assumptions were used to develop the No Action Base Alternative.

- **Existing residential units and commercial square footage within the Heights District will remain.**
- **No redevelopment of existing developed areas will occur.**
- **Vacant land as identified in the Clark County Vacant Buildable Lands Model (VBLM) will be developed.[2]**
- **To identify the developable area of the vacant land, per the VBLM, a 20 percent reduction was applied for mixed-use sites to account for infrastructure.**
- **The mix of residential and commercial uses likely to develop will be similar to recently submitted projects in commercial zones throughout the City. This results in development that is 95 percent residential. Recently submitted projects are identified in the Methodology and Assumptions Memorandum (Appendix C).**
- **For 95 percent of the developable area of the vacant parcels, residential units will develop at an average density that is the same as the average density for recently submitted projects (61 units/acre).**
- **The existing fire station (Fire Station 3) located northwest of the Mill Plain Boulevard/Devine Road intersection will be removed and relocated outside the Heights District.**
- **The number of jobs assumes 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with recently submitted projects in commercial zones. The number of jobs per square foot for retail and office is based on a jobs analysis completed during the planning process and reflects industry averages for jobs per square foot by use.[3]**

Total development anticipated with the No Action Base Alternative is shown in Table 4.

*Table 4. No Action Base Alternative - Total Development*

| | Existing[a] | Proposed (Base) | No Action Base Total |
|---|---|---|---|
| Residential Units | 232 units | 192 units | 424 units |
| Population[b] | 578 people | 478 people | 1,056 people |
| Commercial Square Footage (retail, office, and hospitality) | 445,500 SF | 7,196 SF | 440,700 SF |
| Institutional (churches, schools, community centers, and government services) | 583,000 SF[c] | 0 | 583,000 SF[c] |
| Jobs | 658 jobs[d] | 19 jobs | 677 jobs |
| Parks and Open Space | Approximately 43 acres (Park Hill Cemetery) | 0 | Approximately 43 acres (Park Hill Cemetery) |

[a] Assumes the existing residential units and the existing commercial square footage remain.
[b] Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
[c] Based on building use analysis provided on page 45 of Heights District Plan Visioning and Analysis Summary (Appendix A). Approximately 5,200 SF removed to account for the relocation of existing Fire Station 3, as planned by the VFD.
[d] Existing jobs include 223 jobs in the three schools located in the subarea and 435 jobs in commercial sectors.

[2] The County VBLM identifies 4.13 acres of commercial vacant land. The remainder of the land within the Heights District is classified as "built." VBLM classifies "underutilized" land, but none of the land within the Heights District is included in that category.

[3] The EcoNorthwest jobs analysis prepared for the Heights District Plan assumes one job per 588 square feet of retail development and one job per 288 square feet of office development.

## No Action High Alternative

The No Action High Alternative would add 1,525 housing units, 161 jobs, and 54,886 square feet of commercial development. No new institutional uses or parks or open spaces are included in the No Action High Alternative. The following assumptions were used to develop the No Action High Alternative.

- **Vacant land identified in the County VBLM will be developed.**
- **Redevelopment will occur on 50 percent of the proposed Tower Mall Redevelopment Area. Redevelopment will occur at the same residential-commercial mix (95 percent residential) identified for the No Action Base scenario (based on recently submitted projects).**
- **Existing residential units will remain within the Heights District and the existing commercial space will be reduced by 146,000 SF, given the likelihood that the Tower Mall property will be included in the portion of the site that is assumed to redevelop.**
- **The existing fire station (Fire Station 3) located northwest of the Mill Plain Boulevard/Devine Road intersection will be removed and relocated outside the Heights District.**
- **To identify the developable area of the vacant and re-developable land, per the VBLM, a 20 percent reduction was applied for mixed-use sites to account for infrastructure.**
- **The mix of residential and commercial uses likely to develop will be similar to recently submitted projects in commercial zones throughout the City. This results in development that is 95 percent residential.**
- **Residential units will develop at an average density that is the same as the average density for recently submitted projects (61 units/acre). The residential density is calculated for 95 percent of the developable area of the vacant and re-developable parcels.**
- **The number of jobs assumes 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones. Jobs per square foot for retail and office is based on the jobs analysis completed during the planning process and reflects industry averages for jobs per square foot by use.**

Total development anticipated with the No Action High Alternative is outlined in Table 5.

*Table 5. No Action High Alternative - Total Development*

| | Existing[a] | Proposed (High) | No Action High Total |
|---|---|---|---|
| Residential Units | 232 units | 1,652 units | 1,884 units |
| Population[b] | 578 people | 4,113 people | 4,691 people |
| Commercial Square Footage (retail, office, and hospitality) | 299,500 SF | 62,081 SF | 361,581 SF |
| Institutional (churches, schools, community centers, and government services) | 549,000 SF[c] | 0 | 549,000 SF[c] |
| Jobs | 576 jobs | 161 jobs | 737 jobs |
| Parks and Open Space | Approximately 43 acres (Park Hill Cemetery) | 0 | Approximately 43 acres (Park Hill Cemetery) |

a Assumes the existing residential units remain and the existing commercial space is reduced by 146,000 SF given the likelihood that the Tower Mall property would be included in the portion of the site that is assumed to redevelop. In this scenario, existing jobs are reduced by 82, which is 50 percent of jobs currently included in the Redevelopment Area per a jobs analysis prepared by EcoNorthwest for the Heights District Plan.
b Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
c Assumes the same square footage included in the No Action Base Alternative with the existing church (approximately 34,000 SF) in Tower Mall removed with redevelopment.

## Project Alternative

The City proposes to adopt the Heights District Plan as a subarea plan for a 205-acre area in central Vancouver. The Project Alternative would add 1,800 residential units, 204,000 square feet of commercial development (accommodating 490-510 jobs), 36,000 square feet of institutional development, and 6.1 acres of parks and open space. The Project Alternative includes the following actions:

- **Adoption of amendments to the Comprehensive Plan, including the incorporation of the Heights District Plan by reference. Additional details are provided in the Land Use section.**
- **Adoption of amendments to Vancouver Municipal Code (VMC) Title 20, Land Use and Development Code, including provisions for a new zone within the Commercial and Mixed Use Zones (VMC 20.430), Transit Overlay District (VMC 20.550), and Parking and Loading (VMC 20.945). Additional details are provided in the Land Use section.**

- **Adoption of amendments to the capital facilities plan and street standards to reflect infrastructure improvements necessary to support redevelopment in the Heights District. Additional details are provided in the Transportation and Public Service and Utilities sections.**
- **Adoption of urban design standards and guidelines for the Heights District.**
- **Adoption of Comprehensive Plan and zoning map amendments.**
- **Adoption of an ordinance designating the Heights District Plan as a planned action for purposes of future permit review and SEPA compliance.**
- **Development of the Heights District consistent with adopted provisions.**

## Plan Vision and Principles

The following vision and guiding principles are identified in the plan for the Heights District.

### Vision

The Heights District is a vibrant, connected, and sustainable neighborhood center that promotes community health, wellness and equity.

### Design Principles

The success of the Heights District will rely on an understanding and application of the following principles:

- **Neighborhood context, culture, and history**
- **Proximity to future Mill Plain bus rapid transit (BRT)**
- **Sustainable design best practices**
- **Design character and compatibility**
- **Community health, well-being, and equity**

These principles are further defined and implemented through adherence to overarching, primary, and secondary drivers as described below.

### Overarching Guiding Principle: Mixed-Income Based Housing

A fundamental principle of the Heights District is the integration of a variety of housing types and a balanced mixed-income housing approach toward affordable, attainable, and market-rate housing.

### Primary Drivers

- **Connectivity – Strengthen multimodal connections and improve accessibility throughout the Heights District and within the 20-minute walkshed.**
- **Community Health, Wellness, and Equity – Embrace and promote healthy living, universal design and social equity as core values of the Heights District.**
- **Sustainability – Reflect social, economic, and environmental responsibilities.**

### Secondary Drivers

- **Public Realm – Create a variety of vibrant community spaces to enrich the quality of life for all residents and visitors.**
- **Arts/Culture – Promote arts and culture in the Heights District.**
- **Economic Development – Attract private investment and deliver equitable public benefit, including housing and amenities that serve residents of diverse racial/ethnic and socioeconomic backgrounds.**
- **Urban Form/Character – Promote good urban form that invites high-quality design and supports safe and vibrant public spaces.**

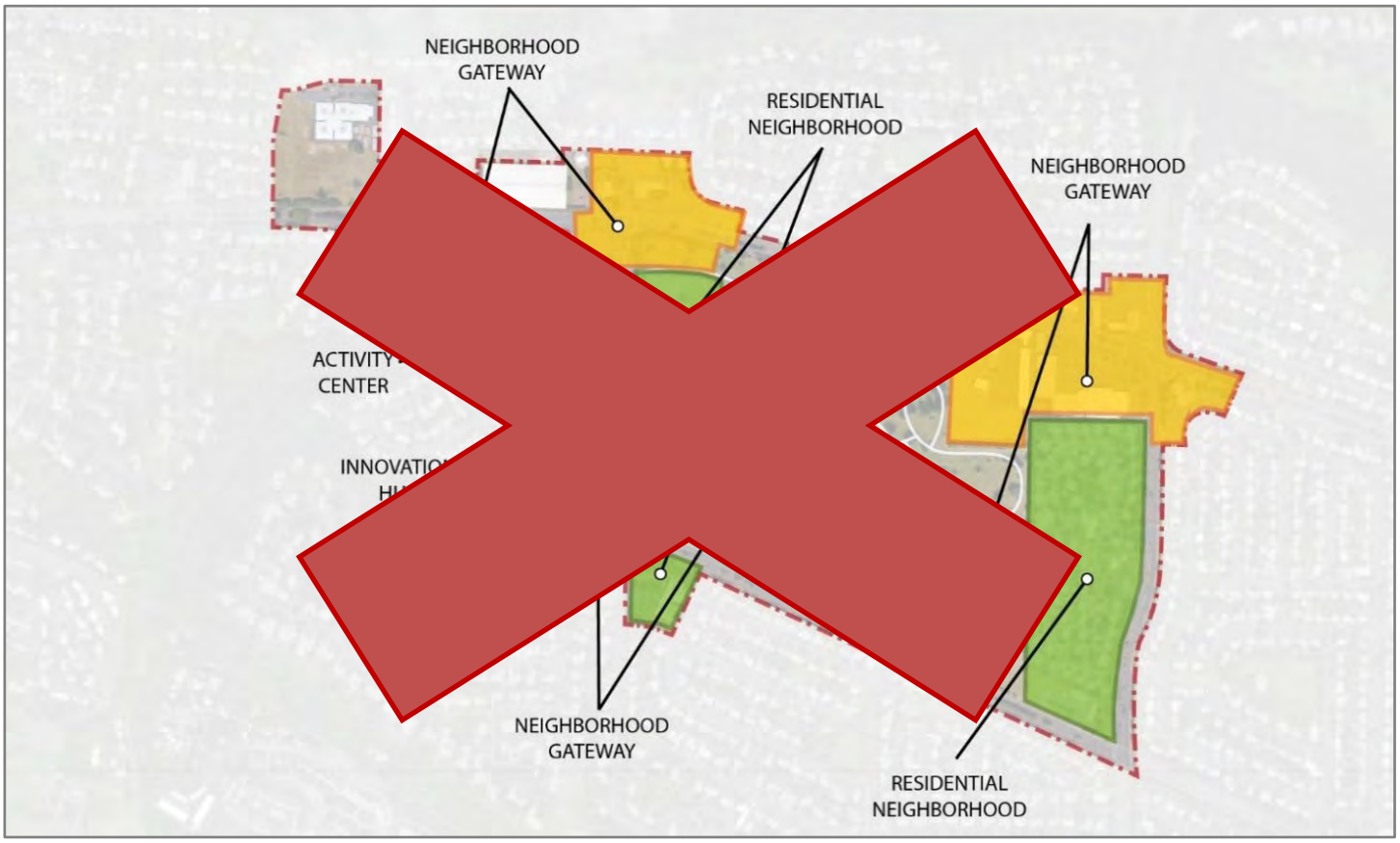
## Urban Design Standards and Guidelines

The Urban Design Framework (Appendix D) provides an organizational structure to guide proposed, high-quality, sustainable development in the Heights District over time. The Framework addresses key aspects of development, such as urban character, public realm, architecture, sustainability and other infrastructure considerations that are deemed essential to creating a dynamic, safe and enjoyable neighborhood.

The Framework will be used to inform the future Heights District Site Development Standards and Urban Design Guidelines. The standards and guidelines will be specifically established for the Heights District, and once adopted, will be codified within VMC Title 20 (Land Use and Development Code) and will serve as the principal regulating tool for the City to review and approve projects in the Heights District.

These tools will be developed as part of the next phase of the project, and are anticipated to include provisions in the current Commercial and Mixed Use Districts (VMC 20.430) and Design Review (VMC 20.265) sections of the VMC. In addition, a new Heights Plan District section will be added to the Plan Districts (VMC 20.600) section of the code, which will provide detailed Development Standards for future development in the Heights. Design Guidelines, intended to accompany development standards and provide options for meeting design requirements articulated in the code, will be provided for reference in both the Design Review and Heights Plan District sections.

*Figure 3. Heights District Character Zones*




### Character Zones

To further define and implement the urban design intent of the plan, the Framework includes a series of character zones for the Heights District. The zones address particular character attributes, massing and scale, and uses and context for different areas of the Heights District. Character zones are defined below and identified on Figure 3.

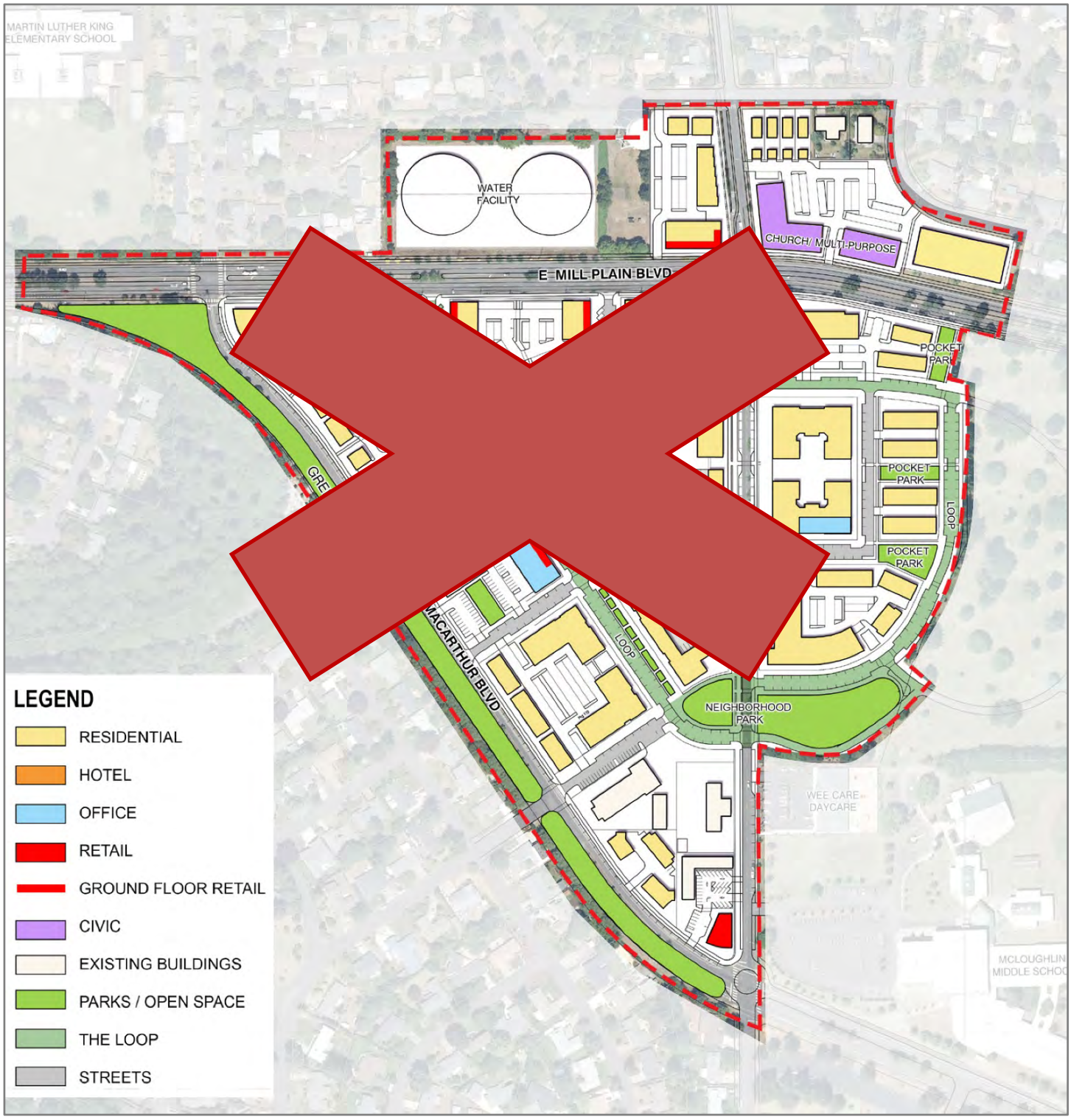
- **~~Neighborhood~~ District Gateways – serve as entries to the Heights District with iconic art, signage and scale within the context of the adjacent uses, varying from north to south and east to west.**
- **Activity Center – is the "heart" of the Heights District and includes the most diverse uses, highest density of buildings, and highest quality of materiality and amenities.**
- **Residential Neighborhood – includes lower scale townhomes, offices, family housing, quiet streets, street-end parks, and views of trees, large open space, and informal walking paths in the Park Hill Cemetery.**
- **Innovation Hub – is likely to be built in later phases of the Heights District buildout and incorporates an eclectic mix of existing uses, health supportive services, and office/employment at a comfortable scale adjacent to the proposed MacArthur Boulevard Greenbelt.**

## Tower Mall Redevelopment Area

Redevelopment within the Heights District is focused on the 63-acre Tower Mall Redevelopment Area. Under the Project Alternative, the Redevelopment Area is envisioned as a 20-minute walkable neighborhood[4] and would become a mixed-use destination defined by an integrated system of public amenities linked by complete streets. A central element of the area is the Loop – a 3/4-mile linear, walkable park/street that knits together civic and neighborhood parks, shops, restaurants, living spaces and workplaces (see Figure 4).

[4] A 20-minute walkable neighborhood is an area with a range of uses and services (residential, commercial, office, institutional, and parks and open spaces) that can be reached within a 20-minute walk. Access improvements such as sidewalks and crosswalks can increase the extent of the 20-minute walk by providing better connectivity.

*Figure 4. Proposed Land Uses – Redevelopment Area*




MARTIN LUTHER KING ELEMENTARY SCHOOL
WATER FACILITY
E MILL PLAIN BLVD
POCKET PARK
LOOP
CIVIC PARK
GREENBELT PARK
MACARTHUR BLVD
DEVINE ROAD
NEIGHBORHOOD PARK
WEE CARE DAYCARE
LEGEND
RESIDENTIAL
HOTEL
OFFICE
RETAIL
GROUND FLOOR RETAIL
CIVIC
EXISTING BUILDINGS
PARKS / OPEN SPACE
THE LOOP
STREETS

## Methodology and Assumptions

The calculation of development totals for the Project Alternative used the following methodology and assumptions.

- **Existing commercial uses within the Redevelopment Area will be redeveloped into mixed-use properties.**
- **Existing church properties within and outside the Redevelopment Area may ~~be~~ redeveloped~~ed~~ in the future, and could include some multi-family units. While these properties are not included in the rezone area in the plan, individual property owners could request site-specific rezones in the future. To account for these potential future changes, the development totals for the Project Alternative assumes some redevelopment of the church properties. If this redevelopment does not occur, it is assumed the multi-family units and/or commercial square footage envisioned on these properties would be absorbed somewhere else in the District and the overall development totals would remain the same. Furthermore, the Project Alternative includes 20,000 square feet of new church/multi-use space within the Redevelopment Area, as it assumes that Northcrest Church will continue to operate on its current property but may develop a new multipurpose building.**
- **The existing fire station (Fire Station 3) located northwest of the Mill Plain/Devine intersection will be removed and relocated outside the Heights District.**
- **Existing jobs within the Redevelopment Area will be maintained or replaced with new jobs proposed in the Project Alternative.**
- **The number of jobs per square foot for retail and office is based on the jobs analysis completed during the planning process and reflects industry averages for jobs per square foot by use.**
- **The portion of the Park Hill Cemetery included in the Redevelopment Area is not occupied by gravesites and will be redeveloped in the Project Alternative.**

## Anticipated Development

As previously described, the Project Alternative would add 1,800 residential units, 204,000 square feet of commercial development (accommodating 490 to 510 jobs), 36,000 square feet of institutional development, and 6.1 acres of parks and open space. Most of this redevelopment would occur within the Tower Mall. Future development under the Project Alternative would be subject to the development regulations codified to implement the Heights District Plan.

Table 6 and Table 7 outline the existing, proposed, and total development anticipated for the Project Alternative within and outside the Tower Mall Redevelopment Area.

***Table 6. Project Alternative – Development within Redevelopment Area***

| | Existing | Proposed (Project Alt) | Project Alt Total |
|---|---|---|---|
| Residential Units | 2 units | 1,340 units | 1,342 units |
| Population[a] | 5 people | 3,334 people | 3,339 people |
| Commercial Square Footage (retail, office, and hospitality) | 258,500 SF | 204,000 SF | 204,000 SF[b] |
| Institutional (churches, schools, community centers, and government services) | 178,500 SF | 36,000 SF[c] | 163,000 SF[d] |
| Jobs | 164 jobs | 410 jobs | 410 jobs[e] |
| Parks and Open Space | Approximately 2.6 acres (portion of Park Hill Cemetery) | 6.1 acres | 6.1 acres[f] |

[a]Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
[b]Assumes redevelopment of existing commercial square footage inside the Redevelopment Area; the total commercial square footage inside the Redevelopment Area is therefore the same as the proposed commercial square footage.
[c]Includes 20,000 SF of new church/multipurpose space and 16,000 SF of new civic space.
[d]The total institutional square footage included inside the Redevelopment Area in the Project Alternative equals the proposed Institutional uses (36,000 SF) plus a City-owned property associated with the existing water facility (approximately 127,000 SF). The other existing institutional uses (approximately 51,500 SF) is anticipated to be redeveloped. ~~existing church property inside the redevelopment area is likely to redevelop at some time in the future. This use is anticipated to continue to operate on its current property, but may develop a new building. The existing fire station is planned for removal in current VFD planning documents (see the Fire and Emergency Medical Services section 0for additional details. Therefore, the total for Institutional development inside the redevelopment area equals the proposed Institutional uses plus a City-owned property associated with the existing water facility (approximately 127,000 SF).~~
[e]Existing jobs within the Redevelopment Area are anticipated to be maintained or replaced with jobs proposed in the Project Alternative; therefore, total jobs in the Redevelopment Area are the same as proposed jobs.
[f]The portion of the Park Hill Cemetery included in the Redevelopment Area is not occupied by gravesites and is anticipated to be redeveloped in the Project Alternative; therefore, the total parks and open space in the Redevelopment Area is the same as the proposed parks and open space.

*Table 7. Project Alternative – Development outside Redevelopment Area*

| | Existing | Proposed (Project Alt) | Project Alt Total |
|---|---|---|---|
| Residential Units | 230 units | 460 units | 690 units |
| Population[a] | 573 people | 1,145 people | 1,718 people |
| Commercial Square Footage (retail, office, and hospitality) | 187,000 SF | 187,000 SF[b] | 187,000 SF[b] |
| Institutional (churches, schools, community centers, and government services) | 409,500 SF | 0 | 319,000 SF[c] |
| Jobs | 494 jobs[d] | 80-100 jobs[e] | 574-594 jobs |
| Parks and Open Space | Approximately 40.4 acres (remainder of Park Hill Cemetery) | 0 | 40.4 acres |

[a]Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
[b]Proposed development includes the redevelopment of existing commercial sites into mixed-use buildings, which will result in no net change of commercial square footage.
[c]The Heights District Plan envisions redevelopment of some institutional properties located within the District, including the existing church properties and an existing Veterans of Foreign Wars center ~~are anticipated to be relocated and the properties redeveloped with the Project Alternative~~; therefore, the total institutional square footage outside the Redevelopment Area is less than the existing institutional square footage.
[d]Includes 223 jobs in three schools in the District and 271 jobs in commercial sectors.
[e]The range in proposed jobs results from two mixed-use development scenarios where commercial space develops either as retail (100 jobs) or other commercial uses (80 jobs).

Total development (inside and outside the Redevelopment Area) anticipated as a result of the Project Alternative is shown in Table 8.

*Table 8. Project Alternative – Total Development*

| | Existing | Proposed (Project Alt) | Project Alt Total |
|---|---|---|---|
| Residential Units | 232 units | 1800 units | 2032 units |
| Population[a] | 578 people | 4482 people | 5060 people |
| Commercial Square Footage (retail, office, and hospitality) | 445,500 SF | 204,000 SF | 391,000 SF[b] |
| Institutional (churches, schools, community centers, and government services) | 588,000 SF | 36,000 SF | 482,000[c] |
| Jobs | 658 jobs | 490-510 jobs | 984-1004 jobs[d] |
| Parks and Open Space | 43 acres | 6.1 acres | 46.5 acres[e] |

[a]Population assumes 2.49 persons per household per the Heights District Plan Visioning and Analysis Summary.
[b]The total commercial square footage is less than the existing commercial square footage as a result of anticipated redevelopment inside the Redevelopment Area.
[c]The Heights District Plan envisions redevelopment of some institutional properties located within the District, including the existing church properties and an existing Veterans of Foreign Wars center; therefore, the total institutional square footage is less than the current existing institutional square footage. The total institutional square footage included in the Project Alternative equals the proposed institutional uses (36,000 SF) plus a City-owned property associated with the existing water facility (approximately 127,000 SF), the existing school properties (approximately 288,000 SF), and a community center within the Skyline Crest housing development (approximately 31,000 SF). ~~[c]The total institutional square footage is less than the existing institutional square footage as a result of anticipated redevelopment of existing church and other institutional properties.~~
[d]Existing jobs include 164 inside Redevelopment Area and 494 outside Redevelopment Area. Only the 494 outside the Redevelopment Area would remain at full build-out. Therefore, the total jobs anticipated in the Project Alternative equals proposed jobs (490-510) plus 494 existing jobs.
[e]The total parks and open space acreage includes the proposed parks and open space included in the Redevelopment Area (6.1 acres) ~~in redevelopment area and~~ plus the portion of Park Hill Cemetery outside the Redevelopment Area (40.4 acres). The portion of Park Hill Cemetery within the Redevelopment Area ~~minus~~ (2.6 acres in the northwest corner adjacent to Mill Plain Blvd) is envisioned to redevelop in the Heights District Plan and is therefore removed from the total parks and open space acreage in the Project Alternative ~~identified for redevelopment~~).

The redevelopment of the Heights District would also result in capital improvements to support the anticipated development. The following physical improvements will support the proposed mixed-use development.

- **Development of the Loop – a 3/4-mile linear, walkable park/street. The Loop is intended to provide circulation through the Redevelopment Area in a park-like setting with pedestrian amenities, including built-in and moveable seating, outdoor dining areas, and interpretive and historic markers. The Loop will include bio-retention planters and interactive elements such as water features and outdoor game areas.**
- **Development of new parks within the Redevelopment Area, including a civic park, neighborhood park, and greenbelt park.**
- **Redesign/reconstruction of Mill Plain Boulevard from MacArthur Boulevard to N Andresen Road as a multi-modal boulevard to include BRT stations, buffered sidewalks, protected bike lanes, on-street parking, safe street crossings, and landscaping.**
- **Redesign of MacArthur Boulevard from Mill Plain Boulevard to N Andresen Road as a neighborhood collector, green street to include a stormwater management system, protected bike facilities, and pedestrian greenway.**
- **Redesign of Devine Road from Mill Plain Boulevard to MacArthur Boulevard to reduce the travel lane widths and provide a two-way protected bike facility, wider sidewalks, and landscape areas.**
- **Redesign of Andresen Road from just south of the Mill Plain Boulevard/Andresen Road intersection to Highland Drive to reduce travel lanes to one lane in each direction and add protected bike facilities.**

Transportation improvements are further described in the Transportation section and utility improvements in the Public Services and Utilities section.

CHAPTER 3

# AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS, MITIGATION MEASURES, AND UNAVOIDABLE IMPACTS



CITY OF Vancouver WASHINGTON

The following sections describe the affected environment, the impacts of the Proposed Action(s) and Alternatives, relevant mitigation measures, and any significant unavoidable adverse impacts that may occur. For each element of the environment, potential significant impacts are evaluated for the two No Action Alternatives and the Project Alternative.

Mitigation measures are identified for the Project Alternative, as it is the only alternative requiring specific actions by the City. The mitigation measures are listed under two categories – "Mitigation Designed into the Project" and "Existing Regulations and Other Mitigation." Mitigation Designed into the Project includes measures to offset potential impacts that are unique to the Heights District Plan, such as proposed infrastructure improvements and the creation of new land use and development standards. Existing Regulations and Other Mitigation includes the existing regulations applicable to future development envisioned in the Heights District Plan and other measures to further reduce impacts, such as monitoring potential spillover parking into adjacent residential areas.

# Land Use

This section describes existing conditions and addresses the potential significant adverse impacts of the Project Alternative (adoption of the Heights District subarea plan) and the No Action Alternatives. Under either No Action alternative, the City would not adopt the Heights District Plan or new and revised implementation tools (zoning, design standards) for the Heights District. This section discusses the impacts to land use, population and employment, and existing City regulatory documents for each alternative.

## Affected Environment

This section presents the distribution of existing land uses within the study area and the existing development standards that govern development currently. The description of the project site for the affected environment applies to all alternatives.

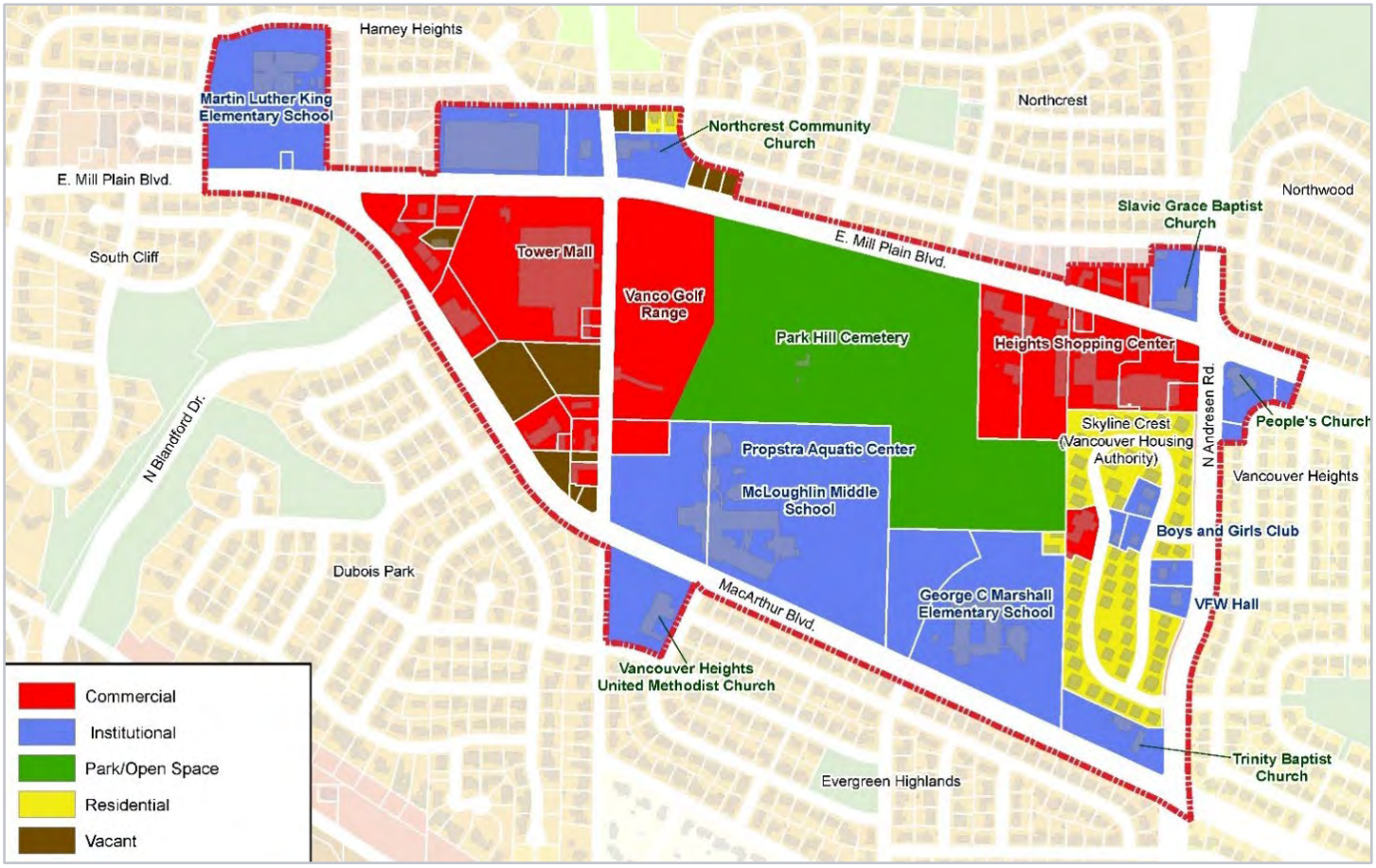
### Existing Land Uses

The Heights District consists of approximately 205 acres and contains many types of uses with a significant portion of the land in the subarea used for public schools (approximately 57 acres) and a cemetery (approximately 43 acres). Buildings comprise 15 percent of the subarea while 85 percent is open area, including parking lots, the Park Hill Cemetery, and school properties. Existing land use categories are defined in Table 9 and identified on Figure 5.

*Table 9. Land Use Categories*

| Land Use Category | Description | Acreage |
|---|---|---|
| Commercial | Commercial uses within the Heights District include retail, entertainment, food and beverage, social services, and professional and medical offices. | 54 |
| Institutional | Institutional uses within the Heights District include schools, religious institutions, community centers, and public utility facilities. | 74 |
| Parks and Open Spaces | Parks and open spaces within the Heights District include the Park Hill Cemetery. | 43 |
| Residential | Residential uses within the Heights District include an affordable housing complex and a few single-family homes | 14 |
| Vacant | Vacant land identified in Figure 5 includes undeveloped parcels within the Heights District. This land use category includes more parcels than identified as vacant in the County VBLM. | 7 |

*Figure 5. Existing Land Use Categories*




## Commercial

There are a variety of commercial uses throughout the subarea that comprise approximately 22 percent of the land area. Commercial uses are concentrated at the Andresen Road/Mill Plain Boulevard intersection (the Heights Shopping Center), and within the triangular area between MacArthur Boulevard, Mill Plain Boulevard, and N Devine Road (including the Tower Mall property). These areas consist primarily of retail and food service uses with some social service and medical offices. The Heights Shopping Center is anchored by a Safeway store and includes other retail, professional office, and restaurant uses. Commercial uses within the Tower Mall property include a dance studio and various social service offices.

## Institutional and Civic Uses

Approximately 38 percent of the subarea is currently in institutional or civic use. This includes a fire station, water station, three public schools, community centers, and five churches.

Fire Station 3 is a 5,160-square foot structure on a 65,000-square foot parcel, located at the northwest corner of Mill Plain Boulevard and Devine Road. The Vancouver Fire Department (VFD) plans to relocate the station to an area southeast of the Heights District. Fire service is further described in the Fire and Emergency Medical Services section.

Vancouver Water Station 5 is located immediately west of the fire station. Water Station 5 includes an 8.0-million gallon (MG) partially buried water reservoir and an elevated 0.75-MG water tank. Water service is further described in the Water Service section.

There are five freestanding churches within the subarea. Two are located along N Devine Road (Northcrest Community Church and Vancouver Heights United Methodist Church) and three are located along Andresen Road (Slavic Grace Baptist Church, People's Church, and Trinity Baptist Church).

Three schools (Martin Luther King Elementary, George C. Marshall Elementary, and McLoughlin Middle School) and the Propstra Aquatic Center owned by Vancouver Public Schools (VPS) are located within the subarea. The school facilities and aquatic center account for 28 percent of the existing land use in the subarea. In February 2017, voters approved a school bond measure that will fund replacement and upgrades to several public schools, including the reconstruction of King Elementary, and the current construction of a new building that will house both Marshall Elementary and McLoughlin Middle School. The building now occupied by Marshall Elementary will remain and become the new home of VPS's Lieser Campus, a nontraditional education option for students in kindergarten through 12th grade. Schools are further described in the Schools section and the aquatic center in the Parks and Recreational Facilities section.

Community center uses in the subarea include a Boys and Girls Club and a Veterans of Foreign Wars center. Both are located off Andresen Road.

### Parks/Open Space

Park Hill Cemetery accounts for approximately 29 percent of the land area in the Heights District. The Park Hill Cemetery is owned and managed by the City and includes over 25,000 burial sites. In addition, there are several existing parks and open spaces adjacent to or within walking distance of the Heights District, but the cemetery is the only land designated as open space by the City's Comprehensive Plan within the subarea. Internal cemetery roads are informally used for light recreational activities such as biking and dog walking. The western area of the cemetery, also designated as open space, is leased through 2024 by the Vanco Golf Range. The golf range is a commercial driving range and no cemetery or grave sites are located in this area.

### Residential

Residential development accounts for approximately 8 percent of the subarea which currently contains 232 residential units. Most of the residential uses are within Skyline Crest, an affordable housing campus owned by the Vancouver Housing Authority (VHA) and located northwest of the Andresen/MacArthur intersection. Additionally, in 2019, VHA completed Caples Terrace, a 28-unit housing complex for young people transitioning from homelessness. Caples Terrace is located on the west side of Skyline Crest. The Heights District also includes two single-family homes to the north of the fire station.

### Vacant and Underutilized Land

The Clark County VBLM identifies approximately 4.13 acres of vacant land within the subarea. These properties are located within the Tower Mall Redevelopment Area south of the Tower Mall property. The VBLM does not identify any underutilized land in the subarea; however, the Tower Mall property and surrounding areas could be considered underutilized with large expanses of surface parking and vacant buildings. After the 2009 recession, Tower Mall struggled to find market-rate tenants and the last decade has been characterized by vacancy and non-market tenants.

## Population, Housing, and Employment

There are 232 dwelling units and approximately 580 people currently living in the Heights District.[5] Nearly all of the housing consists of single-story duplexes located in VHA's Skyline Crest neighborhood on the eastern border of the Heights District.

There are approximately 658[6] jobs within the subarea, including 223 jobs at the three Vancouver Public Schools (VPS) sites and 435 jobs in commercial sectors. Given the limited amount of residential development in the Heights District, most ~~residents~~people work~~ing~~ ~~out~~inside the Heights District live outside the District.

## Vancouver Comprehensive Plan

The Comprehensive Plan land use map shows a variety of designations in the Heights District, including low and high density residential, commercial, parks and open space, and public facilities. Existing Comprehensive Plan designations are shown on Figure 6 and described in Table 10.

[5] Based on an average household size of 2.49 people per ECONorthwest household demographic analysis included in Heights District Plan Visioning and Analysis Summary (Appendix A).
[6] Data provided by the City of Vancouver. Source: Longitudinal Employment Household Dynamics Survey, U.S. Census Bureau and VPS.

*Figure 6. Existing Comprehensive Plan Designations*

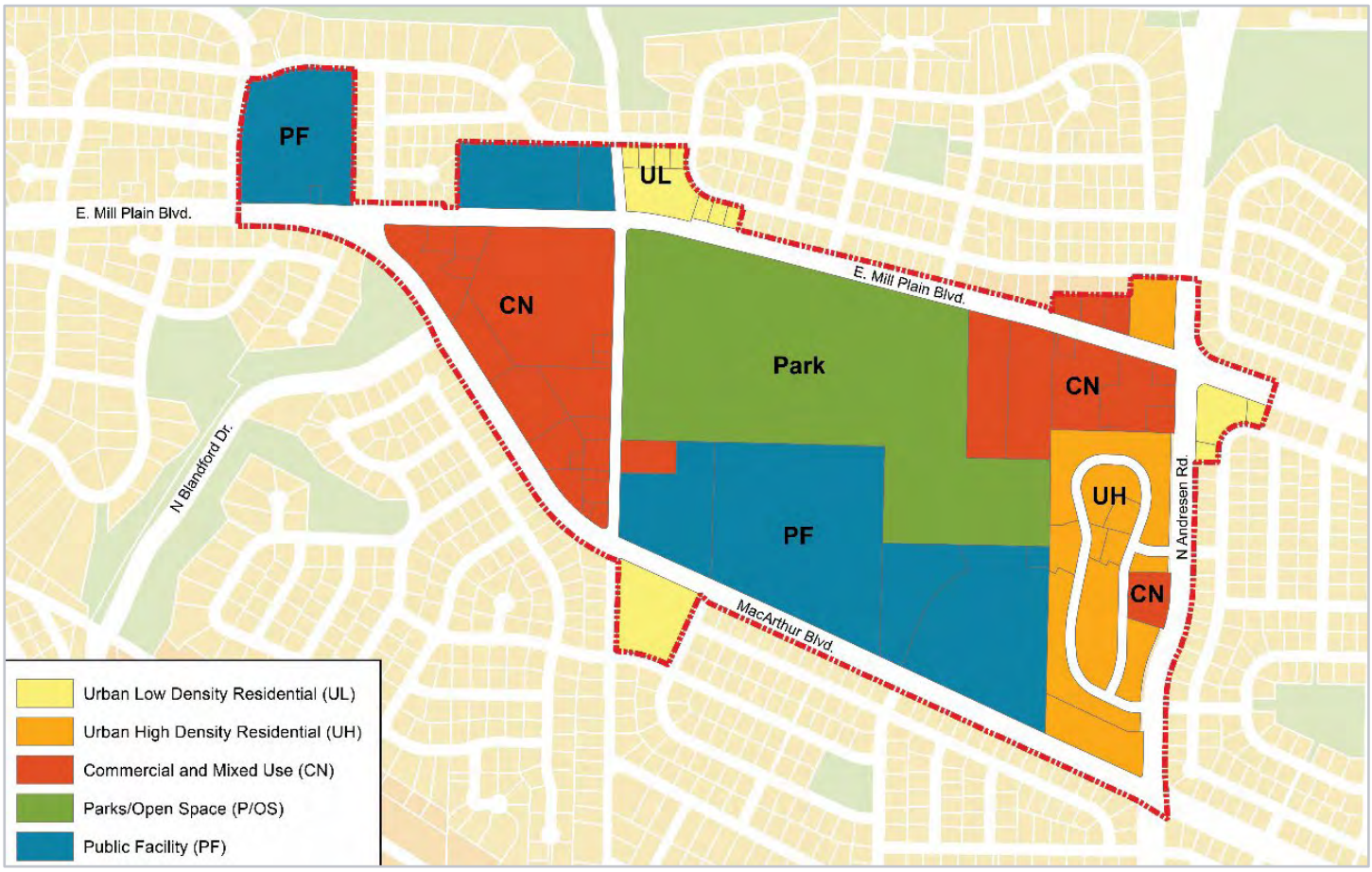



*Table 10. Comprehensive Plan Designations*

| Designation | Corresponding Zoning | General Intent |
|---|---|---|
| Urban Low Density Residential (UL) | R-4, R-6, R-9 | Predominantly single-family detached residential development, with some allowances for duplexes, townhouses, and single-family homes on small lots using infill standards. |
| Urban High Density Residential (UH) | R-18 | Predominantly apartments and condominiums, with some allowance for attached housing (such as duplexes, townhouses, and small-lot single-family homes) and mixed use. |
| Commercial and Mixed Use (COM) | CN | Small scale commercial uses and services primarily serving nearby residences. Designated areas are typically less than 2 acres in size. These areas provide services within walking distance for the frequent needs of the surrounding residents and are generally small areas designed to be compatible with the surrounding residentially zoned neighborhoods. |
| | CC | Medium scale commercial uses and services, typically serving more than one neighborhood. Designated areas are typically between 2 and 10 acres in size, located near collector or arterial street intersections. |
| Parks and Open Space (P/OS) | P | Areas intended for parks, greenways, and natural areas. |
| Public Facilities (PF) | All zones | Areas developed with schools, fire stations, colleges, hospitals, and other large facilities serving the public. |

In addition to the land use map, several sections of the City's Comprehensive Plan address development in the Heights District Plan area. The community development chapter identifies urban centers and corridors where subarea planning has occurred or is planned. As previously stated, the Heights District is identified as the MacArthur/Mill Plan urban center in the Comprehensive Plan. Policy CD-4 relates to development within urban centers and corridors.

Policy CD-4 - Urban centers and corridors: Achieve the full potential of existing and emerging urban activity centers and the corridors that connect them, by:

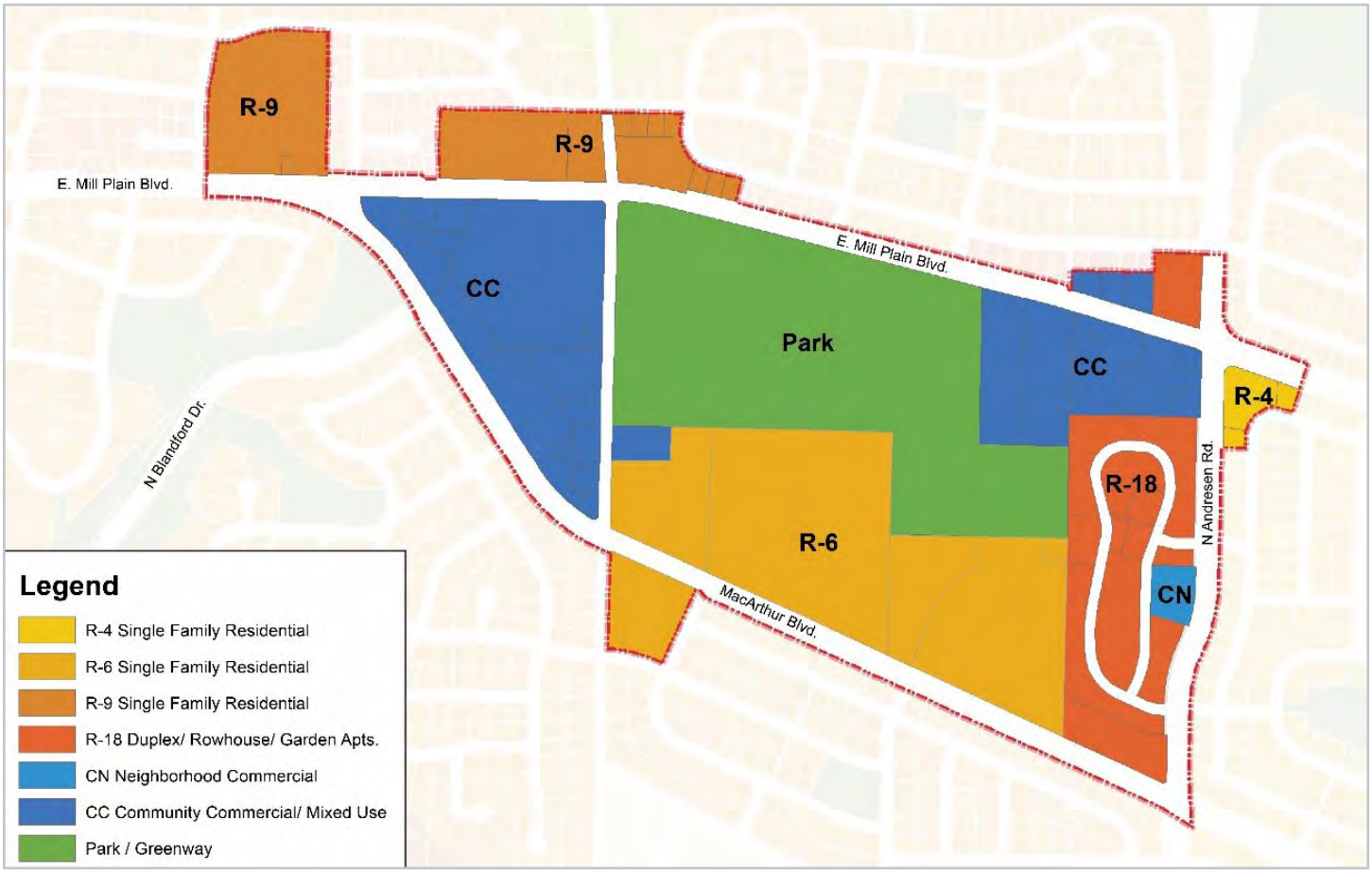
- **Promoting or reinforcing a unique identity or function for individual centers and corridors**
- **Planning for a compact urban form with an appropriate mix of uses**
- **Working with stakeholders to develop flexible standards to implement the vision for that center or corridor**
- **Encouraging innovative, attractive private development that efficiently uses available land and resources**
- **Establishing connectivity within each center and to other areas to provide accessibility**
- **Providing a range of transportation options**
- **Investing in public facilities and amenities to enhance livability**

In addition, the Comprehensive Plan includes policies related to integrated area planning (CD-12), connected and integrated communities (CD-14), promoting improved public health through integrated land use and street patterns (CD-15), providing higher density housing near public transportation facilities and in designated centers and corridors (H-5), and using level of service (LOS) standards for public facilities and services to encourage growth in designated centers and corridors (PFS-2).

## Zoning Designations and Development Standards

The Heights District contains four residential zones, two commercial zones, and one open space zone (Figure 7).

*Figure 7. Existing Zoning Designations*



As described in Vancouver Municipal Code (VMC) Chapter 20.430, the general intent of commercial and mixed-use districts is to ensure the availability of a full range of retail and office uses throughout the City. The code also states the importance of creating more opportunities for mixed uses in new and redeveloping commercial areas. The Community Commercial (CC) district is designed to provide for retail goods and services purchased regularly by residents of nearby neighborhoods. The zone also allows office, housing, and institutional development. The Neighborhood Commercial (CN) district is designed to provide small-scale, convenience commercial uses to serve adjacent residential neighborhoods. Above the ground floor housing and some civic and institutional uses are allowed conditionally. Both the CC and CN districts promote walking, biking, and transit trips through building design, landscaping, and access.

Higher density residential districts are intended to promote a range of housing choices. Some non-residential uses are permitted outright and others conditionally (VMC 20.420). However, the VMC indicates the development of mixed-use areas should not result in a predominance of business or commercial uses in residential districts. The Heights District includes land zoned R-18, which supports duplexes, row houses, and garden-type apartments at a minimum lot size of 1,800 square feet per unit.

Low density residential districts are designed to preserve and promote low density single-family detached neighborhoods with nonresidential development, such as elementary schools, churches, parks, and child care facilities permitted at appropriate locations and scales (VMC 20.410). The Heights District includes three low density districts: R-9, R-6, and R-4. All three support single-family residential development with or without accessory residential units, and some civic and institutional uses are permitted as limited or conditional uses. Densities per zone are included on Table 12.

Open space districts are intended to provide for a full range of passive and active uses as well as environmental protection and enhancement for the future (VMC 20.450). The Heights District includes land within the Parks zoning district. This zone includes land that has been, or is intended to be, developed to provide for moderate- to high-intensity recreational activities in addition to passive or low-intensity recreational experiences.

Table 11 identifies the development standards for the commercial/mixed use zones and Table 12 outlines the development standards for residential zones included in the Heights District. The development standards for the parks zone are the standards of the most restrictive zoning district located adjacent to the property.

*Table 11. Commercial/Mixed-Use and Open Space Development Standards*

| Standard | CN | CC |
|---|---|---|
| Minimum lot size | None | None |
| Minimum lot width | None | None |
| Minimum lot depth | None | None |
| Maximum lot coverage | Determined by compliance with other applicable standards (e.g., landscaping) | |
| Minimum setbacks adjacent to residential district | Pursuant to the screening and buffering standards contained in VMC Tables 20.925.030-1 and 20.925.030-2, plus an additional 1/2 foot for each foot the building exceeds 20 feet in height to a maximum setback requirement of 40 feet. Buildings in excess of 20 feet may be stepped. | |
| Minimum setbacks adjacent to nonresidential districts | Pursuant to screening and buffering standards contained in VMC Tables 20.925.030-1 and 20.925.030-2. | |
| Maximum height | 35 feet | 50 feet |
| Minimum landscaping | 15 percent | 15 percent |

*Table 12. Residential Development Standards*

| Standard | R-18 | R-9 | R-6 | R-4 |
|---|---|---|---|---|
| Minimum lot size | 1,800 sf | 5,000 sf | 7,500 sf | 10,000 sf |
| Maximum lot size | NA | 7,400 sf | 10,500 sf | 19,000 sf |
| Min/max density[a] | 12/18 units per acre | 5.9/8.7 units per acre | 4.5/5.8 units per acre | 2.3/4.4 units per acre |
| Maximum lot coverage | 50% | 50% | 50% | 50% |
| Minimum lot width/depth | 20′/50′ | 45′/65′ | 50′/90′ | 80′/90′ |
| Front setback | 10′ | 10′ | 10′ | 10′ |
| Rear and through yards | 0-5′ | 5′ | 5′ | 5′ |
| Side setback | 0-5′ | 0-5′ | 0-5′ | 7′ |
| Street side yard | 10′ | 10′ | 10′ | 10′ |
| Maximum height | 50′ | 35′ | 35′ | 35′ |
| Minimum landscaping | 10% | 10% | 10% | 10% |
| Minimum off-street parking | 1 per unit | 1 per unit | 1 per unit | 1 per unit |

[a]Minimum and maximum density are only used to calculated densities of planned unit developments, infill development, density transfer, and when an existing house is allowed on a lot that is larger than the maximum lot size.

### Other Vancouver Development Codes

In addition to the zoning codes identified above, the following sections of VMC Title 20, the City's Land Use and Development Code, apply to the Heights District.

### Parking and Loading

VMC Chapter 20.945, which deals with parking and loading, regulates parking requirements in the City. These requirements specify the number of off-street parking spaces (including loading berths) per land use (e.g., one space per single-family home and one space per 250 square feet for an eating or drinking establishment). Properties zoned CN may count available on-street parking spaces that are immediately adjacent to the development toward the minimum on-site parking requirement.

### Tree, Vegetation, and Soil Conservation

VMC Chapter 20.770, the tree, vegetation, and soil conservation ordinance, provides for the protection, preservation, replacement, proper maintenance, and use of trees, vegetation, and soils. A tree, vegetation, and soil plan is required when a project needs a tree removal permit. The detail required on the plan depends on the level of disturbance, but generally includes a site plan identifying the existing vegetation, the trees to be retained and removed, and the locations of new trees for mitigation (if required), and describing how trees, vegetation, and soils will be protected during construction. The required minimum tree density is 30 tree units per acre for new development, and 30 tree units per acre of site disturbance for commercial, industrial and multi-family (more than four units).

Requirements for street trees are included in VMC Chapter 20.925 (Landscaping); they include requirements that all planting lists be approved by the Planning Official, and that trees be spaced no further than 30 feet apart along the frontage of a development.

### Landscaping

VMC Chapter 20.925, which regulates landscaping, contains numerous requirements for landscaping and screening development, in addition to the street tree requirements noted above. Landscaping requirements include protecting existing vegetation, buffering and screening storage areas, standards for conserving water, and landscape plan requirements.

### Critical Areas Protection

VMC Chapter 20.740, the City's critical areas protection ordinance, provides protection for critical areas, which are defined as wetlands, fish and wildlife habitat conservation areas, geologically hazardous areas, and frequently flooded areas. Critical aquifer recharge areas are protected in VMC Chapter 14.26. Protection of these areas is consistent with the GMA as well as the City's Comprehensive Plan. Critical areas protection stipulates that activity, including development activity, may result in no net loss of functions and values in the critical areas. The critical areas present, or with the potential to be present, in the Heights District are discussed in the Plants and Animals section of this FEIS.

### Archaeological Resource Protection

VMC Chapter 20.710 encourages the identification and preservation of cultural, archaeological, and historic resources. The code requires an archaeological predetermination when the existence of an archaeological site within a disturbance area is probable, as determined based on the Clark County predictive model; or when the disturbance area is proposed within a quarter-mile of a known, recorded archaeological site; or when any item of archaeological interest is discovered during ground-disturbing action; or when the Planning Official determines that reliable and credible information indicates the probable existence of an archaeological site. Additional information related to archaeological resources is included in the Historic and Cultural Resources section.

### Site Plan Review

VMC Chapter 20.270 requires site plan review prior to the issuance of building permits, the establishment of any new uses, or the commencement of any site work. The purpose of site plan review is to ensure the design of site improvements and building improvements is consistent with applicable standards, minimizes adverse impacts on surrounding land uses, and allows and encourages flexibility in the design and layout of site improvements and buildings and innovation in design and construction.

## Impacts

This section describes the potential land use impacts that could result from each of the three alternatives considered in the EIS.

### No Action Alternatives

Under both No Action Alternatives, the City would not adopt a subarea plan or associated implementing tools (zoning or code amendments) for the Heights District. The existing Comprehensive Plan land use and zoning designations and development ordinances would remain unchanged. The type, form, and amount of development would depend on market conditions and the situations and goals of individual property owners consistent with the established regulations. Redevelopment would not be guided by a cohesive plan or overarching vision. Land use impacts unique to each No Action alternative are discussed below.

#### No Action Base Alternative

##### Land Uses and Land Use Patterns

Under the No Action Base Alternative, land use patterns in the Heights District are not anticipated to change. No cohesively planned redevelopment is assumed in the No Action Base Alternative and, therefore, the Tower Mall property and others would remain underutilized and no existing land uses would be displaced. Over time, the area might redevelop but not according to a cohesive plan. Pedestrian and vehicle circulation improvements, which can affect adjacent land uses, also would occur incrementally as development is proposed. Given the limited amount of development anticipated under the No Action Base Alternative, the low density land use character of the area is not anticipated to be impacted.

##### Population and Employment

The No Action Base Alternative assumes an increase of 192 residential units and approximately 7,200 square feet of commercial development, which equate to approximately 478 more people and 19 new jobs in the Heights District. This increase would occur incrementally over time, as development would not be driven by a coordinated planning effort. No adverse impacts on population and employment are expected.

##### Plans and Policies

The Comprehensive Plan identifies the MacArthur/Mill Plain intersection as one of several future “urban centers” where the City intends to develop and adopt subarea plans. Under the No Action Base Alternative, the City would not adopt a subarea plan for the Heights District and, therefore, this alternative would not align with Comprehensive Plan policies directing growth to urban centers and corridors.

##### Compliance with Zoning and Applicable Ordinances

Development in the plan area under the No Action Base Alternative is expected to comply with the City land use and development code. Therefore, no impacts or changes to the code are expected.

### No Action High Alternative

#### Land Uses and Land Use Patterns

Under the No Action High Alternative, the proposed residential and limited commercial land uses would be consistent with the current land uses present in the Heights District. Over time, the quantity of residential development assumed under the No Action High Alternative would intensify the low density residential nature of existing development with a shift to more medium and higher density residential development. Impacts to existing land uses would occur as properties within the area are redeveloped. As development under this alternative would occur incrementally over time, existing land uses could be impacted by piecemeal development and an overall intensification of the land use pattern of the area.

#### Population and Employment

Under the No Action High Alternative, development would add approximately 1,650 residential units and 62,000 square feet of commercial development, which would equate to approximately 4,113 people and 161 jobs. This increase would occur incrementally over time and would be anticipated to be incorporated into future Comprehensive Plan growth projections. No adverse impacts to population or employment are expected.

#### Plans and Policies

Similar to the No Action Base Alternative, the No Action High Alternative would not result in the adoption of a subarea plan for the Heights District and, therefore, would not align with Comprehensive Plan policies directing growth to urban centers and corridors.

#### Compliance with Zoning and Applicable Ordinances

Development in the plan area under the No Action High Alternative is expected to comply with the city's land use and development code. Therefore, no impacts or changes to the code are expected.

### Project Alternative

Under the Project Alternative, the Heights District Plan would be formally adopted as an amendment to the Comprehensive Plan. The plan provides direction for new business and housing developments, as well as improvements to open space and transportation facilities. At full buildout, the Project Alternative would provide approximately 1,800 new dwelling units, 4,482 more people, and 490-510 new jobs.

#### Land Uses and Land Use Patterns

Implementation of the Heights District Plan would contribute to an intensification of residential, office, and commercial uses within the Heights District and would alter the existing character of the Heights District and surrounding area.

Adoption of the subarea plan would result in the incremental redevelopment over time of underutilized properties within all zoning districts in the subarea. This would result in some displacement of existing businesses. However, it is anticipated these businesses would have the opportunity to relocate within new mixed-use developments. At full buildout, the plan includes approximately the same commercial square footage that currently exists within the Heights District. The proposed increase in jobs is based on the type of commercial uses included in the plan.

The Project Alternative anticipates significant public and private investment in the plan area. As described in the Project Alternative section, the plan includes the development of the Loop, redesign and reconstruction of the existing roadways through and surrounding the Heights District, and the development of new parks and civic spaces. While these infrastructure improvements do not directly result in changes to land use, together with the proposed mixed-use development included in the Project Alternative, they would change the character of the plan area.

Mitigation to offset impacts associated with this densification and intensification of land uses is described in the Heights District Plan and identified in the Land Use Mitigation Measures section.

#### Population and Employment

Over a 20-year period, development under the plan would result in 1,800 additional residential units, which equates to approximately 4,482 additional residents. The plan is also expected to increase employment by approximately 490-510 new jobs. Although development under the plan would result in more people living and working in the Heights than under either of the No Action Alternatives, the increase would still occur incrementally over time. The City's Comprehensive Plan identifies a citywide population increase of 40,095 people from 2011 to 2030. The Comprehensive Plan does not identify a population increase specific to the Heights District. It is assumed that the population increase associated with the Heights District Plan would be accommodated within the overall growth projections for the City.

Additionally, the Heights District Plan calls for mixed-income housing and the integration of a variety of housing types, which can have a positive impact on the overall socioeconomic conditions of the plan area. The plan targets 25 to 40 percent of housing units as income based units, including low to moderate income family housing, senior housing, and live/work units.

### Plans and Policies

The Project Alternative is the only alternative that would align with the City's Comprehensive Plan. The Comprehensive Plan identifies the area as a future "urban center," and the adoption of the Heights District Plan would constitute the completion of the subarea planning process as envisioned in the Comprehensive Plan. Per the Comprehensive Plan, urban centers can provide opportunities for growth where services can be provided more efficiently, and are envisioned as areas expected to contain a mixture of employment, housing, and cultural opportunities. The proposed mixed-use development and infrastructure improvements included in the Heights District Plan are consistent with the goal established in the Comprehensive Plan for urban centers.

The plan is also consistent with other Comprehensive Plan policies supporting the integration of land uses and transportation systems and providing for higher density development near public transportation facilities. Adoption of the plan would allow the coordinated improvement of utilities and transportation infrastructure, which would support the Comprehensive Plan. Implementation of the plan would include updates to the City's capital facility and transportation plans to reflect the improvements included in the Heights District Plan. Based on these implementation measures, the Heights District Plan is consistent with applicable City plans and policies.

### Compliance with Comprehensive Plan and Zoning Designations

Adoption of the Heights District Plan would result in amendments to the Comprehensive Plan designation and zoning of some areas identified on Figures 8 and 9, respectively. In addition to these areas, there are five church properties (Vancouver Heights United Methodist Church, Northcrest Community Church, People's Church, Slavic Grace Baptist Church, and Trinity Baptist Church) and the Veterans of Foreign Wars property included within the plan boundary that were previously identified for rezoning. Based on public comments received on the draft Heights District Plan and the DEIS, the Heights District Plan does not propose the rezone of these properties. However, individual property owners could request site-specific rezones in the future and therefore, the impacts of rezoning these properties is still evaluated below. This evaluation only analyzes the potential impacts of those zone changes should they be requested in the future by individual property owners or by other consideration.[7]

~~In the near term, a~~Adoption of the plan plus the addition of the church properties and the Veterans of Foreign Wars property would increase the amount of land in the subarea designated Commercial by the comprehensive land use map. Table 13 identifies the ~~proposed~~ potential Comprehensive Plan map amendments (based on the plan and potential future rezoning of church properties and the Veterans of Foreign Wars property). In total, 27 acres would ~~will~~ be converted to Commercial from residential, public facility, and open space designations. Corresponding zone changes would ~~will~~ convert approximately 70 acres to a new use zone proposed under the plan. The zone changes include the 27 acres included in the Comprehensive Plan designation amendments and an additional 43 acres of existing commercial property. Zone changes are outlined in Table 14. ~~Figure 8 shows the location of the proposed comprehensive plan map amendments and Figure 9 shows the location of the proposed zone changes.~~

*Table 13. Comprehensive Plan Map Amendments*

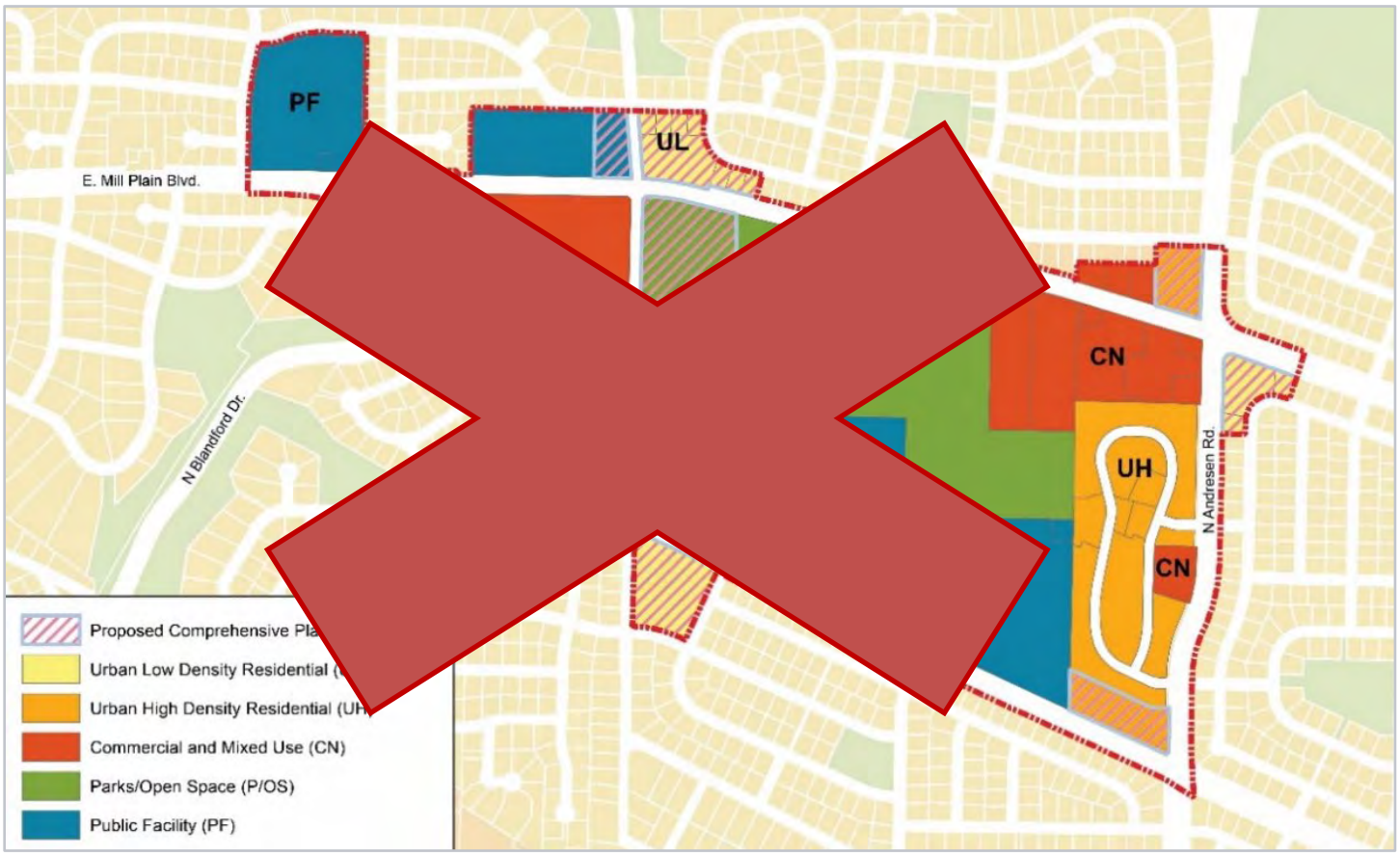
| Existing Designation | Proposed Designation | Acreage |
|---|---|---|
| Public Facilities | Commercial | 1.5 |
| Urban Low Density Residential | Commercial | 9.8 |
| Urban High Density Residential | Commercial | 4.7 |
| Open Space | Commercial | 11.0 |
| Total | | 27.0 |

*Table 14. Zone Changes*

| Existing Zone | Proposed Zone | Acreage |
|---|---|---|
| R-18 | Heights Mixed Use | 4.7 |
| R-9 | Heights Mixed Use | 5.3 |
| R-6 | Heights Mixed Use | 4.0 |
| R-4 | Heights Mixed Use | 2.0 |
| Park | Heights Mixed Use | 11.0 |
| CC | Heights Mixed Use | 41.5 |
| CN | Heights Mixed Use | 1.5 |
| Total | | 70.0 |

[7] Policy L-12 in the Land Use section of the Heights District Plan, indicates properties that request a rezone in the future should be rezoned to HX with the District Gateway sub-district design standards and guidelines applied.

*Figure 8. Proposed Comprehensive Plan Map Amendments in the Heights District Plan*



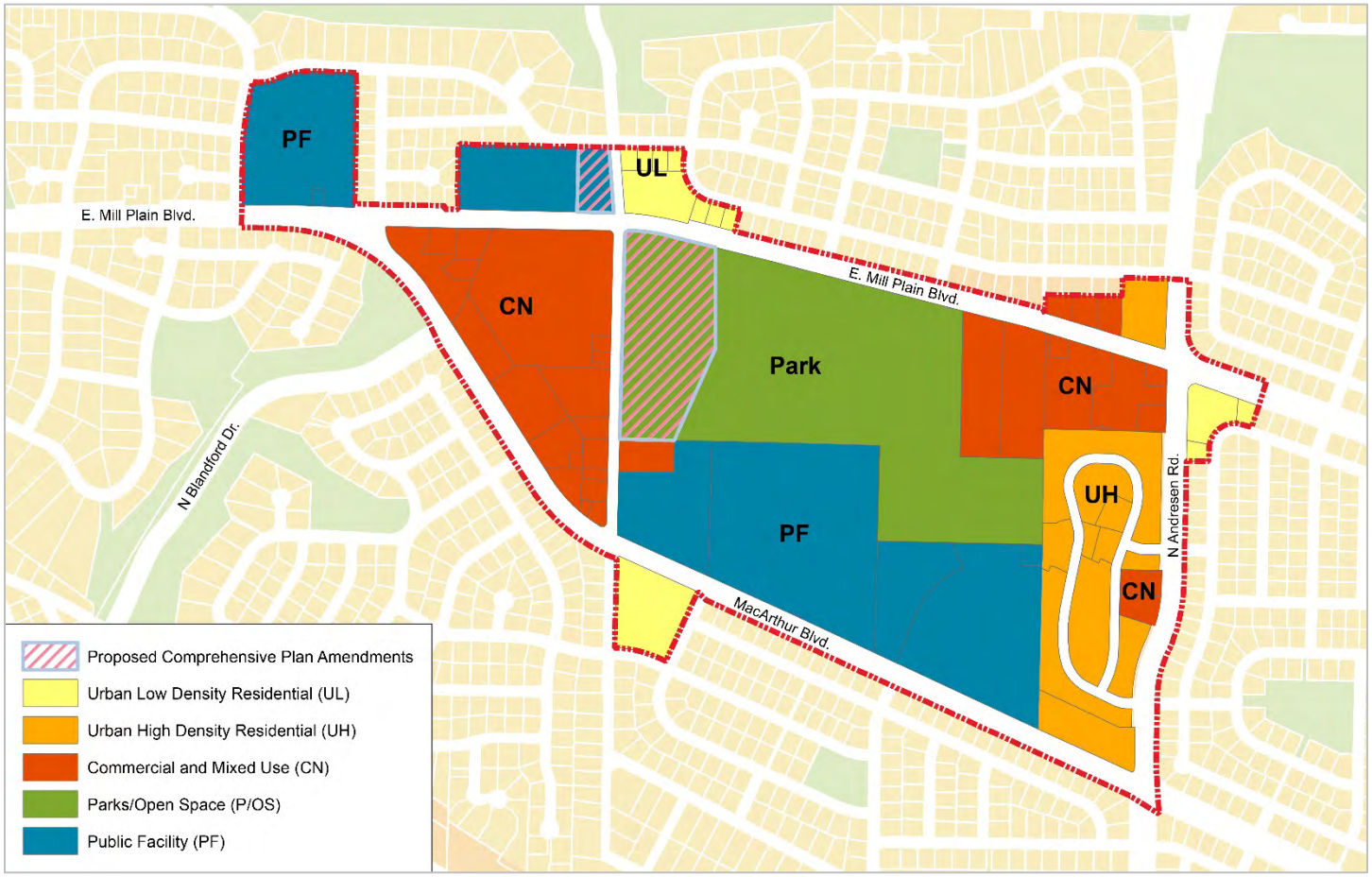
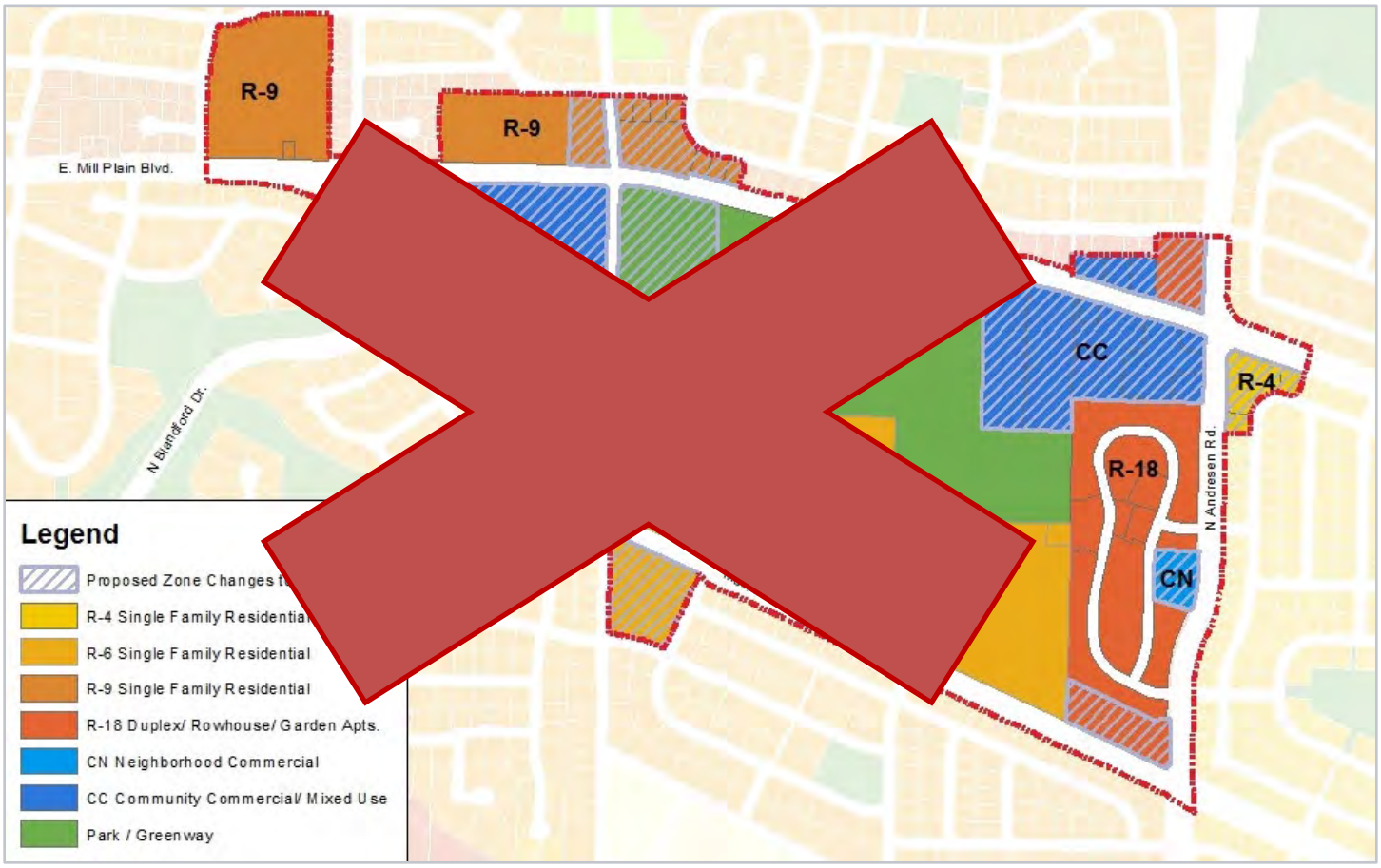



*Figure 9. Proposed Zone Changes in the Heights District Plan*




### Compliance with Applicable Ordinances

The proposed plan recommends amendments to various chapters within Title 20. The amendments include the addition of a new mixed-use zone (Heights Mixed Use [HX]) and plan district for plan implementation. Development standards for the HX zone and associated design guidelines will be created as part of the first stage of implementation of the plan, and will require a separate Planning Commission and City Council adoption process, including opportunities for public input and review. The new zone ~~is~~ will be based on the City's current CX zone and is anticipated to include specific standards and requirements related to building massing and scale, articulation, and other considerations in the application of sub-districts. Development standards for the proposed HX zone, compared to current standards for the CN and CC zones (applicable zones under the No Action Alternatives), are listed in Table 15. Uses allowed in the HX zone are similar to those allowed in the CC and CN zones and include residential, commercial, retail, commercial, office, hospitality, civic, public facilities, and parks and open spaces.

*Table 15. Proposed HX Development Standards*

| Standard | CN | CC | Proposed HX |
|---|---|---|---|
| Minimum lot size | None | None | None |
| Minimum lot width | None | None | None |
| Minimum lot depth | None | None | None |
| Maximum lot coverage | Determined by compliance with other applicable standards (e.g., landscaping) | | 100% (subject to additional development standards applicable to the Heights Plan District) |
| Minimum setbacks adjacent to residential district | Adjacent to residential district: Pursuant to the screening and buffering standards contained in VMC Tables 20.925.030-1 and 20.925.030-2, plus an additional 1/2 foot for each foot the building exceeds 20 feet in height to a maximum setback requirement of 40 feet. Buildings in excess of 20 feet may be stepped.<br>Adjacent to nonresidential district: Pursuant to screening and buffering standards contained in VMC Tables 20.925.030-1 and 20.925.030-2. | | **Front:** Commercial/ Office/Institutional: None. Activity zone requires a build-to line at the property line.<br>Residential: 6 feet minimum and 10 foot maximum.<br>**Rear and rear through street:** None.<br>**Side:** 5 feet when abutting existing residential uses; otherwise none.<br>**Street Side:** None |
| Maximum height | 35 feet | 50 feet | 80 feet (6 stories)<br>Taller structures and buildings with perceived greater massing will be located in the core Activity Center sub-district, and buildings will be subject to height transition requirements from the core area to the perimeter of the Redevelopment Area.<br>Development in the District Gateway sub-district will be subject to height transition requirements and standards that vary based on applicable conditions, including but not limited to: abutting or adjacent to single-family residential uses, and adjacent or abutting different roadways based on classification (i.e. principal arterial, minor arterials, and collector arterials). |
| Minimum landscaping | 15 percent | 15 percent | None (subject to additional design standards and guidelines included in the Heights Plan District). |

## Mitigation Measures

### Mitigation Measures Designed into the Project

With the adoption of the Heights District Plan and a planned action ordinance, the Proposed Alternative enables a planned approach to site redevelopment ensuring a consistent quality and character of design throughout the Heights District. The Project Alternative includes the following measures to mitigate potential impacts associated with increased development and density.

- **Adoption and adherence to the standards included in a new HX zone and Heights Plan District to implement the Heights District Plan, including standards to address building height adjacent to residential zones.**
- **Adoption and adherence to the Heights District design standards and guidelines, which include standards to address building scale and mass, landscaping, lighting, and infrastructure design.**
- ~~**Regulation of legal non-conforming uses created by the adoption and implementation of the Heights District Plan under VMC 20.930, Nonconforming Situations.**~~
- **Adherence to parking standards for the Heights Plan District and included within VMC 20.945, Parking and Loading.**
- ~~**Adherence to the standards and provisions included in VMC 20.935, Off-Site Impacts.**~~

### Existing Regulations and Other ~~Potential~~ Mitigation

- **Legal non-conforming uses created by the adoption and implementation of the Heights District Plan are regulated under VMC 20.930, Nonconforming Situations.**
- **Adherence to the standards and provisions included in VMC 20.935, Off-Site Impacts.**

No additional mitigation measures have been identified beyond existing regulations and those already included in the project, as described above.

## Significant Unavoidable Adverse Impacts

The impacts of increased bulk and scale would be mitigated with the implementation of the Heights District design standards and guidelines and new HX zone regulations codified in the VMC. While the study area will potentially change in character and scale compared to existing conditions, if proposed mitigation strategies are implemented, no significant unavoidable adverse impacts are anticipated.

# Aesthetics, Light and Glare

This section assesses the details of the existing visual setting of the Heights District and evaluates how development associated with the study alternatives would affect the visual character, including landforms, land cover, scenic views, and light and glare.

## Affected Environment

This section describes the applicable regulations associated with the assessment of aesthetics, the existing landscape setting, including the extent of vegetation and open space, as well as the area of potential effect as it relates to aesthetics, light and glare.

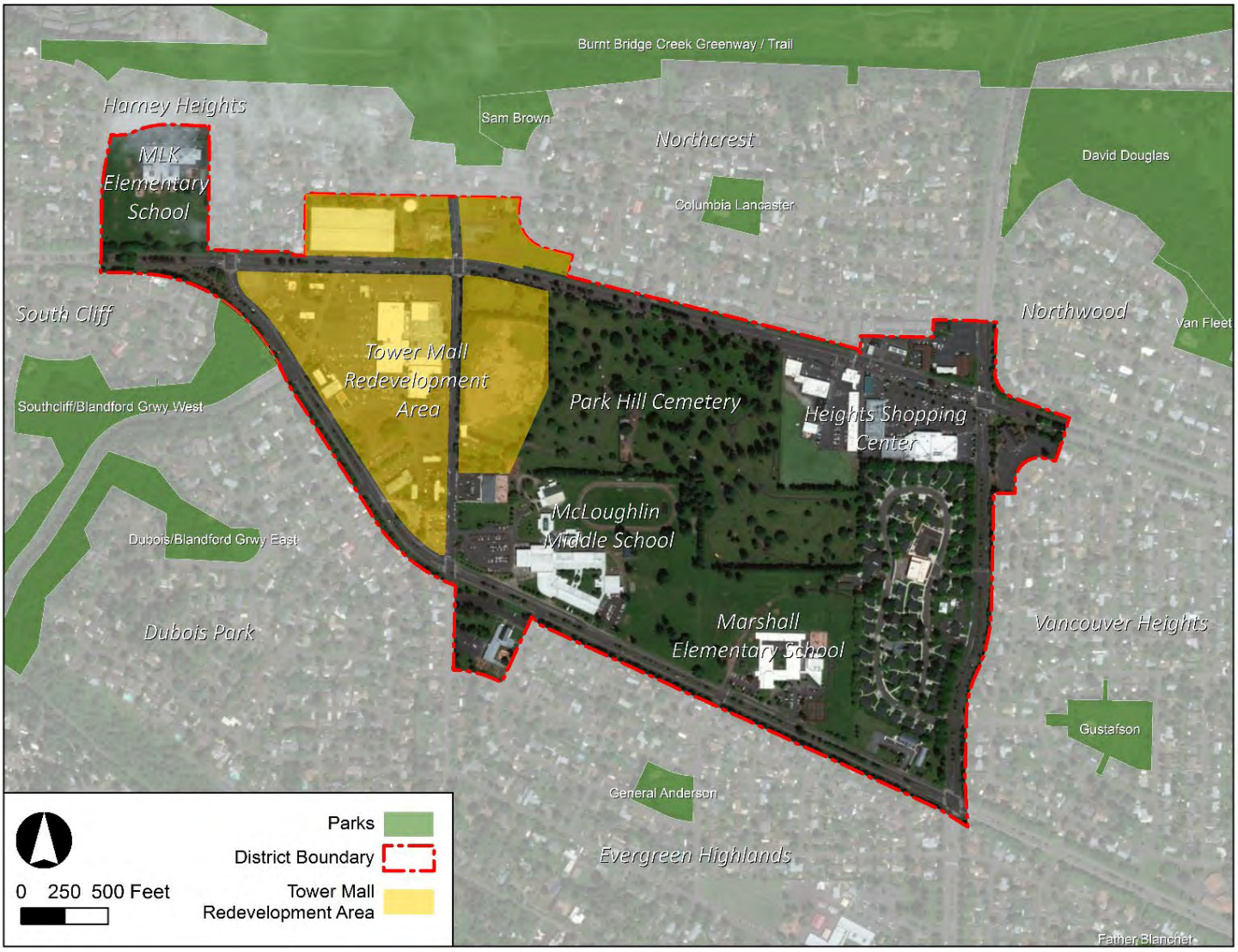
### Applicable Regulations

State and local regulations, statutes, and guidelines require review of the potential environmental impacts that could result from the study alternatives. WAC 197-11-444 (2biii and iv) identifies aesthetics and light and glare as elements of the environment applicable to SEPA review. City SEPA regulations are codified in VMC 20.790 and per VMC 20.790.310, the City adopts by reference the SEPA rules for preparing environmental impact statements.

### Regional and Local Landscape Settings

The Heights District is located within an urbanized setting amid a natural landscape that is characteristic of the Pacific Northwest region of the United States. Existing terrain elevation varies by only a few feet across the Heights District with large deciduous and evergreen trees as the dominant natural features within the Park Hill Cemetery property. The remainder of the Heights District is dominated by views of the built environment, including existing commercial, retail, civic, and residential areas. Figure 10 identifies existing parks, open space, and natural areas and development within and surrounding the Heights District.

*Figure 10. Existing Visual Character*




The Heights District and immediate surroundings are heavily modified from their original natural state and typified by relatively flat expanses of impervious surfaces (streets, parking lots, and man-made structures) (Figure 11). Residential areas provide some ornamental landscaping and vegetated areas (Figure 12). The Park Hill Cemetery, Vanco driving range, and school sites also provide some landscaping and open space. The surrounding area also includes the Burnt Bridge Creek Greenway to the north of the Heights District and several parks of varying sizes (see Figure 10).

*Figure 11. Surrounding Residential Area (Dubois Park)*

*Figure 12. Tower Mall Site*

### Area of Visual Effect

Existing land uses and vegetation completely obscure the Heights District for viewers beyond approximately 0.5 mile. No direct views to or from the site are expected beyond 0.5 mile. Therefore, the area of visual effect (AVE) for the Heights District Plan is for viewers within a foreground proximity zone.

## Impacts

The section describes the potential aesthetic, light and glare impacts that could result from each of the three alternatives considered in the EIS. Development under any of the three alternatives would change the aesthetic character of the Heights District and have the potential to impact light and glare. Impacts are addressed qualitatively compared to existing conditions as described in the affected environment section.

### No Action Alternatives

Impacts to visual resources and light and glare are anticipated to be similar for each of the No Action Alternatives. Because development under the No Action Alternatives would be limited to uses allowed under existing zoning and applicable development regulations, new development is expected to be similar in scale, form, and materiality to the existing development found in the area. Under the No Action Base Alternative, the existing commercial development is anticipated to remain and no redevelopment is assumed. Under the No Action High Alternative, the density of man-made structures would increase and some redevelopment, including demolition and redevelopment of the Tower Mall property, is anticipated.

Under the No Action Alternatives, existing street lights, parking lot lights and light sources on existing buildings will remain. Existing light fixtures may be dated and can contribute to urban light pollution. Furthermore, existing expansive parking lots with little landscaping do not sufficiently reduce light and glare impacts from on-site vehicles or from vehicles traveling along adjacent roadways. Additional light sources would be included in redeveloped areas and would require compliance with current regulations.

Development under either of the No Action Alternatives will likely be visually compatible with existing development. No significant scenic views exist on or off the site. Impacts to light and glare could be improved in redeveloped areas, but are anticipated to remain unchanged throughout much of the site. Overall impacts to visual quality are expected to be neutral.

### Project Alternative

The Project Alternative will have a coordinated set of aesthetic guidelines that will regulate scale, form, massing, and materiality throughout the Heights District. The development will be visually compatible even as the density of man-made structures is increased. Landscape requirements for streets, parking lots and individual sites will help to unify the development and screen light and glare impacts. Views into the Heights District from surrounding areas will change as a result of the increased density included in the Project Alternative. However, no significant scenic views exist on or off the site and adherence to the Heights urban design guidelines will ensure continuity of design and the new open space, parks, and greenways included in the plan will add visual interest to the Heights District, which is anticipated to provide an overall improvement to views.

The Project Alternative will result in new light sources, including building, street, and pathway lighting. However, the overall amount of light emanating from the proposed development is expected to result in less light pollution because of the lighting design standards incorporated into the plan as well as the increase in site and street landscaping, which will reduce vehicular light and glare.

Aesthetic, light, and glare conditions will be enhanced as existing expansive parking lots, vacant structures, and outdated lighting are replaced. Overall impacts to visual quality from the Project Alternative are expected to be beneficial.

## Mitigation Measures

### Mitigation Measures Designed into the Project

Adoption and enforcement of the Heights District urban design standards and guidelines will help shape the character, urban form, and public spaces of the Heights District. The guidelines establish baseline development standards, as well as flexible guidelines to implement the overall plan vision and goals. The standards include requirements for light fixtures to reduce light pollution. Adherence to the design standards and guidelines will minimize impacts to visual resources and light and glare.

### Existing Regulations and Other Mitigation

No additional mitigation measures ~~are recommended~~have been identified beyond those already included in the project, as described above.

## Significant Unavoidable Adverse Impacts

With the implementation of the project's mitigation measures, no significant unavoidable adverse impacts to visual resources or light and glare are anticipated.

# Historic and Cultural Resources

This section summarizes the known or potential historic and cultural resources within the Heights District, and assesses the potential impacts, mitigation measures, and unavoidable adverse environmental impacts of the project on archaeological sites and historic buildings and structures. AINW conducted historical research, a historic building survey, and an overview of archaeological resources for the City between May and June 2019. AINW's report is included as Appendix E.

## Affected Environment

This section summarizes applicable regulations and the results of background research and a field reconnaissance to verify and identify potential archaeological and historic resources within the Heights District.

### Applicable Federal, State, and Local Regulations

#### National Register of Historic Places

The National Park Service administers the National Register of Historic Places (NRHP) which is the official national list of districts, sites, buildings, structures and objects deemed significant in United States history, architecture, archeology, engineering and culture. Nominations for listings in Washington are coordinated by the Washington State Advisory Council on Historic Preservation, under the umbrella of the Department of Archaeology and Historic Preservation (DAHP).

#### Section 106

If the future development of parcels within the Heights subarea involves federal funding or permitting, those developments may also be subject to review under Section 106 of the NHPA.

#### Washington State Historic and Archeological Resource Protection

Historic properties and sites in Washington are protected under RCW Chapter 27.34 (State Historical Societies-Historic Preservation) and Chapter 27.48 (Preservation of Historical Materials). Archaeological discoveries are protected under Chapter 27.44 (Indian Graves and Records) and RCW Chapter 27.53 (Archaeological Sites and Resources). The state requires investigation of known archaeological sites and burials, and disturbance of these sites is subject a permit from DAHP.

The Washington Heritage Register (WHR) is the official listing of historically significant districts, sites, buildings, structures and objects. The list is maintained by DAHP and includes any sites listed in the NRHP. If future development of parcels within the Heights subarea involves state capital funding, those developments may also be subject to review under Governor's Executive Order (GEO) 05-05.

#### City of Vancouver Historic and Archeological Resource Protection

Under VMC Chapter 17.39 (Historic Preservation), the City provides a process for the identification, evaluation, and protection of cultural and historic resources and encourages the preservation, restoration, and rehabilitation of these resources for future generations. This applies to properties that are listed in or eligible for listing in the historic or cultural resource inventory for Clark County and to properties that are listed in or eligible to be listed in the NRHP, the WHR, and the Clark County Heritage Register. The Clark County Historic Preservation Commission serves as the reviewer for historic properties within the City of Vancouver.

Under VMC Chapter 20.710 (Archaeological Resource Protection), the City provides procedures and specific standards for identifying, documenting, and preserving Vancouver's cultural, archaeological, and historic resources. The City adopted a "predictive model" for identifying the probability of an area to contain archeological resources. The City designates the higher probability areas as Level A and the lower probability areas as Level B.

An archaeological study (predetermination) is required for development review of ground-disturbing activities within Level A, or if the disturbance area is at least 5 acres in size and entirely within Level B. In addition, a predetermination is required if the disturbance area is within 1/4 mile of a known, recorded archaeological site.

### Existing Conditions

#### Archaeology

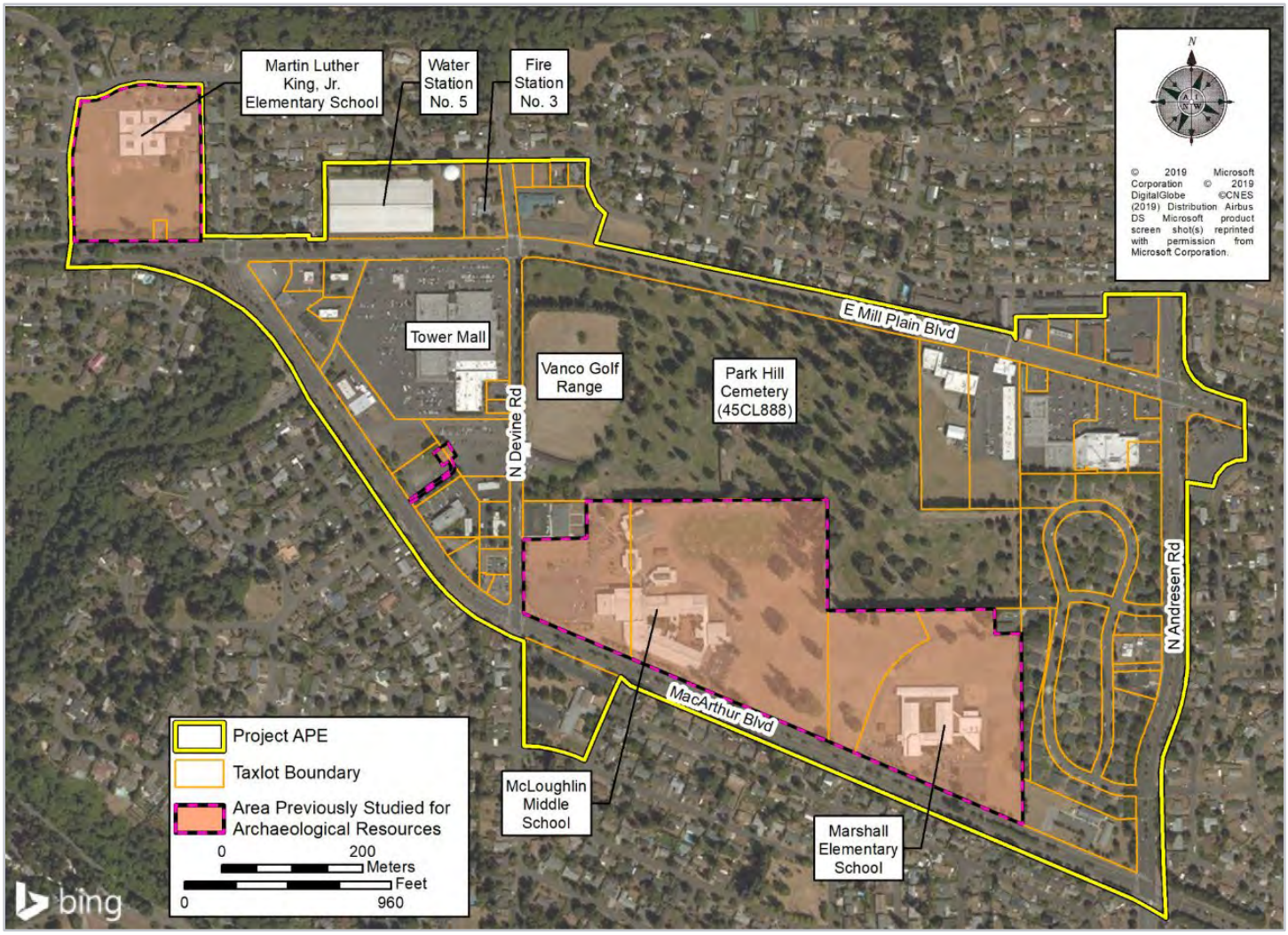
AINW reviewed records available in DAHP's online database, known as the Washington Information System for Architectural and Archaeological Records Data (WISAARD). To date, no archaeological resources have been recorded within the Heights District. Park Hill Cemetery has been assigned a Smithsonian number (45CL888) by DAHP, but it has not been recorded as an archaeological or historic resource.

Washington's statewide archaeological predictive model (available on WISAARD) indicates that the Heights District falls within the category labeled Archaeological Survey Highly Advised: Very High Risk for archaeological resources. Clark County's archaeological predictive model classifies the majority of the Heights District as Level B - Lower Probability for archaeological resources. The northwest portion of the project area is mapped as Level A - Higher Probability for archaeological resources.

Most of the 205-acre project area has not been studied for archaeological resources. Three previous investigations overlap the Heights District (Figure 13). Of these, two were archaeological predetermination studies for Martin Luther King, Jr., Elementary School (Colón 2017) and for the adjoining Marshall Elementary and McLoughlin Middle Schools (Sarjeant and Fackler 2017). The third study was a small archaeological survey completed in 2014 on the north side of MacArthur Boulevard west of Devine Road (Maceyko and Holschuh 2014). All three studies included excavation of shovel tests to look for evidence of buried archaeological deposits. The results of shovel testing for these studies indicated previous subsurface disturbance in these locations. No artifacts or evidence of an archaeological site were identified as a result of these three archaeological studies.

On May 21, 2019, a supervising archaeologist from AINW conducted a field reconnaissance for this project. The reconnaissance included walking along the major roadways within and around the perimeter of the Heights subarea to view existing conditions and assess the potential for subsurface archaeological deposits. Many of the parcels in the Heights District are developed with buildings and paved asphalt and concrete surfaces. Undeveloped and unpaved land was observed on some parcels around existing buildings, at Park Hill Cemetery, and at Vanco Golf Range.

*Figure 13. Locations of Previous Archaeological Studies*



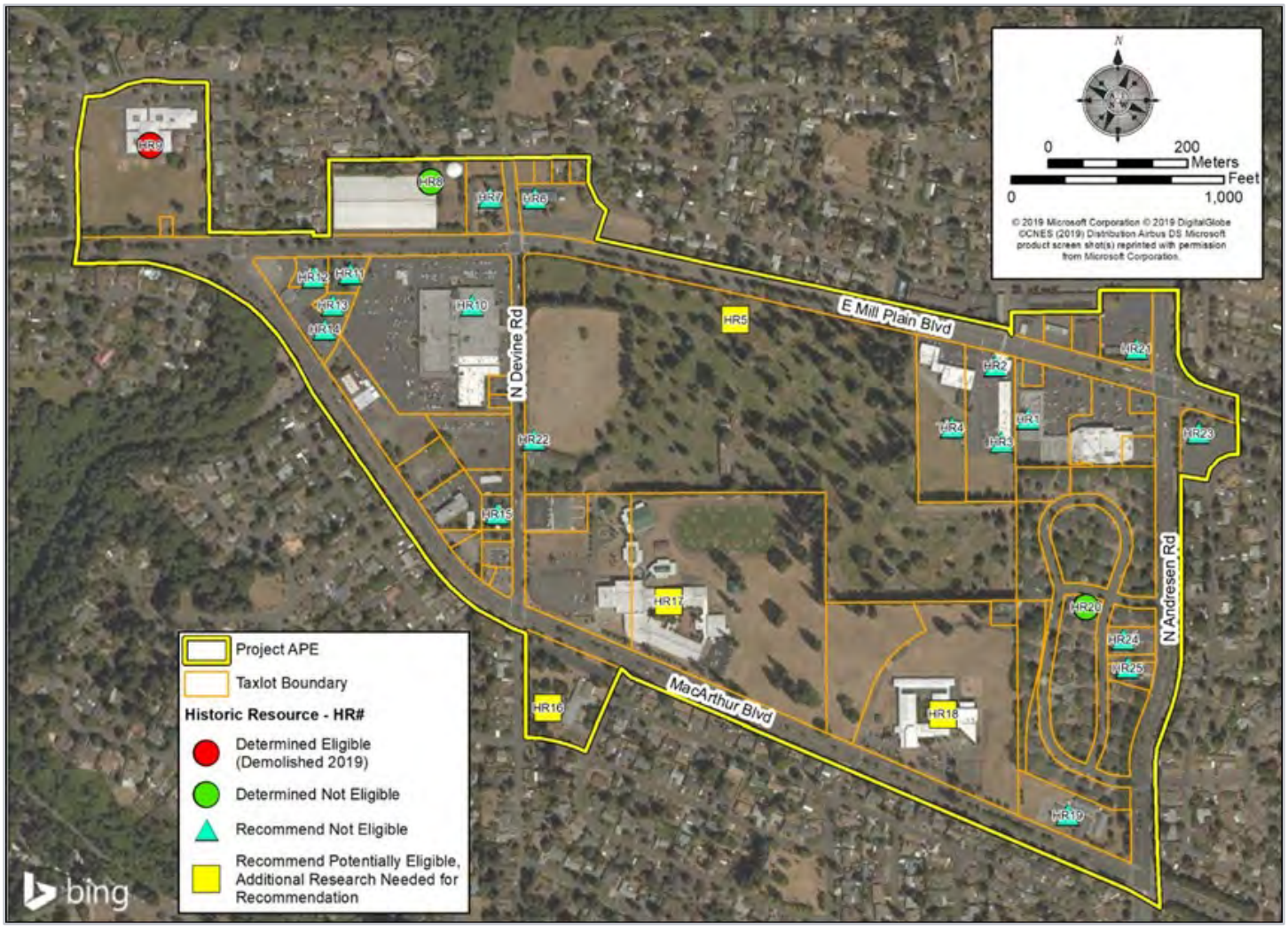
## Historic Resources

The May 21, 2019 AINW field reconnaissance evaluated buildings and structures that were built in or before 1974. AINW also reviewed historical aerial imagery available on Clark County's MapsOnline GIS and Tax Assessor information to confirm dates of construction. Records available on DAHP's WISAARD online database were reviewed to determine which buildings and structures had been previously inventoried and/or evaluated for eligibility for listing in the NRHP. The results of the historic resource analysis are summarized below. Additional information is included in Appendix E.

In total, 25 historic resources were identified within the Heights District (see Figure 14). Twenty-two historic resources have not yet been inventoried or evaluated for NRHP eligibility and three historic resources were previously inventoried and have been evaluated for NRHP eligibility. The three resources previously inventoried include:

- **Martin Luther King, Jr., Elementary School (HR9) was documented as a historic resource in 2019 (Gall 2019). According to information available on WISAARD, DAHP determined the school to be eligible for listing in the NRHP in June 2019. The school building was subsequently demolished in 2019. No further cultural resource work is recommended.**
- **Skyline Crest (HR20) and Water Station No. 5 (HR8) were previously documented for other projects (Mattia 2011, 2012; Pinyerd 2010; Reule 2014). According to WISAARD, the U.S. Department of Housing and Urban Development (HUD) determined Skyline Crest to be not eligible for listing in the NRHP, and Water Station No. 5. was determined by DAHP to be not eligible for listing in the NRHP.**

*Figure 14. Historic Resources within Heights District*



## Impacts

This section describes the potential archaeological and historic resource impacts that could result from each of three alternatives considered in the EIS.

### No Action Alternatives

The potential impacts to archaeological and historic resources are similar for both No Action Alternatives. Under both No Action Alternatives, the Heights District would experience some development and redevelopment (No Action High Alternative). Under both alternatives, new development is assumed to take place on existing vacant parcels identified by the Clark County VBLM. These parcels are located between MacArthur Boulevard and Devine Road (parcels 37910132 and 37910164), and a portion of the sites was previously studied for archaeological resources (Maceyko and Holschuh 2014). As indicated above, the prior study found evidence of previous subsurface disturbance but identified no artifacts or evidence of an archaeological site. Additionally, no historic resources are located on these parcels.

Under the No Action High Alternative, some redevelopment is anticipated and it is assumed this would occur on the Tower Mall site. While no prior archaeological studies have been conducted for this site, it has been previously disturbed and is currently occupied with a paved parking lot and defunct shopping mall. The Tower Mall building was constructed prior to 1974. However, the Archaeological and Historic Resource Report preliminarily identified the structure as not eligible for listing in the NRHP.

Given the level of prior disturbance, impacts to archaeological and historic resources are not anticipated with either No Action alternative. Archaeological predetermination-level studies (or survey-level studies, depending on compliance requirements) are recommended for parcels that have not yet been studied and where development is proposed.

### Project Alternative

The Project Alternative assumes a higher level of redevelopment than the No Action Alternatives and would therefore result in greater site disturbance. Most of the Redevelopment Area and areas identified for redevelopment outside the Redevelopment Area (i.e., corner of E. Mill Plain Boulevard and Andresen Road) have not been previously studied for archaeological resources. However, these areas have been previously developed and prior subsurface disturbance is likely. Recommended mitigation measures are described below to offset any potential impacts to unknown archaeological resources.

As shown on Figure 14, several historic resources are located within the Redevelopment Area. The Archaeological and Historic Resource Report identified all of these resources as "recommended not eligible" for listing in the NRHP. In addition, Water Station No. 5 was previously evaluated and determined not eligible for listing by DAHP.

Redevelopment under the Project Alternative outside the Redevelopment Area could impact historic structures. Of the historic structures outside the Redevelopment Area, the Archaeological and Historic Resource Report identified only one, the Vancouver Heights United Methodist Church located south of MacArthur Boulevard, as potentially eligible for listing. Recommended mitigation measures are described below to offset potential impacts to this resource.

## Mitigation Measures

### Mitigation Measures Designed into the Project

The Project Alternative does not identify any specific measures to address potential impacts to Historic and Cultural Resources. Existing regulations and other mitigation to offset potential impacts are identified below.

### Existing Regulations and Other Mitigation

Under any alternative, all development projects will be required to demonstrate consistency with VMC 17.39 and 20.710, as well as state requirements as listed above. Development review would ensure compliance with VMC, which requires an archaeological study (or predetermination) when any part of the land is in Predictive Model Probability Level A, or when the development is 5 acres or more in size and within Predictive Model Probability Level B, or when it is within 1/4 mile of a recorded archaeological site. All areas that have not been previously included in an archaeological study are recommended for a predetermination-level study.

Specific recommendations are provided below for four parcels owned by the City. None of the City's parcels were previously investigated for archaeological resources. For each of these parcels, an archaeological predetermination study is recommended prior to development, in accordance with VMC Chapter 20.710. For each parcel, at least a portion of the parcel is classified as high probability for archaeological resources according to the Clark County and/or statewide predictive models. If future developments within the Heights District involve federal funding or permitting or state funding, a cultural resource survey for archaeological and historic resources would also be needed to comply with the NHPA and/or GEO 05-05, as applicable.

- **The 11.83-acre Tower Mall parcel (tax lot 37910148) is entirely covered with asphalt and concrete. For that reason, archaeological fieldwork is recommended to include monitoring of geotechnical investigations (if geotechnical investigations are needed) and/or subsurface sampling with a backhoe to investigate subsurface conditions beneath the pavement.**

- **Water Station No. 5 (tax lot 37910014) measures 5.3 acres in size. Archaeological fieldwork is recommended to consist of a pedestrian survey and excavation of three to four shovel tests to look for evidence of buried archaeological deposits.**
- **Fire Station No. 3 (tax lot 36359292) measures 1.49 acres in size. An archaeological pedestrian survey and excavation of one to two shovel tests is recommended to look for evidence of buried archaeological deposits.**
- **Vanco Golf Range is within the western portion of tax lot 37909805, which includes Park Hill Cemetery. The level of effort recommended for archaeological fieldwork at Vanco Golf Range is a pedestrian survey and excavation of up to eight shovel tests to look for evidence of buried archaeological deposits.**

Based on the results of the field reconnaissance and background research, the Archaeological and Historic Resource Report offers preliminary recommendations for the historic resources that have not yet been documented.

- **Of the 22 buildings and structures, 18 are recommended to be not eligible for listing in the NRHP. These include commercial buildings, churches, a single-family residence, a Veterans of Foreign Wars post, and a circa 1965 building at Vanco Golf Range.**
- **Four resources are possibly eligible for listing in the NRHP. These include Park Hill Cemetery (HR5), Vancouver Heights United Methodist Church (HR16), McLoughlin Middle School (HR17), and George C. Marshall Elementary School (HR18). McLoughlin Middle School is scheduled for demolition and no additional work is necessary. Additional research is recommended for the other three resources to evaluate their historical significance and NRHP eligibility. ~~Additional research is recommended to evaluate the historical significance of these resources in order to evaluate their NRHP eligibility.~~**

## Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts to archaeological or historic resources are anticipated.

# Transportation

This section discusses the transportation study area and affected environment, potential environmental consequences of project alternatives, and potential mitigation measures. The transportation analysis addresses impacts to level of service for motor vehicles, transit, biking, and walking, as well as parking and the overall transportation system. A traffic impact analysis was completed for the Heights District Plan and is included as Appendix F.

## Affected Environment

This section summarizes the characteristics and performance of the existing transportation system in the project area and connections to surrounding areas.

### Regional Connections

Regionally, the Heights District is well connected to the State and Interstate Highway system. Mill Plain Boulevard provides direct connections to I-5, approximately two miles to the west, and I-205, approximately 2 miles to the east. Andresen Road provides access to SR 500 approximately a mile and a half to the north, and MacArthur Boulevard connects to SR 14 via Lieser Road, approximately a mile to the southeast. Andresen Road and Blandford Road also provide access to SR 14. See Figure 15below.

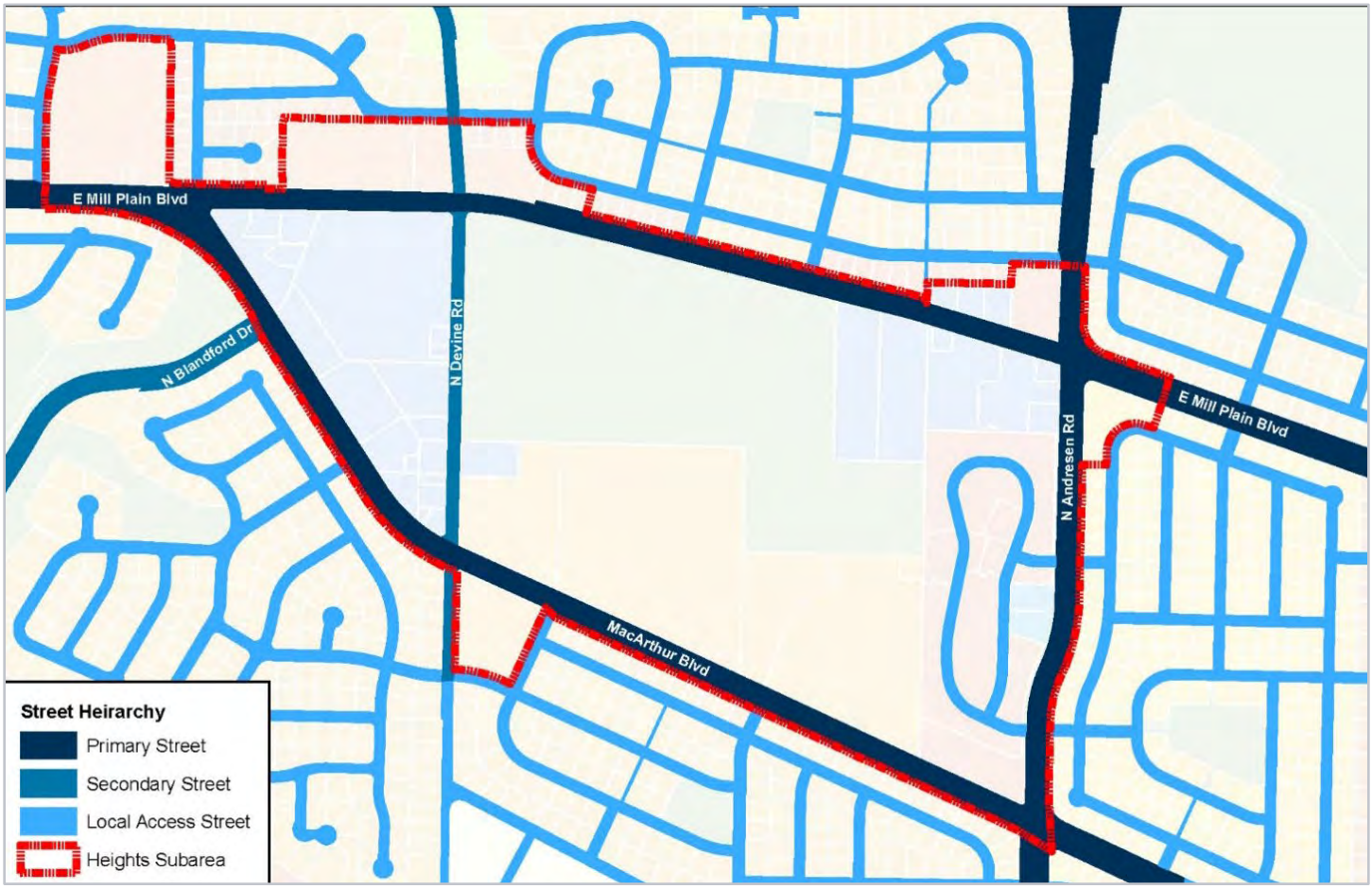
*Figure 15. Regional Connectivity*


## Motor Vehicle Travel

The existing street network surrounding the Heights District reflects the typical network of postwar developments. Connectivity in and around the Heights District is limited and as shown on Figure 16, abutting neighborhoods have relatively few access points into the Heights District. As a result, a few streets carry the burden of the large majority of traffic to and from the adjacent neighborhoods for all modes of travel (people in cars, on bikes, and on foot). In addition, the relatively few number of access points causes out-of-direction travel, which is particularly challenging and inconvenient for people walking or biking.

Figure 16 also highlights the lack of internal connectivity within the Heights District. Devine Road is the only internal connection in the "superblock" created by Mill Plain Boulevard, MacArthur Boulevard, and Andresen Road, with no east west connectivity. The block east of Devine Road is more than 140 acres in size with a perimeter of approximately two miles.

*Figure 16. Street Network*




## Peak Hour Operations

The existing AM peak for most of the study area intersections was determined to be 7:45 AM to 8:45 AM. During the PM period, however, the peak hour varied significantly. Traffic volumes were collected between 2:00 PM and 6:00 PM to account for traffic near the local area schools. Because multiple intersections were heavily influenced by school traffic, it was determined that the individual PM peak hour for each intersection would be used. The peak hours used for analysis at each intersection are shown below in Table 16.

*Table 16. Intersection Peak Hours*

| Intersection | AM Peak | PM Peak |
|---|---|---|
| E Mill Plain Blvd at Brandt Rd/Rhododendron Dr. | 7:45 – 8:45 | 3:00 – 4:00 |
| E Mill Plain Blvd at MacArthur Blvd/Ogden Ave. | 7:45 – 8:45 | 3:00 – 4:00 |
| E Mill Plain Blvd at N Devine Rd. | 7:45 – 8:45 | 3:30 – 4:30 |
| E Mill Plain Blvd at N Andresen Rd. | 7:45 – 8:45 | 4:30 – 5:30 |
| E Mill Plain Blvd at Garrison Rd. | 7:45 – 8:45 | 4:45 – 5:45 |
| E Mill Plain Blvd at Lieser Rd. | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Blvd at N Lieser Rd and St Helens Ave. | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Blvd at N Andresen Rd | 7:45 – 8:45 | 2:45 – 3:45 |
| MacArthur Blvd at N Devine Rd | 7:45 – 8:45 | 3:30 – 4:30 |
| N Andresen Rd at NE 18th St | 7:45 – 8:45 | 4:30 – 5:30 |
| N Devine Rd at E 18th St | 7:45 – 8:45 | 4:00 – 5:00 |

## Existing Traffic Operations

An existing conditions traffic operations analysis for the project area intersections was performed using Synchro (version 10). A summary of the AM and PM peak hour intersection delay and level-of-service (LOS), and a summary of the AM and PM peak hour intersection volume-to-capacity (v/c) ratios, are provided in the tables below. Detailed Synchro, HCM, and Queue reports for existing conditions are provided in Appendix F.

As shown in Table 17 and Table 18, most project area intersections are operating at level of service (LOS) D or better except for the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which is operating at LOS F in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E. As indicated in Table 19, multiple intersections are operating over-capacity, with v/c ratios that exceed 1.0; including E Mill Plain Boulevard and N Andresen Road in the AM peak hour and the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection in both the AM and PM peak hours. The E Mill Plain Boulevard and N Lieser Road intersection is operating close to capacity (v/c of 0.96) in the PM peak hour.

*Table 17. Existing Intersection Delay and Level of Service – AM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.4 | A | 9.2 | A | 23.2 | C | 56.0 | E | 16.8 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 6.2 | A | 8.0 | A | 22.8 | C | 12.4 | B | 9.7 | A |
| E Mill Plain Boulevard at N Devine Road | 15.5 | B | 21.1 | C | 36.5 | D | 32.9 | C | 23.1 | C |
| E Mill Plain Boulevard at N Andresen Road | 30.1 | C | 27.0 | C | 36.2 | D | 73.0 | E | 46.7 | D |
| E Mill Plain Boulevard at Garrison Road | 15.3 | B | 9.6 | A | 24.4 | C | 32.5 | C | 14.6 | B |
| E Mill Plain Boulevard at N Lieser Road | 15.1 | B | 20.0 | B | 26.5 | C | 31.1 | C | 19.7 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 109.2 | F | 83.5 | F | 134.4 | F | 106.4 | F | 111.7 | F |
| MacArthur Boulevard at N Andresen Road** | 18.8 | C | 18.8 | C | 16.2 | C | 21.3 | C | 19.3 | C |
| MacArthur Boulevard at N Devine Road** | 10.1 | B | 9.5 | A | 10.2 | B | 10.3 | B | 9.9 | A |
| N Andresen Road at NE 18th Street | 59.5 | E | 67.5 | E | 25.4 | C | 26.5 | C | 35.6 | D |
| N Devine Road at E 18th Street | 10.3 | B | 10.9 | B | 21.1 | C | 20.0 | B | 13.6 | B |

**Unsignalized intersection; intersection results based on HCM 6 AWSC report.
Red = Approach or intersection operating at LOS F.

*Table 18. Existing Intersection Delay and Level of Service – PM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.2 | A | 4.0 | A | 12.0 | B | 32.4 | C | 10.0 | A |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 12.6 | B | 8.4 | A | 29.1 | C | 12.7 | B | 14.5 | B |
| E Mill Plain Boulevard at N Devine Road | 27.5 | C | 29.8 | C | 29.6 | C | 18.4 | B | 27.7 | C |
| E Mill Plain Boulevard at N Andresen Road | 34.2 | C | 35.1 | D | 61.5 | E | 44.4 | D | 40.3 | D |
| E Mill Plain Boulevard at Garrison Road | 18.5 | B | 10.8 | B | 75.6 | E | 69.0 | E | 23.1 | C |
| E Mill Plain Boulevard at N Lieser Road | 20.7 | C | 28.1 | C | 38.2 | D | 38.8 | D | 27.2 | C |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 43.4 | E | 30.0 | D | 81.5 | F | 57.2 | F | 59.1 | F |
| MacArthur Boulevard at N Andresen Road** | 18.2 | C | 14.0 | B | 14.9 | B | 15.4 | C | 15.7 | C |
| MacArthur Boulevard at N Devine Road** | 11.6 | B | 9.9 | A | 10.4 | B | 13.7 | B | 11.6 | B |
| N Andresen Road at NE 18th Street | 55.1 | E | 83.2 | F | 40.3 | D | 27.1 | C | 45.7 | D |
| N Devine Road at E 18th Street | 14.7 | B | 16.3 | B | 22.9 | C | 21.4 | C | 17.6 | B |

**Unsignalized intersection; intersection results based on HCM 6 AWSC report.
Red = Approach or intersection operating at LOS F.

*Table 19. Existing Intersection Volume/Capacity Ratios*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.24 | 0.32 | 0.49 | 0.38 | 0.13 | 0.14 | 0.86 | 0.77 | 0.86 | 0.77 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.18 | 0.33 | 0.43 | 0.28 | 0.62 | 0.77 | 0.23 | 0.11 | 0.62 | 0.77 |
| E Mill Plain Boulevard at N Devine Road | 0.28 | 0.66 | 0.72 | 0.72 | 0.61 | 0.67 | 0.61 | 0.26 | 0.72 | 0.72 |
| E Mill Plain Boulevard at N Andresen Road | 0.59 | 0.77 | 0.68 | 0.60 | 0.51 | 0.75 | 1.20 | 0.78 | 1.20 | 0.78 |
| E Mill Plain Boulevard at Garrison Road | 0.49 | 0.74 | 0.40 | 0.47 | 0.42 | 0.84 | 0.57 | 0.99 | 0.57 | 0.99 |
| E Mill Plain Boulevard at N Lieser Road | 0.48 | 0.54 | 0.86 | 0.96 | 0.75 | 0.81 | 0.11 | 0.23 | 0.86 | 0.96 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 1.21 | 0.89 | 1.10 | 0.68 | 1.32 | 1.09 | 1.18 | 0.96 | 1.32 | 1.09 |
| MacArthur Boulevard at N Andresen Road** | 0.51 | 0.55 | 0.55 | 0.33 | 0.37 | 0.36 | 0.57 | 0.40 | 0.57 | 0.55 |
| MacArthur Boulevard at N Devine Road** | 0.18 | 0.32 | 0.26 | 0.21 | 0.16 | 0.12 | 0.22 | 0.45 | 0.26 | 0.45 |
| N Andresen Road at NE 18th Street | 0.81 | 0.85 | 0.76 | 0.92 | 0.73 | 0.78 | 0.64 | 0.53 | 0.81 | 0.92 |
| N Devine Road at E 18th Street | 0.48 | 0.49 | 0.22 | 0.35 | 0.62 | 0.62 | 0.03 | 0.19 | 0.62 | 0.62 |

**Unsignalized intersection; worst stop-controlled movement used for each approach and overall intersection v/c ratio.
Red = Approach or intersection v/c ratio exceeds 1.0

## Transit

Two C-TRAN bus routes provide service to the Heights District. Route 32 operates on Andresen Road and connects the Heights District with Downtown Vancouver to the west and Vancouver Mall to the northeast. Route 37 provides frequent bus service on Mill Plain Boulevard and connects the Heights District with Downtown Vancouver to the west and East Vancouver, including the Fisher's Landing Transit Center, to the east. C-TRAN is currently working on a plan for Bus Rapid Transit (BRT) on Mill Plain Boulevard, which could improve service to and from the area. The Mill Plain Boulevard BRT project is currently in the planning phase and construction funding has not been secured.

Existing transit conditions include a variety of bus stops: in-lane stops without shelter, in-lane stops with shelter, and bus pullouts. The future BRT stop locations are not determined at this time and may differ from the current Route 37 stops.

The existing transit service provides standard access surrounding the Heights District. However, the lack of sidewalks on surrounding residential streets, and lack of curb ramps coupled with existing street widths, make access to transit from within and surrounding the Heights District difficult for those that are mobility impaired. Crossing Mill Plain Boulevard is a barrier for safety reasons, including the width of the roadway, traffic speeds, traffic volumes, and distance between intersections/crossings. Additionally, MacArthur Boulevard is a barrier for those that need Americans with Disabilities Act (ADA) accessible facilities. Access to bus stops from the Heights District and surrounding neighborhoods is circuitous and may require crossing a major roadway.

## Bicycle

Within the Heights District, dedicated bike facilities exist on Mill Plain Boulevard and MacArthur Boulevard. Beyond the Heights District boundary, bike lanes exist on Andresen Road north of Mill Plain Boulevard, on Brandt Road, and on Evergreen Boulevard west of Blandford Drive.

Outside the Heights District, commonly used east-west bike route alternatives to Mill Plain Boulevard are Brandt Road to McLoughlin Boulevard, and 13th Street and Idaho Street in the Harney Heights neighborhood, and Kansas Street in the Northcrest and Northwood neighborhoods. Some of these east-west routes are somewhat circuitous as the uncontrolled crossing at Andresen Road can be challenging due to the amount of vehicular traffic. Blandford Drive, with a posted speed limit of 25 miles per hour, provides connections to bike routes on Evergreen Boulevard and 5th Street. However, while scenic, the roadway is narrow and winding and has significant slopes.

The Burnt Bridge Creek Trail is relatively close to the Heights District to the north and provides regional east-west connectivity. Access to the trail from the Heights District is provided by Devine Road and Andresen Road. No bike facilities exist on Devine Road, but on-street bike lanes are present on Andresen Road north of Mill Plain.

## Pedestrian

The pedestrian network within the Heights District mostly consists of sidewalks along major streets. Devine Road between Mill Plain and MacArthur Boulevard has curb-tight sidewalks on both sides about six feet wide, which provide continuous pedestrian routes. While there is no landscape buffer, on-street parking could provide a buffer between pedestrians and moving traffic. However, street parking is currently infrequent and inconsistent due to frequent driveway interruptions and lower density development, thus exposing pedestrians to moving traffic for significant stretches. As described above, at driveways the existing sidewalk dips to accommodate driveway aprons, necessitated by the lack of a planter strip, which makes for an uneven walk and a challenging condition for people with mobility devices. There is also a lack of ADA ramps at intersections.

Local streets in the neighborhoods around the Heights District tend to be wide, in the range of 32 to 40 feet. With few exceptions, neighborhood streets lack sidewalks or any other pedestrian facilities, forcing people to walk in the street.

There is an existing paved mid-block walkway between N Andresen Road and Helena Avenue that provides a walking route from Mill Plain Boulevard into the Northcrest neighborhood to the north. This walkway counteracts the otherwise limited connectivity and allows for a more direct walking route for residents to transit and destinations along Mill Plain Boulevard. These pathways have no signage or marked crossings when they come out at the street edge.

## Parking

Parking in the Heights District and surrounding area is currently characterized by surface parking lots that serve existing commercial and institutional uses and on-street parking allowed on surrounding residential streets. The majority of the surface parking lots are underutilized, as many of the commercial properties are vacant or also underutilized.

## Impacts

### No Action Alternatives

The No Action alternatives assume growth consistent with the City's currently adopted planning and policy documents, including the Comprehensive Plan and transportation system plan. While the No Action alternatives considered in this EIS anticipate different levels of population and employment growth within the Heights District, it is assumed that, without the adoption of a subarea plan, development would occur incrementally over time and would align with forecasted growth totals for the City. Therefore, the traffic analysis considers a single No Build Alternative, which uses a baseline traffic volume forecast for the planning horizon of 2038. This forecast was developed for the Heights District in coordination with City and Southwest Washington Regional Transportation Council (RTC) staff. Future No Build volumes were post-processed using the most current existing (2010) and future (2035) RTC travel demand models. The RTC regional travel demand models include population and employment data, as well as current and proposed transportation networks for both existing conditions and the forecast year.

#### Motor Vehicle

PM peak hour volume plots from the RTC models were used to determine annual growth rates for all PM peak hour turning movements at the study area intersections. Growth rates for the AM peak hour were developed using the reciprocal movement method. For example, the growth rate for the northbound left-turn movement in the PM peak was used for the eastbound right-turn movement in the AM peak. If no growth was reported, or the future RTC model volume was zero, the existing volumes collected in the field were used.

The No Build Alternative represents future conditions with no redevelopment and only Regional Transportation Plan (RTP) identified improvements. The only improvement assumed for the No Build Alternative is an additional westbound left-turn lane at the E Mill Plain Boulevard and N Lieser Road intersection. The No Build Alternative also includes signal timing optimization where applicable. It is assumed that future redevelopment proposed in the Heights District would require concurrency review and additional transportation improvements could be required at that time.

A summary of the AM and PM peak hour intersection delay and LOS, as well as the AM and PM peak hour intersection v/c ratios, is provided in the tables below. Detailed Synchro, HCM, and Queue reports for the No Build Alternative are provided in Appendix F.

As shown on Table 20 and Table 21, most project area intersections are operating at LOS D or better except for the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which is operating at LOS F in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E. These conditions are similar to the existing conditions.

*Table 20. No Build Intersection Delay and Level of Service – AM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 6.8 | A | 4.1 | A | 28.4 | C | 64.8 | E | 11.8 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 6.9 | A | 10.5 | B | 28.1 | C | 11.9 | B | 12.0 | B |
| E Mill Plain Boulevard at N Devine Road | 12.1 | B | 6.6 | A | 58.9 | E | 39.2 | D | 18.3 | B |
| E Mill Plain Boulevard at N Andresen Road | 24.5 | C | 36.4 | D | 57.3 | E | 16.9 | B | 28.9 | C |
| E Mill Plain Boulevard at Garrison Road | 6.2 | A | 5.2 | A | 45.3 | D | 35.4 | D | 9.0 | A |
| E Mill Plain Boulevard at N Lieser Road | 6.2 | A | 15.9 | B | 29.3 | C | 35.1 | D | 14.6 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 191.6 | F | 130.1 | F | 69.2 | F | 92.2 | F | 125.5 | F |
| MacArthur Boulevard at N Andresen Road** | 20.7 | C | 31.0 | D | 16.7 | C | 26.1 | D | 24.9 | C |
| MacArthur Boulevard at N Devine Road** | 10.4 | B | 10.7 | B | 10.4 | B | 10.5 | B | 10.6 | B |
| N Andresen Road at NE 18th Street | 48.4 | D | 58.9 | E | 34.1 | C | 33.1 | C | 39.1 | D |
| N Devine Road at E 18th Street | 11.4 | B | 11.7 | B | 21.1 | C | 24.3 | C | 14.1 | B |

**Unsignalized intersection; intersection results based on HCM 6 AWSC report.
Red = Approach or intersection operating at LOS F.

*Table 21. No Build Intersection Delay and Level of Service – PM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.6 | A | 5.4 | A | 25.8 | C | 66.7 | E | 14.2 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 7.3 | A | 9.7 | A | 28.4 | C | 12.7 | B | 11.9 | B |
| E Mill Plain Boulevard at N Devine Road | 12.6 | B | 14.6 | B | 61.2 | E | 42.6 | D | 24.1 | C |
| E Mill Plain Boulevard at N Andresen Road | 23.2 | C | 19.4 | B | 62.3 | E | 44.8 | D | 31.2 | C |
| E Mill Plain Boulevard at Garrison Road | 12.8 | B | 9.5 | A | 138.6 | F | 56.2 | E | 19.8 | B |
| E Mill Plain Boulevard at N Lieser Road | 6.6 | A | 18.3 | B | 32.3 | C | 37.9 | D | 15.8 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 123.8 | F | 32.7 | D | 51.3 | F | 48.7 | E | 71.9 | F |
| MacArthur Boulevard at N Andresen Road** | 30.6 | D | 16.6 | C | 15.7 | C | 15.8 | C | 20.0 | C |
| MacArthur Boulevard at N Devine Road** | 15.2 | C | 11.0 | B | 11.0 | B | 19.6 | C | 15.1 | C |
| N Andresen Road at NE 18th Street | 52.3 | D | 66.5 | E | 27.8 | C | 33.6 | C | 39.3 | D |
| N Devine Road at E 18th Street | 18.0 | B | 15.6 | B | 23.9 | C | 24.0 | C | 18.8 | B |

**Unsignalized intersection; intersection results based on HCM 6 AWSC report.
Red = Approach or intersection operating at LOS F.

As indicated on Table 22, only the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection is operating over-capacity (v/c ratio > 1.2) in both the AM and PM peak hours. The E Mill Plain Boulevard and N Andresen Road intersection had a v/c ratio of 1.20 in the existing AM peak hour but has been reduced to 0.79 in the No Build Alternative due to signal timing optimization. The E Mill Plain Boulevard corridor is currently utilizing a 100 second cycle length in the existing AM peak period, whereas a 130 second cycle length was used in the No Build AM peak period, along with changes to lead/lag phasing for protected left turns. The existing PM peak period is utilizing a 120 second cycle length but was optimized to 110 seconds in the No Build Alternative.

*Table 22. No Build Intersection Volume/Capacity Ratios*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.18 | 0.36 | 0.54 | 0.36 | 0.09 | 0.08 | 0.83 | 0.83 | 0.83 | 0.83 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.24 | 0.42 | 0.53 | 0.31 | 0.70 | 0.74 | 0.14 | 0.05 | 0.70 | 0.74 |
| E Mill Plain Boulevard at N Devine Road | 0.27 | 0.48 | 0.64 | 0.42 | 0.85 | 0.86 | 0.58 | 0.59 | 0.85 | 0.86 |
| E Mill Plain Boulevard at N Andresen Road | 0.49 | 0.71 | 0.90 | 0.72 | 0.74 | 0.77 | 0.78 | 0.93 | 0.90 | 0.93 |
| E Mill Plain Boulevard at Garrison Road | 0.45 | 0.78 | 0.48 | 0.53 | 0.59 | 1.06 | 0.57 | 0.92 | 0.59 | 1.06 |
| E Mill Plain Boulevard at N Lieser Road | 0.45 | 0.56 | 0.73 | 0.74 | 0.74 | 0.73 | 0.08 | 0.17 | 0.74 | 0.74 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 1.43 | 1.21 | 1.27 | 0.71 | 1.12 | 1.01 | 1.15 | 0.91 | 1.43 | 1.21 |
| MacArthur Boulevard at N Andresen Road** | 0.54 | 0.78 | 0.80 | 0.46 | 0.41 | 0.38 | 0.77 | 0.37 | 0.80 | 0.78 |
| MacArthur Boulevard at N Devine Road** | 0.19 | 0.50 | 0.38 | 0.26 | 0.13 | 0.11 | 0.18 | 0.61 | 0.38 | 0.61 |
| N Andresen Road at NE 18th Street | 0.77 | 0.87 | 0.77 | 0.77 | 1.05 | 0.85 | 0.81 | 0.59 | 1.05 | 0.87 |
| N Devine Road at E 18th Street | 0.53 | 0.58 | 0.29 | 0.35 | 0.62 | 0.64 | 0.01 | 0.11 | 0.62 | 0.64 |

**Unsignalized intersection; worst stop-controlled movement used for each approach and overall intersection v/c ratio.
Red = Approach or intersection v/c ratio exceeds 1.0

### Transit

The No Build Alternative includes existing transit service and improvement of the existing Mill Plain Boulevard transit line (Line 37) to BRT service. The BRT service will improve frequency, capacity, and user comfort, and is currently planned to serve stops at Devine Road and Andresen Road. The No Build Alternative does not include any access improvements (i.e., crosswalks or sidewalks) to improve accessibility to the existing or planned transit facilities. No impacts to transit are anticipated as a result of the No Build Alternative.

### Bicycle and Pedestrian

The No Build Alternative includes existing bicycle and pedestrian facilities, as well as improvements included in the East McLoughlin Safety Improvement Project (East McLoughlin project). The East McLoughlin project is a City-led project to improve bicycle and pedestrian facilities to meet complete street standards. The first phase of the project is being implemented as a pilot project from the summer of 2019 to the ~~summer~~ fall of ~~2020~~2021 (the pilot period was extended due to COVID-19 and the difficulty in evaluating the pilot given reduced travel for all modes). The first phase includes the following improvements in or in the vicinity of the Heights District.

- **Permanent installation of speed cushions on McLoughlin Boulevard from Reserve Street to Brandt Road**
- **Permanent pedestrian crossing improvements at 13th Street and 32nd Avenue**
- **Pilot installation of buffered bike lanes on McLoughlin Boulevard from Reserve Street to Grand Boulevard**
- **Pilot installation of sharrows/shared street on McLoughlin Boulevard from Grand Boulevard to Brandt Road**
- ~~**Buffered bike lanes on Brandt Road from McLoughlin Boulevard to Mill Plain Boulevard**~~
- ~~**Bike-only slip lane (southbound) from Mill Plain Boulevard to MacArthur Boulevard**~~
- **Protected bike lanes on Mill Plain Boulevard from Brandt Road to MacArthur Boulevard**

A future phase of the project is planned to include the following:

- **Buffered bike lanes on Brandt road from McLoughlin Boulevard to Mill Plain Boulevard**
- **Bike-only slip lane (southbound) from Mill Plain Boulevard to MacArthur Boulevard**
- **Protected bike lanes[8] on Mill Plain Boulevard from Brandt Road to MacArthur Boulevard**

Future development proposed under the No Build Alternative may include bicycle or pedestrian facility improvements; however, improvements would be project-specific and are not anticipated to substantially change the bicycle and pedestrian environment that currently exists in the Heights District. The bike network will likely continue to be comprised of striped bike lanes adjacent to higher speed, higher volume traffic, and shared roadway facilities with limited connectivity to the regional network. Likewise, the pedestrian environment would continue to include narrow, curb-tight sidewalks with frequent driveway crossings and limited connectivity.

The street network under the No Build Alternative would not comply with the city's Complete Streets Policy, which envisions a safe, accessible, interconnected street network that serves all users and modes of travel.

### Parking

Under the No Build Alternative, parking in the Heights District would be developed/redeveloped in conjunction with future development proposals consistent with city parking standards. It is anticipated that parking would continue to be developed as surface lots. No parking impacts are expected as a result of the No Build Alternative.

## Project Alternative

### Motor Vehicle

The Project Alternative anticipates an estimated 1,800 new residential units that will generate approximately 700 to 850 new vehicle trips during the AM and PM peak hours. Assuming the planned BRT stations and new bike/pedestrian infrastructure in the study area, trip generation estimates were reduced by six percent to account for multimodal trips. While there is an increase in jobs anticipated under the Project Alternative (due to the type of commercial uses included in the plan), the net commercial leasable space will effectively remain unchanged. As such, the traffic analysis did not include new commercial trips compared to the No Build Alternative.

[8] Protected bike lanes include some form of barrier (landscape planter, curb, parked cars, posts, etc.) to separate bikes from vehicular traffic.

The Project Alternative represents future conditions with RTP identified improvements and the proposed redevelopment. The RTP improvement includes an additional westbound left-turn lane at the E Mill Plain Boulevard and N Lieser Road intersection. As part of the proposed redevelopment, the existing stop-controlled intersections on MacArthur Boulevard at N Andresen Road and N Devine Road have been converted to single lane roundabouts. N Andresen Road currently has two lanes in each direction but will be reduced to one travel lane in each direction with protected bike facilities. N Andresen Road will transition back to two lanes in each direction south of the E Mill Plain Boulevard intersection.

The MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection is assumed to be signalized under the Project Alternative. The Project Alternative also includes signal timing optimization along the E Mill Plain Boulevard corridor and at the N Andresen Road at NE 18th Street intersection. Signal timing optimization included utilizing a 110 second cycle length for the AM peak and a 120 second cycle length for the PM peak (or half cycle lengths), as well as adjustments to splits, offsets, and lead/lag phasing for protected left turns.

A summary of the AM and PM peak hour intersection delay and LOS, as well as peak hour intersection v/c ratios, is provided in Table 23, Table 24, and Table 25. Detailed Synchro, HCM, and Queue reports for the Project Alternative are provided in Appendix F. As shown below, all project area intersections are operating at LOS D or better in both the AM and PM peak hours. Several intersections have approaches that are operating at LOS E and the northbound approach of Garrison Road at E Mill Plain Boulevard is operating at LOS F in the PM peak, similar to the No Build Alternative. The unsignalized MacArthur Boulevard and N Lieser Road/Saint Helens Avenue intersection, which was operating at LOS F in the No Build Alternative, is operating at LOS C or better in the Project Alternative with a signal.

The E Mill Plain Boulevard and N Andresen Road intersection is operating near capacity, with a v/c ratio of 0.95 in the AM peak hour and a v/c ratio of 0.93 in the PM peak hour. The E Mill Plain Boulevard and Garrison Road intersection is operating over capacity (v/c ratio of 1.14) in the PM peak, but this is due to the low volume side street approach. The N Andresen Road and NE 18th Street intersection is also operating over capacity in the AM peak (v/c ratio of 1.10) due to the northbound left-turn movement. The unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which was operating significantly over-capacity (v/c ratio > 1.2) in both the AM and PM peak hours in the No Build Alternative, is operating at a v/c ratio of 0.83 in both the AM and PM peak hours with the proposed traffic signal.

*Table 23. 2038 Project Alternative Intersection Delay and Level of Service – AM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.5 | A | 8.3 | A | 25.5 | C | 63.1 | E | 15.1 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 10.0 | A | 13.0 | B | 30.0 | C | 10.1 | B | 14.8 | B |
| E Mill Plain Boulevard at N Devine Road | 15.1 | B | 7.6 | A | 61.8 | E | 37.5 | D | 20.4 | C |
| E Mill Plain Boulevard at N Andresen Road | 28.7 | C | 42.2 | D | 57.2 | E | 15.5 | B | 31.1 | C |
| E Mill Plain Boulevard at Garrison Road | 7.2 | A | 5.2 | A | 47.0 | D | 35.1 | D | 9.3 | A |
| E Mill Plain Boulevard at N Lieser Road | 6.9 | A | 15.9 | B | 29.5 | C | 35.0 | C | 14.5 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue | 22.3 | C | 29.2 | C | 14.7 | B | 25.1 | C | 22.4 | C |
| MacArthur Boulevard at N Andresen Road** | 11.1 | B | 11.5 | B | 11.7 | B | 28.1 | D | 17.7 | C |
| MacArthur Boulevard at N Devine Road** | 4.6 | A | 9.4 | A | 4.1 | A | 5.7 | A | 7.5 | A |
| N Andresen Road at NE 18th Street | 47.9 | D | 58.8 | E | 36.3 | D | 34.8 | C | 40.4 | D |
| N Devine Road at E 18th Street | 11.8 | B | 13.2 | B | 19.3 | B | 26.0 | C | 14.5 | B |

**Roundabout intersection; intersection results based on HCM 6 Roundabout report.
Red = Approach or intersection operating at LOS F.

*Table 24. 2038 Project Alternative Intersection Delay and Level of Service – PM Peak*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 11.3 | B | 5.9 | A | 22.6 | C | 64.0 | E | 15.5 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 9.1 | A | 11.9 | B | 30.7 | C | 12.3 | B | 13.8 | B |
| E Mill Plain Boulevard at N Devine Road | 16.8 | B | 13.5 | B | 61.2 | E | 45.6 | D | 26.2 | C |
| E Mill Plain Boulevard at N Andresen Road | 26.7 | C | 23.8 | C | 58.8 | E | 47.6 | D | 33.8 | C |
| E Mill Plain Boulevard at Garrison Road | 11.1 | B | 11.5 | B | 167.6 | F | 55.3 | E | 20.5 | C |
| E Mill Plain Boulevard at N Lieser Road | 13.6 | B | 18.6 | B | 32.5 | C | 37.1 | D | 18.6 | B |
| MacArthur Boulevard at N Lieser Road and S. Helens Avenue | 33.0 | C | 24.7 | C | 17.2 | B | 38.4 | D | 27.3 | C |
| MacArthur Boulevard at N Andresen Road** | 11.3 | B | 9.7 | A | 11.2 | B | 11.4 | B | 10.9 | B |
| MacArthur Boulevard at N Devine Road** | 8.0 | A | 7.0 | A | 6.4 | A | 7.5 | A | 7.4 | A |
| N Andresen Road at NE 18th Street | 52.9 | D | 65.5 | E | 33.9 | C | 37.6 | D | 42.8 | D |
| N Devine Road at E 18th Street | 20.9 | C | 18.2 | B | 23.3 | C | 27.3 | C | 20.8 | C |

**Roundabout intersection; intersection results based on HCM 6 Roundabout report.
Red = Approach or intersection operating at LOS F.

*Table 25. 2038 Project Alternative Volume/Capacity Ratios*

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.21 | 0.45 | 0.64 | 0.41 | 0.08 | 0.07 | 0.86 | 0.85 | 0.86 | 0.85 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.29 | 0.55 | 0.63 | 0.33 | 0.79 | 0.80 | 0.12 | 0.06 | 0.79 | 0.80 |
| E Mill Plain Boulevard at N Devine Road | 0.37 | 0.60 | 0.74 | 0.48 | 0.90 | 0.88 | 0.58 | 0.71 | 0.90 | 0.88 |
| E Mill Plain Boulevard at N Andresen Road | 0.64 | 0.72 | 0.95 | 0.81 | 0.74 | 0.74 | 0.77 | 0.93 | 0.95 | 0.93 |
| E Mill Plain Boulevard at Garrison Road | 0.50 | 0.79 | 0.49 | 0.56 | 0.61 | 1.14 | 0.57 | 0.92 | 0.61 | 1.14 |
| E Mill Plain Boulevard at N Lieser Road | 0.51 | 0.60 | 0.73 | 0.76 | 0.74 | 0.74 | 0.08 | 0.17 | 0.74 | 0.76 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue | 0.83 | 0.83 | 0.77 | 0.50 | 0.46 | 0.59 | 0.67 | 0.75 | 0.83 | 0.83 |
| MacArthur Boulevard at N Andresen Road** | 0.43 | 0.53 | 0.55 | 0.48 | 0.45 | 0.43 | 0.85 | 0.55 | 0.85 | 0.55 |
| MacArthur Boulevard at N Devine Road** | 0.16 | 0.36 | 0.53 | 0.37 | 0.07 | 0.10 | 0.19 | 0.39 | 0.53 | 0.39 |
| N Andresen Road at NE 18th Street | 0.78 | 0.88 | 0.78 | 0.76 | 1.10 | 0.73 | 0.83 | 0.67 | 1.10 | 0.88 |
| N Devine Road at E 18th Street | 0.55 | 0.67 | 0.35 | 0.39 | 0.59 | 0.67 | 0.02 | 0.26 | 0.59 | 0.67 |

**Roundabout intersection; intersection results based on HCM 6 Roundabout report.
Red = Approach or intersection v/c ratio exceeds 1.0

### Transit

Similar to the No Build Alternative, the Project Alternative includes existing transit service and improvement of the existing Mill Plain Boulevard transit line (Line 37) to BRT service. The BRT service will improve frequency, capacity, and user comfort, and is currently planned to serve stops at Devine Road and Andresen Road. In addition, the Project Alternative includes access improvements such as sidewalks and crosswalks to improve accessibility and universal access to transit facilities. Aligning crosswalks with new BRT stops will increase connectivity and safety. Furthermore, the area around the planned Devine Road BRT stop is within the Redevelopment Area and envisioned as an enhanced station area with supportive facilities and amenities, including bike parking. The overall vision for the Heights District and increased density included in the plan will support increased transit access and is anticipated to have a net benefit on transit service.

### Bicycle and Pedestrian

The access/circulation intent of the Heights District Plan is to strengthen multimodal connections and improve accessibility throughout the Heights District and within the 20-minute walkshed[9] by connecting schools, homes, and jobs through a walkable, pedestrian-friendly, and bikeable street network and urban trail system. It is anticipated that the Project Alternative would increase bicycle and pedestrian trips into and out of the Heights District. As described in the mitigation measures (section 0), the proposed bicycle and pedestrian facility improvements included in the Heights District Plan are designed to offset potential impacts and enhance the functionality and safety for people riding bicycles, people walking, and people using assistance devices.

### Parking

The Project Alternative would increase parking demand in the Heights District. The parking required based on the proposed HX zone is included in Table 26.

*Table 26. Required Parking*

| Proposed Development | Parking Standard | Required Spaces |
|---|---|---|
| 1,800 Multi-Family Residential Units | 1 space/dwelling unit | 1,800 |
| 121,000 SF Commercial (retail and office) | 1 space/1,000 SF of floor area | 121 |
| 83,000 SF (156 rooms) Hospitality | 1 space/unit | 156 |
| 36,000 SF Institutional (churches, schools, community centers, and government services) | 1 space/1,000 SF of floor area | 36 |
| 6.1 acres Parks and Open Space | To be determined by Parks Department | 0[a] |
| **Total** | | **2,113** |

[a]It is anticipated that on-street parking would satisfy the parking need of the proposed parks and open spaces within the Heights District.

To meet the required parking, the Heights District Plan proposes a parking strategy that includes a combination of structured parking, surface and tuck-under parking, and on-street parking. The proposed parking is based on a multimodal, complete street model that anticipates increased transit service through the new BRT line on Mill Plain Boulevard and the proposed enhanced bicycle and pedestrian infrastructure within and surrounding the Heights District. Future development will be required to provide the parking necessary to meet the standards of the HX zone. However, if parking demand within the Heights District exceeds supply, people who live or work in the Heights District could seek parking in adjacent residential neighborhoods. This spillover parking has the potential to increase on-street parking demand in affected areas; thereby increasing parking congestion in the affected area and making it more difficult for residents of the affected area to find parking within close proximity of their homes.

[9] A 20-minute walkshed includes all locations reachable within a 20-minute walk of the Heights District.

## Mitigation Measures

Implementation of the following mitigation measures would offset potential impacts to transportation and parking associated with development under the Heights District Plan. ~~Development under any studied alternative would be required to meet City codes and pay traffic impact fees in accordance with VMC 20.915.040.~~

### Mitigation Measures Designed into the Project

The following motor vehicle, transit, and bicycle and pedestrian improvements are proposed within the Heights District Plan to offset potential impacts associated with the Project Alternative.

#### Motor Vehicle

- **Convert existing stop-controlled intersections on MacArthur Boulevard at N Andresen Road and N Devine Road to single lane roundabouts.**
- **Convert existing stop-controlled intersection on MacArthur Boulevard/St Helens Avenue at N Lieser Road to a signalized intersection.**
- **Reduce N Andresen Road to one travel lane in each direction from just south of the Mill Plain Boulevard intersection to Highland Drive with protected bike facilities.**
- **Signal timing optimization along the E Mill Plain Boulevard corridor and at the N Andresen Road at NE 18th Street intersection. Signal timing optimization includes 110 second cycle length for the AM peak and a 120 second cycle length for the PM peak (or half cycle lengths), as well as adjustments to splits, offsets, and lead/lag phasing for protected left turns.**
- ~~**Compliance with VMC 11.70.060, Transportation Concurrency, is required, including the submittal of trip generation reports for future projects.**~~

#### Transit

- **Coordinate with C-TRAN to ensure sidewalk and crosswalk improvements provide safe and convenient access with future BRT stations on Mill Plain Boulevard, preliminarily planned near the intersections with Devine Road and Andresen Road.**
- **Ensure sidewalk widths near and adjacent to planned BRT stations are sufficient to accommodate platforms, station amenities, and pedestrian through travel.**
- **Where possible, align additional crosswalks with bus stops to improve pedestrian access to and from stops.**
- **Ensure ADA-compliant access to bus stops and stations throughout the Heights District.**

#### Bicycle and Pedestrian

- **Mill Plain Boulevard: Buffered bike lanes and continuous sidewalks with street trees, pedestrian lighting, and site furnishings.**
- **MacArthur Boulevard: Two-way protected bike facility and greenbelt with multiuse trail, lighting, and enhanced landscaping on the south side.**
- **Devine Road: Two-way protected bike facility on the west side of Devine Road through the Redevelopment Area.**
- **Buffered bike lanes on N Andresen Road between MacArthur Boulevard and Mill Plain Boulevard.**
- **Improved crosswalks along major arterials and added crosswalks and ADA curb ramps at key points within the Heights District.**
- **Landscaped pedestrian walkways and safe crosswalks to BRT stops and where feasible, weather protection.**
- **Increase access to Park Hill Cemetery and add pedestrian circulation improvements to create a more connected walkway network. Potential walkway connections include to Heights Shopping Center, Skyline Crest Apartments, Burdick Avenue/ Marshall Elementary School, Northcrest Community Church, and People's Church. Future connections shall be identified in individual redevelopment projects and provided where feasible.**

In addition to the proposed bicycle and pedestrian facilities included within the Heights District, the plan includes the following connectivity improvements to improve the bicycle and pedestrian circulation in surrounding areas.

- **Improved crossings on Kansas Street at Andresen Road and Idaho Street at Devine Road, which will improve connections between neighborhoods and MLK Elementary.**
- **Improved safety and connectivity on Blandford Drive, which could include on or off-street bicycle facilities to connect the Heights District to the Lower Grand Employment Area, neighborhoods to the south, and the Columbia River.**
- **Improved bicycle facilities on Devine Road north of Mill Plain to connect the Heights District to existing bike facilities (including Burnt Bridge Creek Trail and Evergreen Boulevard).**
- **Improve existing pedestrian walkways connecting adjacent neighborhoods with the Heights District, add ADA curb ramps where missing, and increase visibility of walkways through wayfinding signage and landscape maintenance.**

#### Parking

In order to reduce the overall parking demand of future development, the City will develop a Heights District shared use parking plan and require businesses within the Heights District to implement traffic demand management (TDM) techniques (policy L-9 in the Land Use section of the Heights District Plan).

## Existing Regulations and Other ~~Potential~~ Mitigation

### Traffic

Development under any studied alternative would be required to meet City codes and pay traffic impact fees in accordance with VMC 20.915.040.

While new development will bring increased traffic volumes to the study area intersections, the analysis indicates that with the planned improvements, no additional off-site mitigation is required. However, traffic operations could be further improved by providing protected/permitted left turns (flashing yellow arrow) at the E Mill Plain Boulevard and Garrison Road and N Andresen Road and NE 18th Street intersections. If site conditions permit the use of protected/permitted left turns, the v/c ratio at the N Andresen Road and NE 18th Street intersection in the Project Alternative could be reduced from 0.92 to 0.80 in the AM peak hour. Additionally, compliance with VMC 11.70.060, Transportation Concurrency, is required, including the submittal of trip generation reports for future projects.

### Parking

~~In order to reduce the overall parking demand of future development, the City will develop a Heights District shared use parking plan and require businesses within the Heights District to implement traffic demand management (TDM) techniques (policy L-9 in the Heights District Plan). In addition, t~~The City will actively manage the on-street parking system within the Heights District through time limits, metering, or other measures to ensure sufficient parking for visitors and guests. The City will also monitor parking demand as development occurs within the Heights District to determine if there is spillover parking into adjacent residential neighborhoods. If it is determined that spillover parking is occurring, then additional measures would be introduced to reduce or eliminate spillover parking. Measures could include but are not limited to residential permit parking or time limits for on-street parking in affected areas.

## Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts to transportation are anticipated.

# Climate Change and Greenhouse Gas Emissions

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified by changes in the mean and/or variability of its properties, and that persists for an extended period, typically decades or longer." One facet of climate change is global warming, which refers to the gradual increase (observed and projected) in global surface temperature as a consequence of greenhouse gas (GHG) emissions. This analysis consists of a qualitative discussion of the potential impacts of the proposed alternatives on global climate change based upon the best information available at this time.

## Affected Environment

Washington has made it a state priority to address climate change and global warming through a reduction in GHG emissions. Washington faces serious impacts to its snowpack, infrastructure, and water supplies as the climate changes and temperatures climb. Municipalities in the state are already experiencing trends that are consistent with a warming climate, from warmer temperatures to rising sea levels to melting snow and ice to more drought and extreme rainfall. Ecology has identified nine key indicators and projections of climate change affecting Washington (Adelsman, Hedia and Ekrem, Joanna, 2012):

1. **Increasing carbon dioxide levels**
2. **Warmer air temperatures**
3. **Drier summers and reduced snowfall**
4. **More frequent and severe extreme weather events**
5. **Rising sea levels**
6. **More acidic marine waters**
7. **Warmer water temperatures**
8. **Increasing frequency and severity of wildfires**
9. **Increasing frequency and severity of flooding**

In 2008, the state legislature adopted reduction targets for GHGs which include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6). The complete list of GHGs regulated by the state for their global warming potential is provided in WAC 173-441-040. Washington's current targets are to:

- **Reduce overall greenhouse gas emissions to 1990 levels by 2020**
- **Reduce overall greenhouse gas emissions 25 percent below 1990 levels by 2035**
- **Reduce overall greenhouse gas emissions 50 percent below 1990 levels by 2050**

The legislature also acknowledged that the emissions goals (above) will not be met without a substantial reduction in transportation emissions and adopting policies to reduce GHGs from the transportation sector by reducing vehicle miles traveled (VMT) (RCW 70.235.070). The policies also recognize the role that land use plays in VMT and vehicle emissions.

WSDOT's Public Transportation Division administers the state's Commute Trip Reduction (CTR) law to reduce carbon emissions and keep the busiest commute routes flowing.

In the Pacific Northwest, planning level efforts to prepare for climate change tend to focus on climate resiliency. This includes supporting resilient agro-ecosystems, using green or hybrid green/gray infrastructure, and strengthening social networks in frontline communities (e.g. tribal lands and coastal fishing communities) to assist in meeting basic needs (May et al. 2018). In an urban environment, such as the City of Vancouver, planning efforts focus on fostering "urban resilience", which is defined as the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social wellbeing, the economy, and the environment (Maxwell et al. 2018). Frequently, urban resilience is tied to the ability of an area's infrastructure (e.g., water, transportation, energy) to withstand extreme weather events.

### Comprehensive Plan Policies

The 2009 Creating a More Sustainable Vancouver Plan identified a range of goals and strategies directed at both the City's operations and the community at large to reduce GHG emissions and encourage energy efficiency and the responsible use of resources. The plan included a GHG inventory of the City's emissions. The Comprehensive Plan adopted the plan and associated studies by reference. The following policies from the Comprehensive Plan were identified as applicable to the reduction of GHG emissions in the City.

*EN-3 Energy Conservation: Promote and facilitate energy conservation and alternative energy sources and generation.*

*PFS-5 System balance: Allocate resources to balance transportation choices. Promote development of a broader range of transportation options including pedestrian, bike, and transit systems, rather than focusing all resources on satisfying peak commuting demand with roadway capacity alone.*

*CD-16 Sustainability: Facilitate sustainable land use development though measures including but not limited to the following:*

- ***Develop integrated land use patterns and transportation networks that foster reduced vehicle miles traveled and associated greenhouse gas emissions***
- ***Develop individual buildings that minimize energy and resource consumption. Encourage home based efficiencies such as insulation retrofits, efficient water and air heating systems, and use of solar panels or other forms of energy capture.***

## Impacts

GHG emissions from development within the subarea were estimated using the *King County SEPA Greenhouse Gas Emissions Inventory Worksheets*. The worksheet was developed by King County in order to help SEPA applicants determine GHG emissions over the life span of a given project. Although the worksheet was designed to evaluate individual projects rather than large planned developments, it remains a useful tool to assess the magnitude of GHG emissions associated with different kinds of development.

The worksheet estimates GHG emissions associated with obtaining construction materials, fuel used during construction, energy consumed during a building's operation, and transportation by building occupants. GHG emission estimates are reported in metric tonnes of carbon dioxide equivalents or MTCO2e. CO2e means the number of metric tons of CO2 emissions with the same global warming potential as one metric ton of another GHG. GHGs are usually quantified as CO2e, based on their relative longevity in the atmosphere and their related global warming potential.[10]

A summary of the results for each alternative, as well as existing development, is provided in Table 27. Under all the alternatives, GHG emissions would be generated by new building construction, heating and cooling, waste production, and on-road vehicles. The completed worksheets for all alternatives, as well as an explanation of the methodology and assumptions used to create the estimates, are included as Appendix G to this FEIS.

[10] Additional information on global warming potentials can be found at: https://www.epa.gov/ghgemissions/understanding-global-warming-potentials.

*Table 27. Alternatives Annual Greenhouse Gas Emissions*

| Source | Annual Emissions (MTCO2e) | Change in Annual Emissions (MTCO2e) over Existing Development |
|---|---|---|
| Existing Development | 22,155 | NA |
| No Action Base Alternative | 24,833 | 2,678 |
| No Action High Alternative | 43,932 | 21,777 |
| Project Alternative | 46,161 | 24,006 |

Source: See Appendix G

Table 28 provides a summary of annual emissions per capita (person) and per job for each alternative. To determine the per capita and per job emissions, the annual emissions for each alternative in Table 27 were divided by the number of people and number of jobs anticipated under each alternative.

*Table 28. Annual Greenhouse Gas Emissions Per Capita and Job*

| Source | Subarea Population | Annual Emissions Per Capita (MTCO2e) | Change in Annual Emissions Per Capita over Existing Development (MTCO2e) | Subarea Jobs | Annual Emissions per Job (MTCO2e) | Change in Annual Emissions Per Job over Existing Development (MTCO2e) |
|---|---|---|---|---|---|---|
| Existing Development | 578 | 38.3 | NA | 658 | 33.7 | NA |
| No Action Base Alternative | 1,056 | 23.5 | -14.8 *(decrease)* | 677 | 36.7 | 3.0 |
| No Action High Alternative | 4,691 | 9.4 | -29.0 *(decrease)* | 737 | 59.6 | 25.9 |
| Project Alternative | 5,060 | 9.1 | -29.2 *(decrease)* | 984-1004 | 46.0 | 12.3 |

Source: See Chapter 2.0 (Alternatives) for a description of the proposed population and jobs per alternative. See Appendix G for an analysis of annual emissions.

As shown in Tables 27 and 28, all three alternatives would have GHG-related impacts, and the relative difference in the magnitude of these impacts is directly attributable to the density of growth.

The GHG emissions associated with urban development primarily consist of well-mixed GHGs that are circulated and mixed around the globe affecting climate change in the same manner irrespective of the location of the emission source (U.S. Global Change Research Program [USGCRP] 2017). Thus GHG emissions originating from urban development in Vancouver have the same effects as GHG emissions from any other location and vice versa. While the consensus is that GHG emissions from human activities are a cause of climate change, it is the cumulative effect of past and present emissions in the atmosphere rather than individual sources that is the cause (USGCRP 2017). It is also not generally possible to equate a specific climate change response to a specific emissions source from an individual project (U.S. Forest Service, 2009; Environmental Protection Agency [EPA], 2009; California Air Pollution Control Officers Association, 2008; Council on Environmental Quality, 2016; U.S. Fish and Wildlife Service [USFWS], 2008; IPCC, 2007; National Marine Fisheries Service [NMFS], 2017).

Therefore, project-related GHG emissions in relation with state, federal and global emissions are used to identify the relative impact. Because of global scale of climate change, projects typically are evaluated on their cumulative impacts. The GHG emissions from any of the project alternatives, or a single development under a given alternative, would not increase GHG emissions such that it would have a discernible impact on climate change. Rather, it can be assumed that this development would contribute to global development, and as such would cumulatively increase GHG emissions and contribute to climate change.

As such, the impacts from the three alternatives can reasonably be assumed to be similar, and as a result of development and GHG emissions, all of the alternatives would contribute to the impacts affecting the nine key indicators and projections of climate change affecting Washington cited above. Some of these impacts would not directly impact the Heights District. For example, the Heights District is located outside the flood district and there are no surface water resources in the immediate area, and so an increase in the frequency and severity of flooding would not impact the area directly.

### No Action Base Alternative

GHG emissions from the No Action Base Alternative are presented in Table 27 and Table 28. That alternative would increase GHG emissions by 26,678 MTCO2e per year over existing conditions, and would have the lowest GHG emissions of the three alternatives. The results reflect the differences in land use when assuming the Heights District will develop under existing conditions and under the growth assumptions outlined in the Land Use section. The alternative would also see a decrease in per capita emissions, as a result of anticipated population growth over existing conditions. However, the No Action Base Alternative has greater emissions per capita as compared to the No Action High Alternative and the Project Alternative, as it would not develop as densely as those scenarios.

As previously noted, the City's Comprehensive Plan contains several policies related to climate change which align with the state's initiatives for reducing GHG emissions –namely, promoting energy conservation and the use of alternative energy sources (such as developing buildings that are energy and water efficient), and providing for multi-modal transportation (thereby reducing VMT).

This alternative would not benefit from the proposed plan's sustainability initiatives, including LEED certification for buildings and new pedestrian pathways. Both No Action Alternatives would be limited to carrying out existing City initiatives and policies, such as the CTR program.

While the No Action Base Alternative would result in the smallest net increase in GHG emissions when compared to the other alternatives, it would not contribute to achieving the City's Comprehensive Plan goals and the state's campaign to reduce GHG emissions.

### No Action High Alternative

GHG emissions from the No Action High Alternative are presented in Table 27 and Table 28. That alternative would increase GHG emissions by 21,777 MTCO2e per year over existing conditions. The results reflect the differences in land use when assuming the Heights District will develop under existing conditions and under the assumptions outlined in the Land Use section. The No Action High Alternative would have the same types of impacts as the base alternative, but would have a higher level of impact as the development would be greater than under the base alternative. When the projected population and job growth is taken into account, the No Action High Alternative has greater emissions per capita and per job than the Project Alternative.

As previously noted, the City's Comprehensive Plan contains several climate change related policies, which align with the state's initiative for reducing GHG emissions – namely, promoting energy conservation and the use of alternative energy sources (such as developing buildings that are energy and water efficient), and providing for multi-modal transportation (thereby reducing VMT).

This alternative would not benefit from the proposed plan's sustainability initiatives, including LEED certification for buildings and new pedestrian pathways. Both of the No Action Alternatives would be limited to existing City initiatives and policies, such as the CTR program.

While the No Action High Alternative would result in a smaller net increase in GHG emissions when compared to the Project Alternative, it would not contribute to achieving the City's Comprehensive Plan goals and the state's campaign to reduce GHG emissions. As previously described, the GHG emissions impacts from the three alternatives can reasonably be assumed to be similar.

### Project Alternative

GHG emissions from the Project Alternative are presented in Table 27 and Table 28. Compared to existing conditions, the Project Alternative would result in a net increase in GHG emissions of 24,006 MTCO2e per year. When population and employment growth is considered (Table 28), the Project has lower per capita emissions than existing development and the No Action Alternatives, and lower per job emissions than the No Action High Alternative. This is due to the proposed density of the subarea, as co-locating people and jobs is more efficient than a sprawled environment. By encouraging development in the Heights District, the Project Alternative may help reduce development pressure in other areas that are more peripheral and less suited to development (e.g., lacking existing infrastructure). As such, the increased density and infill development within the Subarea may reduce the City's need to expand the UGA over time.

While the Project Alternative would be subject to the proposed plan's sustainability initiatives, including LEED certification for buildings and new pedestrian pathways, both No Action Alternatives would be limited to carrying out existing City initiatives. In addition, some of the policies and design elements of the Project Alternative would address the nine key indicators of climate change in Washington. For example, the use of green infrastructure (e.g. green roofs, rain gardens, street trees) would reduce the heat island effect, in turn addressing the anticipated increase in global temperatures.

The Project Alternative would support city-wide goals and policies included in the Comprehensive Plan as well as additional GHG reduction measures proposed under the Heights District Plan. Mitigation measures to address GHG

emissions are still warranted in order for the Project Alternative to contribute to achieving the goals of the City and state. Mitigation measures to reduce GHG emissions, consistent with City and state policies, are identified below.

## Mitigation Measures

### Mitigation Measures Designed into the Project

The project would implement strategies to reduce VMT, such as increasing access to multi-modal transit options including improved access to BRT service and bicycle and pedestrian infrastructure improvements. In addition to reducing VMT, other strategies can further reduce GHG emissions from energy use. Some of these strategies include employing design features that naturally reduce a project's energy use. Examples include features such as daylighting and green roofs, retaining mature trees and planting new trees to provide carbon sequestration, air purification, and cooling, and generating power on site (e.g., solar panels).

The Project Alternative would implement the Heights District Plan, thereby increasing density in an already urbanized area, advocating for low impact development (LID) and LEED credentials, and increasing access to multi-modal transit options. These facets of the Heights District would enact policies EN-3, PFS-5, and CD-16 of the City's Comprehensive Plan, and help minimize GHG emissions from increased development.

Additionally, implementation of LID and LEED sustainability standards (or equivalent) will support energy and water conservation, and reduce the impacts to energy water demand. Therefore, the LID and LEED standards (or equivalent) specified in the Project Alternative will contribute to urban resiliency.

The City will also establish a Heights-specific TDM program to require developers to provide TDM strategies such as subsidized transit passes, bike parking, and/or shared use vehicles on site.

The following policies, included in the Land Use, Access/Circulation, and Environmental Sustainability sections of the Plan (updated to reflect the current plan policies) ~~from the plan~~ would reduce VMT or energy use associated with the project.

*L-1 Establish a new HX (Heights District) mixed-use zone classification that promotes a flexible mix of residential, retail, and employment land uses and a walkable land use pattern, allowing living and working within walking distance of each other.*

*L-3 Encourage a pedestrian-scale environment and walkability through smaller blocks and narrow street rights-of-way.*

*L-6 Incentivize shared parking strategies that reduce the total number of stalls in the District.*

*C-3 Foster the regional bicycle network by creating protected bike lanes for both directions along all major arterials.*

*C-5 Create a fine-grained network of accessible sidewalks, pathways and bike facilities that include lighting and shelter to allow pedestrians, cyclists, and others users comfortable and direct access to and within the District. Capitalize on existing networks such as the internal cemetery streets and connections between Skyline Crest and nearby schools.*

*S-2 Design roads, roofs, and parking lots to minimize heat island effects.*

*S-4 Strive to exceed relevant sustainability benchmarks for new buildings and infrastructure, similar to what is required for LEED certification standards. All publicly owned buildings shall meet or exceed LEED Gold Certification.*

*S-6 Explore opportunities for district level solutions to waste management and energy production.*

*S-8 Explore opportunities to reduce supply chains through local food production and create opportunities to buy food from local distributors at farmers markets, grocery stores, cafes, and restaurants.*

### Existing Regulations and Other Mitigation

Existing City initiatives that will help to mitigate impacts include the following.

- **CTR program – VMC 18.12**
- **Energy efficiency – VMC 17.09**
- **Landscaping – VMC 20.925**
- **Tree, vegetation, and soil conservation – VMC 20.770**
- **Compliance with state energy code**
- **Compliance with Evergreen Sustainability Development Standard for affordable housing**

## Significant Unavoidable Adverse Impacts

There is no standard significance threshold for GHG emissions in the SEPA rules (WAC 197-11-330). Scientific research and analysis tools sufficient to determine the climate change effects of GHG emissions at a local scale are not yet available and any conclusions would be speculative. While any level of GHG emissions contributes to climate change, the impact occurs only within the context of past and present emissions.

Although the Project Alternative would increase development over both No Action Alternatives, the severity of the impact would be reduced through the identified mitigation, and the Project Alternative would be consistent with both state and City climate change and GHG reduction goals. When considering the per capita and per jobs emissions shown in Table 28, the Project Alternative would have lower per capita emissions than existing development and the No Action Alternatives; and lower per job emissions than the No Action High Alternative. By encouraging

development in the Heights District, the Project Alternative may help reduce development pressure in other areas that are more peripheral and less suited to development (e.g., lacking existing infrastructure).

# Public Services and Utilities

The following sections address public services and utilities within the Heights District, including fire and emergency medical services, police, schools, utility service, and parks and recreation facilities.

## Fire and Emergency Medical Services

### Affected Environment

The Heights District is located in the Vancouver Fire District and is served by the Vancouver Fire Department (VFD), the primary purveyor of fire and emergency services for the City. The VFD serves a population of almost 250,000 from 10 stations covering 90 square miles. A total of 12 frontline fire crews run over 20,000 calls per year. VFD's emergency medical service (EMS) program provides paramedic first response to residents in VFD's service area (City 2019a).

One VFD station is located in the Heights District – Fire Station 3, on the northeast corner of the Mill Plain Boulevard/Devine Road intersection. This 5,160-square foot structure sits on a 65,000-square foot parcel. Three firefighters are on duty for each shift. Station 3 has a service area of 6.2 square miles and, in 2014, the population within that service area was 25,732 (4,152 people per square mile). The station received 3,171 calls in 2014 (Citygate Associates 2015).

The VFD's capital facilities planning identified several fire stations that require significant improvements or reconstruction to meet the Department's current needs and address structural deficiencies at the existing stations. Fire Station 3 is identified for relocation and reconstruction. VFD plans to relocate the station southeast of the Heights District, potentially near the intersection of Andresen Road and MacArthur Boulevard (City 2019b). VFD anticipates constructing a new station and demolishing the existing station by 2022. Fire Station 3 would continue to provide the primary response for fire and emergency service calls within the Heights District from its new location.

### Level of Service

RCW 35.103.040 requires the VFD to report service level performance annually. The 2018 report, presented to the City Council on 1 July 2019, indicates the Department has a target response time of 7:59 for all Priority 1 and Priority 2 (highest priority) calls. According to the VFD, some calls originating from the Heights District exceeded the target response time. Overall, the Department met the response time target 94 percent of the time (City 2019c).

### Impacts

Development under the Project Alternative or the No Action Alternatives would have the potential to impact fire service delivery through an increase in population and potential increases in call volume. In addition, under any of the alternatives, construction-related impacts could result in increased service calls for construction inspections and response to potential construction-related accidents. Impacts are described below for each alternative based on a qualitative analysis of how proposed development would potentially impact fire and emergency medical services.

#### No Action Base Alternative

The No Action Base Alternative represents the lowest amount of development among the alternatives. The increase in population and employment (roughly 500 people and 19 new jobs) associated with the No Action Base Alternative would be incremental over time and is not anticipated to result in a significant increase in fire service calls or to affect VFD response time.

#### No Action High Alternative

The No Action High Alternative assumes some redevelopment of existing underutilized sites within the existing Tower Mall property. Like the No Action Base Alternative, the No Action High Alternative would result in incremental development over time. However, the greater increase in population and employment (roughly 4,113 people and 161 jobs) would result in higher demand for fire and emergency services than anticipated in the No Action Base Alternative.

Based on the results of the Department's annual performance evaluation, the VFD anticipates being able to plan for sufficient staffing and equipment to respond to any increase in calls associated with the No Action High Alternative while maintaining its target response times.

#### Project Alternative

At build-out, the Project Alternative would result in approximately 4,482 additional residents and 490 to 510 new jobs. Among the alternatives, the Project Alternative would result in the highest demand for fire and emergency services because its redevelopment levels are the highest. Because of the adoption of the subarea plan and coordinated planning efforts by the City to promote redevelopment in the Heights District, the Project Alternative is also anticipated to result in the quickest increase in population and employment from existing conditions. This faster pace of redevelopment could result in fire service delivery needs that could outpace the growth of the Department (staffing and equipment). However, the VFD anticipates being able to maintain target response times and plan for sufficient staffing and equipment to respond to any increase in calls associated with the Project Alternative.

### Mitigation Measures

The following mitigation measures would help address potential impacts to fire and emergency services associated with development under the Heights District Plan.

#### Mitigation Measures Designed into the Project

- **The Heights District Plan promotes compact growth and development within an existing urban framework, which could reduce growth in outlying areas of the City. This compact form of development close to existing VFD services could result in more efficient service delivery.**

#### Existing Regulations and Other ~~Potential~~ Mitigation

- **Increases in population and employment resulting from the Heights District Plan will be reviewed annually as part of the VFD's annual performance evaluation. Any required staffing or equipment needs would be planned through the Department's capital facilities planning to offset potential impacts to fire and emergency service delivery, including response time.**
- **All new buildings constructed under the Heights District Plan would be constructed in compliance with the most current version of the International Fire Code, as adopted by the City under VMC 16.04. Most buildings, because of the size and type of construction, would include automatic fire sprinklers which reduce the size, spread, and severity of fires but do not negate the need for an emergency response or reduce the need for other types of emergency response. Adequate fire flow to serve new developments, emergency access standards, and required spacing standards for fire hydrants would be provided as required by the City's specific code requirements.**
- **Redevelopment of the Heights District Plan area will result in additional tax revenues, including construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VFD which would help offset the increase in demand for fire and emergency services.**
- **Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on site and coordination with the VFD to maintain proper emergency access during construction.**

### Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts to fire and emergency services are anticipated.

## Police

### Affected Environment

The Vancouver Police Department (VPD) is currently authorized for 227 sworn staff and 63 civilian staff. VPD serves approximately 50 square miles, divided into two precincts which are further divided into two districts per precinct. Each district is then divided into beats and individual patrol officers are responsible for handling calls for service within each beat. VPD has various units under the crime prevention division, including home safety/burglary prevention, pedestrian safety, and traffic safety. VPD also operates specialty units that include neighborhood response teams, school resource officers, and the Safe Streets Task Force (City 2019a).

The Heights District is located in VPD's Precinct 2 and is split between West District 2 and East District 3 (Clark County MapsOnline 2019). The area to the east of Devine Road south of Mill Plain Boulevard and north of MacArthur Boulevard is located in East District 3. The area west of Devine Road, north of Mill Plain, and south of MacArthur is located in West District 2. The Heights District also overlaps two beats – beats 22 and 31 (VPD 2019). In the Heights District, the beat boundary is the same as the VPD district boundary with the western portion of the plan area in beat 22 and the eastern portion in beat 31. The closest police station to the Heights District is located roughly 2 miles north on NE Stapleton Road.

### Call History

Over the last 6 years, call volumes have risen citywide from 47,315 in 2013 to 60,698 in 2018. In the Heights District, call volumes have remained relatively stable with 581 calls in 2013 and 573 calls in 2018. Table 29 is a summary of call volume from 2013 to 2018 citywide and in the Heights District.

*Table 29. Call Volume History*

| Year | Citywide | Heights District |
|---|---|---|
| 2013 | 47,315 | 581 |
| 2014 | 48,790 | 564 |
| 2015 | 53,528 | 636 |
| 2016 | 57,089 | 550 |
| 2017 | 57,575 | 527 |
| 2018 | 60,698 | 573 |

Source: Vancouver Police Department

To address this increasing call volume, the City adopted a funding package in 2017 that supported the hiring of 42 commissioned officers and 19 civilians for VPD (City 2019c).

Average response time citywide from 2013 to 2018 was 8.3 minutes for Priority 1 calls and 9.5 minutes for Priority 2 calls. In the Heights District, the average response time was 7.9 minutes for Priority 1 and 11 minutes for Priority 2 calls (VPD 2019).

## Impacts

Development under the Project Alternative or the No Action Alternatives would have the potential to impact police services in the Heights District. Under any of the alternatives, there could be an increase in demand for police services during construction, such as calls for service for construction vandalism or theft. The existing numbers of VPD staff are expected to be sufficient to handle any increased calls for service during construction activities under all alternatives.

### No Action Base Alternative

The No Action Base Alternative represents the lowest amount of development among alternatives. The increase in population and employment (roughly 500 people and 19 new jobs) would be incremental over time and is not anticipated to result in a discernible increase in police service calls or impact VPD response times.

### No Action High Alternative

The No Action High Alternative assumes some redevelopment of existing underutilized sites within the existing Tower Mall property. Similar to the No Action Base Alternative, the No Action High Alternative would result in incremental development over time. However, the greater increase in population and employment (roughly 4,113 people and 161 jobs) would result in higher demand for police services and increased call volumes compared with those anticipated in the No Action Base Alternative.

Based on annually analyzing incident response data, the VPD anticipates being able to plan for sufficient staffing and equipment and to respond to any increase in calls associated with the No Action High Alternative while maintaining the Department's target response times.

### Project Alternative

At full build-out, the Project Alternative would result in approximately 4,482 additional people and 490 to 510 new jobs. The Project Alternative would result in the highest demand for police services due to higher redevelopment levels when compared with the other two alternatives. Because of the adoption of the subarea plan and coordinated planning efforts by the City to promote redevelopment in the Heights District, the Project Alternative is also anticipated to result in the quickest increase in population and employment as compared with existing conditions. This faster pace of redevelopment could result in police service needs that outpace the Department's growth. However, the VPD analyzes incident response on an annual basis and anticipates being able to maintain target response times and plan for sufficient staffing and equipment to respond to any increase in calls associated with the Project Alternative.

Additionally, safety may be improved in the Heights District over time under the Project Alternative. The increase in residential and employment density that would occur would result in a more consistent and increased level of activity in the area. Such an increase in activity would contribute to improved safety and potentially to reduced criminal activity. In addition, new development could include crime prevention through environmental design (CPTED) features to reduce criminal activity and calls for services, including providing adequate lighting, ensuring appropriate visibility, and orienting buildings towards the street and public spaces.

## Mitigation Measures

The following mitigation measures would help address potential impacts to police services associated with development under the Heights District Plan:

### Mitigation Measures Designed into the Project

- **The Heights District Plan promotes compact growth and development within an existing urban framework, which could reduce growth in outlying areas of the City. This compact form of development could result in more efficient police service delivery.**
- **CPTED measures, such as orienting buildings towards the street and public spaces, providing public connections between buildings, and providing adequate lighting and visibility, will be used to help reduce criminal activity and calls for service.**

### Existing Regulations and Other ~~Potential~~ Mitigation

- **On full implementation of the 2017 funding package, the VPD will add 42 commissioned officers and 19 civilian staff. In addition to these increases, the VPD analyzes staffing, equipment, and facility needs through the City's strategic planning and biennial budgeting processes. Increases in employees and residents over the buildout period of the Heights District, as well as general growth in the City, would be assessed as part of this process and additional resources added as needed to offset impacts to police services.**
- **Redevelopment of the Heights District Plan area would result in additional tax revenues from construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VPD to help offset the increase in demand for police services.**
- **Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on the site and coordination with the VPD to maintain proper police access during construction.**

### Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts to police service are anticipated.

## Schools

The Heights District Plan area is located in the Vancouver Public Schools (VPS) district. VPS covers roughly 58 square miles in western Vancouver, serves roughly 24,000 students, and employs 3,300 people. The school district comprises 21 elementary schools, six middle schools, and five high schools. Most of the Heights District is located within the attendance boundaries of Marshall Elementary School, McLoughlin Middle School, and Fort Vancouver High School. A small portion of the northwestern corner of the plan area, including Martin Luther King Elementary School, is within the Martin Luther King Elementary attendance boundary.

According to VPS, 24 percent of its students speak a language at home other than English and nearly half (48 percent) are eligible for free or reduced-price lunch (VPS 2019a). A comparison of school and district-wide demographics is shown in Table 30.

*Table 30. School and District Demographics*

| Demographic | Marshall | MLK | McLoughlin | Fort Vancouver | VPS District |
|---|---|---|---|---|---|
| African American | 3.1% | 2.9% | 3% | 4% | 2.5% |
| American Indian | 1% | 0.2% | 0.3% | 0.3% | 0.5% |
| Asian | 2% | 2% | 3.3% | 4.5% | 3.2% |
| Hispanic | 35% | 55.6% | 48.3% | 40.9% | 26.6% |
| Multi-racial | 7.9% | 9.2% | 7.2% | 6.2% | 8.2% |
| Pacific Islander | 2.8% | 4.5% | 5.8% | 5.8% | 2.1% |
| White | 48.2% | 25.7% | 32.2% | 38.4% | 57% |

Source: VPS 2019b.

VPS parcels comprise roughly 28 percent of existing land uses in the Heights District (City 2018). As identified in Table 30, the three VPS facilities located in the area of the Heights District Plan (Martin Luther King Elementary along Mill Plain Boulevard and George C. Marshall Elementary School and McLoughlin Middle School along MacArthur Boulevard) and Fort Vancouver High School, which also serves the Heights District, are generally more demographically diverse than VPS as a whole (VPS 2019b).

In February 2017, voters approved a school bond measure to fund the upgrade and replacement of several VPS facilities. The bond measure included demolishing McLoughlin Middle School and constructing a new building in the same general area. The new building would house both George C. Marshall Elementary School and McLoughlin Middle School. As proposed, the combined school building is roughly 202,500 square feet and is located on the same parcel as the existing McLoughlin Middle School. The new, combined school is currently under construction and will be operational in spring 2020. The building currently occupied by George C. Marshall Elementary School will become VPS's Lieser Campus. The bond measure also included reconstructing Martin Luther King Elementary School on its existing lot (City 2018).

### Enrollment and Capacity

VPS provided the numbers of current and projected enrollment and capacity for each of the schools that serve the Heights District. Enrollment is shown in Table 31 and capacity in Table 32.

*Table 31. Current and Projected Enrollment*

| School | 2017[a] | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| MLK | 490 | 447 | 432 | 414 | 416 | 419 | 425 |
| Marshall | 365 | 373 | 372 | 375 | 399 | 405 | 415 |
| McLoughlin | 988 | 1023 | 1046 | 1048 | 958 | 918 | 879 |
| Fort Vancouver | 1467 | 1522 | 1510 | 1569 | 1643 | 1647 | 1695 |

[a]2017 enrollment based on actual headcount; projected enrollment forecasted from 2017 headcount.
Source: VPS 2019c.

*Table 32. School Capacity*

| School | Capacity[a] |
|---|---|
| MLK | 430 students |
| Marshall | 520 students |
| McLoughlin | 1068 students |
| Fort Vancouver | 1900 students |

[a]Capacity information for Martin Luther King Elementary, McLoughlin Middle, and Marshall Elementary is based on the planned capacity of the new schools, which are currently under construction and scheduled to open in 2020.
Source: VPS 2019c.

Based on current and projected enrollment and capacity, Marshall Elementary, McLoughlin Middle, and Fort Vancouver High are currently under capacity. Martin Luther King Elementary is over capacity, but projected to meet future capacity as forecasted.

## Impacts

Development under the Project Alternative or the No Action Alternatives would have the potential to impact schools within the Heights District and existing school capacities. Increases in population within the Heights District would result in an associated increases in new students at VPS facilities. New students generated by residential development in the Heights District would represent an increase in annual VPS enrollment, in particular in the schools serving the plan area. With the exception of Martin Luther King Elementary, the existing schools that serve the plan area currently have capacity to serve additional students; however, most of the plan area is within the Marshall Elementary attendance boundary and development is not anticipated to impact Martin Luther King Elementary.

Projected student generation for each alternative is based on the average student generation rate currently used by VPS. Table 33 identifies student generation rates per multi-family housing unit.

*Table 33. VPS Average Student Generation Rate (October 2018)*

| Level | Generation |
|---|---|
| Elementary (K-5) | 0.123 |
| Middle (6-8) | 0.059 |
| High (9-12) | 0.063 |

In addition to direct impacts, under any of the alternatives, construction-related impacts could result in increased travel time for students and limited access to school sites because of road closures and/or construction-related traffic delays.

### No Action Base Alternative

The No Action Base Alternative represents the lowest amount of residential development among the alternatives, with a projected total of 192 new multi-family housing units. Residential development under this alternative would generate approximately 47 new students, including approximately 24 elementary students, 11 middle school students, and 12 high school students. The increase in population and students associated with the No Action Base Alternative would be incremental over time. Based on these projections and current VPS enrollment and capacity as noted in Table 31 and Table 32, it is anticipated that new students associated with the No Action Base Alternative could be absorbed into current school capacity and no impacts to schools are expected.

### No Action High Alternative

The No Action High Alternative represents a greater amount of residential development with a projected total of 1652 new housing units in the Heights District. Residential development under this alternative would generate approximately 404 students, including approximately 203 elementary students, 97 middle school students, and 104 high school students. These additional students could cause the schools that serve the Heights District to exceed capacity. However, the increase in population associated with the No Action High Alternative would be incremental over time and, therefore, it is anticipated that new students could be absorbed into current school capacity and no impacts to schools are expected.

### Project Alternative

The Project Alternative represents the highest amount of residential development among the alternatives with a projected total of 1,800 new residential units in the Heights District. Residential development under this alternative would generate approximately 440 students, including approximately 221 elementary students, 106 middle school students, and 113 high school students. Because of the adoption of the subarea plan and coordinated planning efforts by the City to promote redevelopment in the Heights District, the Project Alternative is anticipated to result in the quickest increase in population from current conditions. However, development would still occur incrementally over time and it is anticipated that new students resulting from redevelopment could be absorbed into current school capacity.

The Project Alternative may also benefit the schools and students in the Heights District. Its redevelopment will include connectivity and safety improvements for all modes of travel and users. For example, a reconfiguration of the MacArthur Boulevard corridor with additional multimodal infrastructure could improve the safety and comfort of students traveling to and from school (City 2018). The upgrades to VPS facilities in the Heights District coincide with the Heights District planning process, providing opportunities for faculty and students to work with the project team in providing a mutually-beneficial design. In the past, VPS has considered the idea of creating subsidized teacher workforce housing on lands owned by the school district. This idea is being incorporated in the Heights District planning process with the potential placement of this housing along MacArthur Boulevard near the future combined school (City 2018). This kind of collaboration meets the family-community resource centers goal from the VPS strategic plan (VPS 2014).

## Mitigation Measures

As noted above, the increase in multi-family housing units and students associated with the Heights District Plan would occur incrementally over time. With the exception of Martin Luther King Elementary, the existing schools that serve the plan area currently have capacity to serve additional students; however, the number of students proposed could cause the schools to exceed capacity. The following mitigation measures are proposed to offset potential impacts to schools associated with development under the Heights District Plan.

### Mitigation Measures Designed into the Project

The Heights District Plan promotes connectivity and walkability improvements within an existing urban framework, improving access and safety for students attending schools within the Heights District.

### Existing Regulations and Other ~~Potential~~ Mitigation

- **Increases in the student population resulting from the Heights District Plan will be reviewed annually. Additional capacity needs would be planned through VPS's capital facilities planning to ensure an adequate LOS at VPS facilities.**
- **New residential development in the Heights District would be required to pay school impact fees per unit in accordance with VMC Chapter 20.915.060 to help offset additional demand for services in the Heights District.**
- **Redevelopment of the Heights District Plan area will result in additional tax revenues, including construction and retail sales tax, property tax, utility tax, licenses and permits, and other fees. A portion would accrue to the City and VPS.**
- **Potential construction-related impacts would be mitigated through compliance with all local, state, and federal safety regulations and standards on the site and coordination with the VPS.**

## Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to schools in the Heights District have been identified as a result of the proposed alternatives.

# Water Service

## Affected Environment

The City of Vancouver owns and operates its own municipal water system serving the City and surrounding areas of Clark County including the area encompassing the Height District Plan. The City obtains all of its water supply from groundwater sources.

The Heights District is entirely within the Heights high pressure zone. The City's Water Station No. 5 (WS 5) is located within the Heights District along East Mill Plain Boulevard at East Devine Road. WS 5 supplies Heights low and Heights high pressure zones. WS 5 includes an 8.0-million gallon (MG) partially buried water reservoir and an elevated 0.75-MG water tank. The reservoir serves the Heights low pressure zone and a connected booster pump supplies water to the water tank, which serves the Heights high pressure zone. The Heights high pressure zone is the largest in the City's system.

The 2015 Comprehensive Water System Plan (water system plan) identifies a volume/flow deficiency of 0.4-MG by 2024 and 3.1-MG by 2034 for the Heights high pressure zone, due to the large standby storage and equalizing storage requirements. This was proposed to be remedied by reallocating excess storage from the Heights low zone (6.2-MG in 2034) using existing pumping capacity available from the booster pump at WS 5.

The water system plan indicates the City has adequate water rights through 2034 for average and maximum day demands. However, system facilities are limited in capacity and could be improved to increase supply redundancy during maximum day demands.

Distribution within the Heights District is accomplished through existing water mains. These include 12-inch and larger lines in Mill Plain Boulevard and MacArthur Boulevard and an 8- to 10-inch line in Devine Road. Individual users are served by private lines from these mains.

## Impacts

Future development under the Project Alternative or the No Action Alternatives would have the potential to affect water pressure in the Heights District. The City is projected to experience pressure drops in the Heights high pressure zone due to increased system demand~~draining of the elevated reservoir~~. The potential pressure drops are a result of anticipated new development throughout the Heights high pressure zone and could occur during peak demand under any alternative. To address these anticipated pressure drops the City is currently examining potential options for the replacement of the aging reservoirs, tank, pumps, and controls at WS 5.

The City's water system plan identifies a number of distribution system improvements within the Heights high pressure zone and within close proximity of the Heights District to address existing pressure deficiencies and balance system pressures. These improvements would apply to all alternatives to address future deficiencies and are identified in the mitigation measures.

Development projects are required under the VMC to construct on-site and related water system improvements necessary to support their development. Impacts specific to each alternative follow.

### No Action Alternatives

While the peak hour water demand is higher for the No Action High Alternative (3,120 gallons per minute [gpm] compared to 2,100 gpm for the No Action Base Alternative), the type and scale of development anticipated under each alternative is similar. Under both No Action Alternatives, capital improvements for water supply would occur incrementally in the context of project-by-project development. Projects would continue to be guided by the City's current 5-Year Capital Improvement Plan. Individual developers would propose to develop or redevelop properties within the Heights District according to their own project, current land use and zoning designations, and the market trends at that given point in time. Because development under the No Action Alternatives would not be part of an adopted subarea plan or covered under a planned action ordinance, future applicants would be required to comply with SEPA for individual projects. Project-specific impacts and any required mitigation (including on-site or off-site improvements) would occur on a project-by-project basis as identified through development review and consistent with the City's water system plan.

The No Action Base Alternative would require minimum 10-inch water mains and the No Action High Alternative would require minimum 12-inch water mains in Devine Road and The Loop to provide adequate flow. Both No Action Alternatives would require 8-inch lines on site to serve individual development projects. Based on the incremental nature of development anticipated under the No Action Alternatives and the City requirement for development projects to construct on-site and related water system improvements necessary to support the proposed development, no impacts to water service delivery from the No Action Alternatives is anticipated.

### Project Alternative

Development anticipated under the Project Alternative would increase peak demand from existing conditions by approximately 50 percent to 3,298 gpm. This increase in demand is similar to the No Action High Alternative and would be supplied from the City's existing well production volumes, and would require installation of 12-inch water mains in Devine Road and the proposed Loop roadway and 8-inch on site water lines to serve individual development projects. The increased density and intensity of development anticipated under the Project Alternative would result in greater demand on the water supply and distribution system and improvements would likely be required to provide adequate water pressure. The installation of water conserving features, such as high efficiency plumbing fixtures, native and drought-tolerate landscaping, and grey water reuse systems can reduce per capita water demand. Water system improvements necessary to meet projected demand for the Project Alternative and maintain adequate pressure are identified in the mitigation measures below.

## Mitigation Measures

Implementation of the following mitigation measures would offset potential impacts to water demand associated with development under the Heights District Plan.

### Mitigation Measures Designed into the Project

- **The Heights District Plan encourages the development of buildings and infrastructure that exceed sustainability benchmarks required to achieve Leadership in Energy and Environmental Design (LEED) standards. All new publicly financed buildings are required to meet or exceed LEED Gold Certification. These sustainability standards will support water conservation and reduce the impacts to water demand.**

- ~~New water service connections will require payment of connection fees and system development charges to mitigate for development impacts to source, supply, and storage capacities.~~

### Existing Regulations and Other ~~Potential~~ Mitigation

- **New water service connections will require payment of connection fees and system development charges to mitigate for development impacts to source, supply, and storage capacities.**
- **New development would be required to meet Department of Health and City municipal codes that would, at a minimum, maintain existing system performance.**
- **Improvements required for water service will be included in the Capital Improvement Plan**
- **The City uses a hydraulic network model to evaluate capacity and make a determination of water availability. If there is a gap between what the existing system can provide and what a development needs, the developer is required to upgrade the existing system to meet demand. Upgrades may include replacing existing water mains when the existing system does not have sufficient fire flow capacity and/or the water mains are not sufficiently sized for the domestic and/or fire services needed for the development. Minimum 12-inch water mains and 8-inch on-site water lines would be required to support future development in the Heights District. Developers may also be required to install fire hydrants. New development and redevelopment is required by the plumbing code to include efficient plumbing fixtures. This requirement would reduce the overall impact to water demand resulting from the Project Alternative.**
- **The following improvements are identified in the City's water system plan to address pressure deficiencies and balance system pressures regardless of development of the Heights District.**
  - **Replace the transmission line in Blandford Drive with a new 30-inch-diameter transmission main**
  - **A new transmission line (T-27) paralleling Mill Plain to the north connecting Water Station No. 5 to 87th Avenue.**

### Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts on the water supply system are anticipated.

## Sewer

### Affected Environment

The City operates a wastewater collection system that includes two wastewater treatment facilities, approximately ~~176~~ 802 miles of total sewer lines, and 41 pump stations. These pumping stations provide a means of moving wastewater from areas lacking gravity lines to an adjacent area where gravity lines exist. The total size of the collection system expands each year due to growth. As of November 2019, the City sewer district served an estimated 231,303 residents across ~~55.8~~61.9 square miles (City 2019a).

Wastewater from the Heights District is conveyed through the City's conveyance system to the Marine Park Reclamation Facility located at 4650 Southeast Columbia Way. The facility is designed with the capacity of approximately 16.0 million gallons per day (MGD).[11] ~~Treated wastewater is discharged to an outfall to the Columbia River.~~

~~In 2010, water throughput~~Average daily flow in 2019 was estimated at 10.~~67~~ MGD ~~(City 2011)~~, leaving a remaining 5.~~43~~ MGD available in the system. The facility is rated for a peak hour flow of 41.8 MGD.[12] Actual peak hour flow is not tracked on a regular basis by the City, but it generally falls well below 41.8 MGD. Treated wastewater is discharged to an outfall to the Columbia River.

Existing sewers are generally available to collect wastewater generated from the Heights District, the existing schools, Park Hill Cemetery, and Skyline Crest. The sewers generally flow towards the southwest. The Heights District is located in Sewer Basin G1 and is summarized in Sheets 119 and 120 of Volume 2 of the 2011 General Sewer Plan (GSP). The GSP does not identify any major sewer system improvements for Sewer Basin G1.

Most of the sewers within the Heights District flow to a 24-inch-diameter trunk sewer located in MacArthur Boulevard, which flows directly to the west. The trunk sewer turns to the southwest in Blandford Drive and heads south toward the Columbia River. The City's sewer system ultimately discharges to one of two treatment plants located along the Columbia River. The City's treatment plants have the ability to divert some flows depending upon capacity between the two plants.

### Impacts

Impacts to sewer service were analyzed based on the water demands and wastewater generation rates anticipated from the development proposed under each alternative. The existing 24-inch gravity line in MacArthur and 20-inch forcemain in Mill Plain between MacArthur and Devine would be sufficient to serve future development under all

[11] A capacity of 16 MGD means the average of each day's incoming flow over the course of a month must be less than 16 MGD.

[12] Peak hour flow is the peak flow rate occurring during a one-hour period.

alternatives. The existing trunk sewer located south across Mill Plain on the west end of the Redevelopment Area near the intersection of MacArthur Blvd and Mill Plain on parcel 37910109 is outside of the public right-of-way and was identified by City staff to require structural rehabilitation to address increased structural loads of development over the existing trunk sewer. The existing 10-inch line in Devine Road would require upgrading to an 18-inch line under all alternatives. While the peak hourly sanitary demand is higher for the Project Alternative than either No Action Alternative, the required minimum conveyance pipe size is the same. The City's treatment plants have sufficient capacity for the range of flows expected from any redevelopment within the Heights District (City 2019b). However, the City is anticipating a need to build more capacity at the Marine Park Reclamation Facility to accommodate growth throughout the City, regardless of development in the Heights District (City 2020a). This additional capacity would further support the increased flow resulting from the No Action Alternatives or the Project Alternative. Impacts specific to each alternative are identified below.

### No Action Alternatives

Under both No Action Alternatives, capital improvements for sewer would occur incrementally. Improvements would occur in the context of project-by-project development and projects would continue to be guided by the City's current 5-Year Capital Improvement Plan. Because development under the No Action Alternatives would not be part of an adopted subarea plan or covered under a planned action ordinance, future applicants would be required to comply with SEPA for each individual project. Any required mitigation would occur on a project-by-project basis. Peak hourly sanitary demand for the No Action Base Alternative is 1,750 gpm, which is equivalent to 2.52 MGD or 6% of the 41.8 MGD peak hour flow the Marine Park Reclamation Facility is designed to accommodate. ~~and for~~ Peak hourly sanitary demand for the No Action High Alternative is 2,600 gpm, ~~both of which can be handled by the 5.3 MGD additional capacity available at the~~which is equivalent to 3.74 MGD or 9% of the peak hour flow rating for the Marine Park Reclamation Facility. The increase in peak hour flow from either No Action Alternative could be accommodated at the Marine Park Reclamation Facility.

### Project Alternative

Although the Project Alternative would increase the peak discharge to the sanitary system, the relative difference between the No Action Alternatives is not significant enough to increase the diameter of the conveyance pipe. Furthermore, the use of water efficient plumbing fixtures would result in reduced loads on the system. The Project Alternative also includes the use of greywater systems to reduce the volume entering the City sewer system. The anticipated peak hourly demand for the Project Alternative is 2,748 gpm, which is equivalent to 3.96 MGD or 9.5% ~~approximately 0.02% of the total capacity and 0.05%~~ of the ~~remaining capacity of the~~peak hour flow rating for the Reclamation Facility. The increase in peak hour flow from the Project Alternative could be accommodated at the Marine Park Reclamation Facility.

## Mitigation Measures

Implementation of the following mitigation measures would offset potential impacts to sewer demand associated with development under the Heights District Plan. ~~Development under any studied alternative would be required to meet City sewer codes that would offer improved sewer system management over existing conditions.~~

### Mitigation Measures Designed into the Project

- **Implementation of greywater systems to collect gently-used water from bathroom sinks, showers, tubs, and washing machines for reuse as water for laundry and toilet flushing, as well as outdoor irrigation.**
- **Replacement of the 10-inch sewer in Devine Road with an 18-inch pipe to convey increased flow from the Heights District. This improvement is not identified within the City's General Sewer Plan, but is required due to increased flows resulting from development density.**

### Existing Regulations and Other ~~Potential~~ Mitigation

- **Development under any studied alternative would be required to meet City sewer codes that would offer improved sewer system management over existing conditions.**
- **Improvements required for sewer service will be included in the Capital Improvement Plan.**
- ~~**Replacement of the 10-inch sewer in Devine Road with an 18-inch pipe to convey increased flow from the Heights District. This improvement is not identified within the City's General Sewer Plan, but is required due to increased flows resulting from development density.**~~
- **Rehabilitation and structural strengthening (such as a cured-in place liner) of the existing trunk sewer located south across Mill Plain on the west end of the Redevelopment Area near the intersection of MacArthur Blvd and Mill Plain on parcel 37910109. The sewer was previously deeded to the City, but an easement will be required in conjunction with future development.**
- **Planned capacity expansion at the Marine Park Reclamation Facility will accommodate growth throughout the City.**

## Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on the sewer system are anticipated.

## Franchise Utilities

### Affected Environment

#### Telecommunication

Telecommunications facilities are in place throughout the Heights District and serve existing development. The existing school sites and commercial areas along Mill Plain Boulevard are served with broadband communications infrastructure. Customers in this area have an option for service between at least two competing communication/cable franchisees.

#### Electricity

Electrical power in the Heights District is provided by Clark Public Utilities. Local electrical transmission distribution infrastructure is provided primarily along Mill Plain Boulevard. There are four distribution feeder circuits encompassing the Heights District.

#### Natural Gas

Natural gas in the Heights District is provided by NW Natural. Natural gas is available within the Heights District and provides service to many of the existing properties.

### Impacts

Franchise utilities are not a limiting factor for redevelopment within the Heights District and there are no current identified deficiencies or shortages in service from these utilities. Future development under any of the studied alternatives would increase the demand on franchise utilities and project-specific improvements may be required. However, the existing utility infrastructure is sufficient to support future development and no significant capital improvements are anticipated. The additional electrical loads anticipated from redevelopment would be able to be split amongst the existing electrical circuits. Distribution system improvements are not anticipated to be necessary to provide for redevelopment. Future development will require the installation of onsite utilities to be connected to the existing distribution system.

### Mitigation Measures

#### Mitigation Measures Designed into the Project

No significant capital improvements are anticipated as a result of the Project Alternative to support franchise utility service for future development and therefore, no specific measures to address potential impacts are incorporated into the project. Existing regulations to ensure adequate service are identified below.

#### Existing Regulations and Other Mitigation

Future development will be required to pay system development charges or installation fees for new electrical service. Additionally, the undergrounding of existing overhead power lines ~~may~~ will be required for development proposals within the Heights District. ~~However, no impacts to franchise utility service is anticipated as a result of the Project Alternative and therefore, no additional mitigation measures are recommended.~~

### Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts on franchise utilities are anticipated.

## Parks and Recreational Facilities

This section considers existing conditions, potential impacts, mitigation measures, and unavoidable significant adverse impacts of the Project Alternative and the No Action Alternatives on recreational opportunities (parks, recreation facilities, and open space) within and surrounding the Heights District.

### Affected Environment

This section describes the existing parks and recreation conditions within and surrounding the Heights District and the existing policy documents that govern park and recreation facility development.

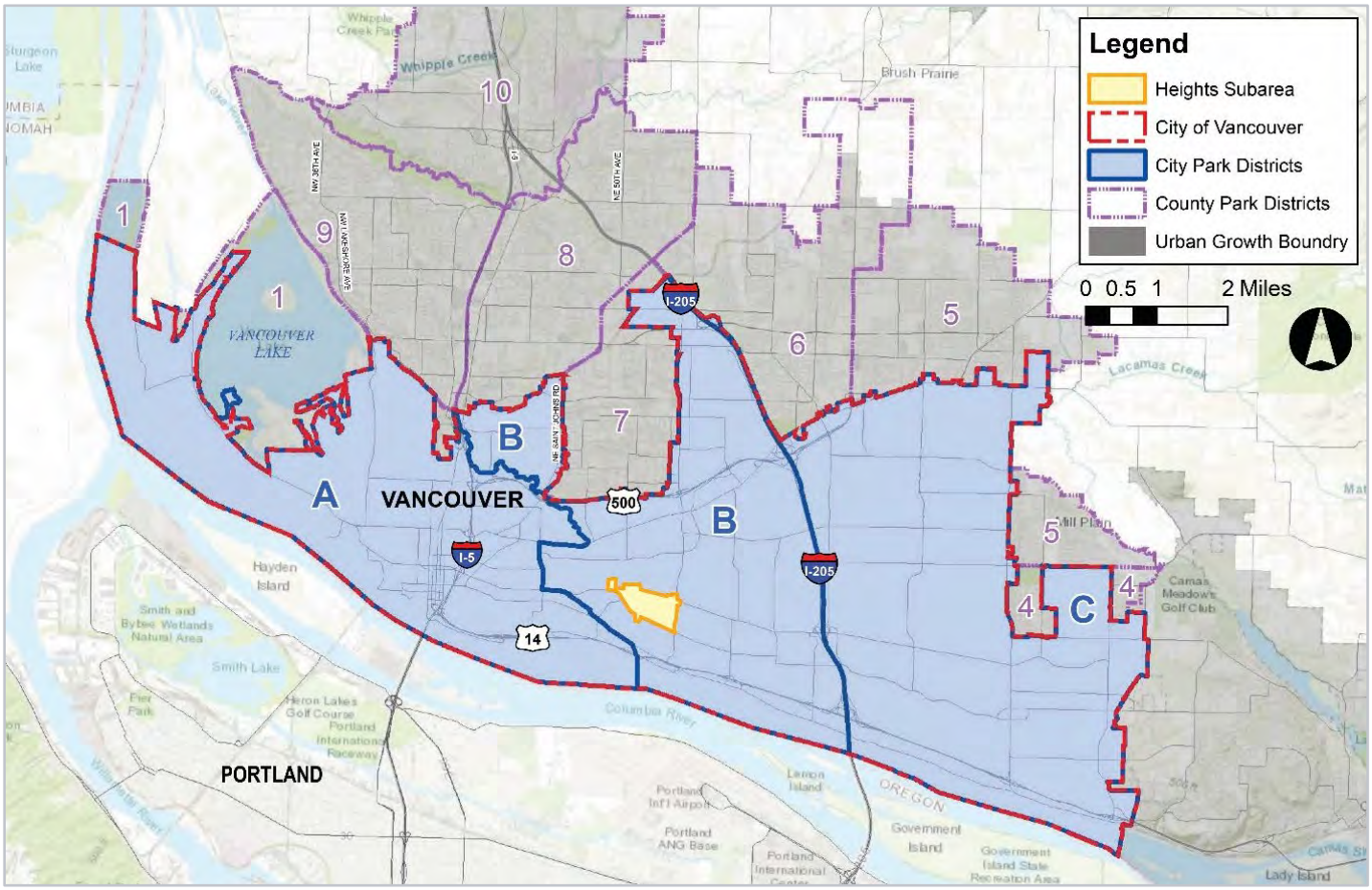
#### Planning Document Guidance

The Vancouver Parks and Recreation Department (VPRD) has established a community-based framework for a healthy, beautiful, and livable city through the adoption of the Vancouver Comprehensive Parks, Recreation and Natural Areas Plan 2014-2020 (parks plan). VPRD strives to provide a diverse and healthy park system that meets residents' diverse interests and needs and enhances their quality of life. The goals and objectives of the parks plan as they apply to VPRD are to:

1) **Provide a balanced, comprehensive, and interconnected system of parks, trails, and natural areas**
2) **Provide diverse recreational opportunities for all residents,**
3) **Be effective stewards of the land**
4) **Preserve our historic and cultural heritage**
5) **Maintain and enhance existing parks and recreation facilities and assets**
6) **Create a dynamic and effective organization**
7) **Acquire adequate funding to meet needs**
8) **Build strong partnerships**
9) **Reflect the community VPRD serves**

To help plan for today and the future and to achieve fairness and equity in the provision of park and open space amenities, VPRD divides the City into three park planning districts (see Figure 17). The Heights District is located within Park District B. Parks district boundaries were designed to "reflect barriers to pedestrian circulation, both natural and man-made, and to support a strong nexus between residents funding this program and those served through land acquisition and park development" (City 2014). The majority of funding for park acquisition and development is from park impact fees collected within the respective district with lesser amounts from grants, general fund and real estate excise taxes.

*Figure 17. Parks District Map*




The parks plan contains adopted parkland acquisition standards, which are derived through an evaluation of local needs in each park district. There are three different population-based park classifications: neighborhood parks, community parks, and natural areas. Regional parks and special facilities and trails are based on characteristics other than population and are independent of park districts.

**Neighborhood Parks** – These serve nearby residents by giving them access to basic recreation opportunities, enhancing neighborhood identity, and preserving neighborhood open space. These parks generally provide amenities like playgrounds, unprogrammed open turf fields, pathways and trails, picnic tables, benches, sports courts, and community gardens and mostly serve residents within a 10-minute walking distance, a radius of approximately a half-mile (see Figure 19). Sites are generally 2 to 5 acres in size but the size may vary depending upon particular site characteristics, opportunities, and land availability. The acquisition standard for neighborhood parks is 2.0 acres per 1,000 people. Where preferred acreage and level of service (LOS) are not possible due to funding limitations or land availability, VPRD may address the need for public park spaces by acquiring smaller urban parcels and developing them to provide increased user capacity where possible.

**Community Parks** – Typically 20 to 100 acres, community parks are a larger gathering place for a wider segment of the population. They generally have a half-mile to a 3-mile service area (see Figure 20). Because of their larger service area, community parks require more support facilities such as parking and restrooms. Community parks may include fields for programmed and organized sports, skate parks, community gardens, water access, play courts, programmed elements (such as the amphitheater at Esther Short Park), and/or recreational facilities such as community or senior centers. Community parks may also incorporate passive recreation space and natural areas. The acquisition standard for community parks is 3.0 acres per 1,000 people. In urban areas where a site of adequate size is not available, or in areas that are poorly served by community parks, VPRD may modify neighborhood park standards to compensate. In particular, consideration may be given to increasing the site size and type of development of neighborhood parks to allow increased recreation opportunities.

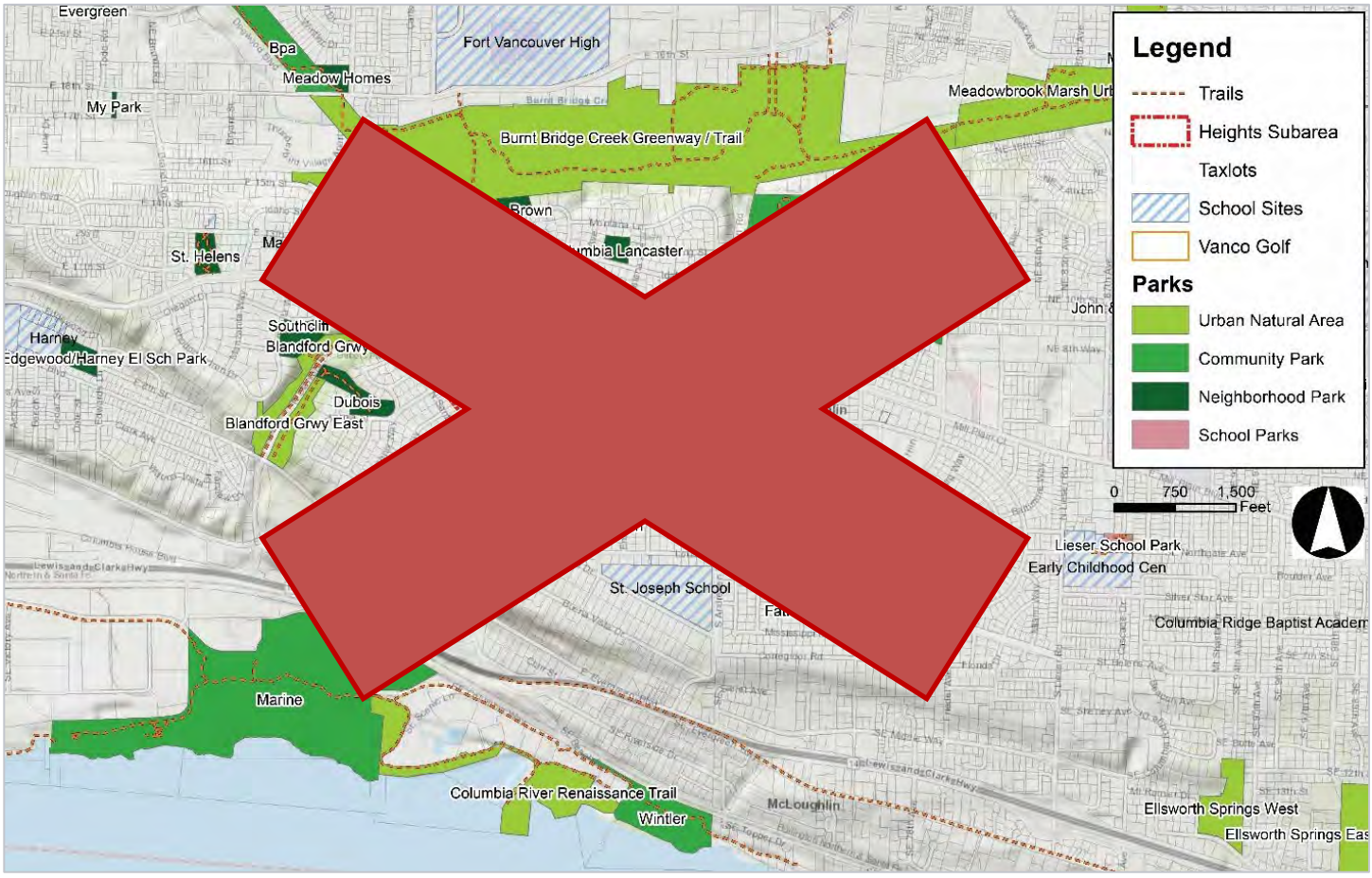
**Urban Natural Areas** – These include greenways, natural areas, conservation areas, and open space and are collectively referred to as urban open spaces. They are primarily managed for natural ecological value and their light recreational amenities and can provide relief from urban density (see Figure 21). Light, nature-based recreational opportunities may include trails for walking, running, hiking, and biking, viewpoints, interpretive signage, bird-watching, and environmental education. Urban natural areas may include wetlands, forests, wildlife habitats, or stream corridors that preserve or protect environmentally sensitive areas, such as endangered animal habitat and native plant communities. They range in size but are typically based on natural characteristics such as topography or surface water and are independent of population or parks district area and, therefore, do not have a standard service size. The acquisition standard for urban natural areas is 1 acre of open space per 1,000 people.

Figure 18 shows existing parks, trails, and open spaces. The VPRD program establishes an LOS standard for urban parks, including neighborhood and community parks. The acquisition standard is 6 acres per 1,000 people.

## Existing Conditions

There are no formal public parks within the Heights District boundaries; however, the Park Hill Cemetery, school sites, and Vanco Golf Range provide recreation opportunities in the Heights District. Outside the Heights District, there are multiple existing neighborhood and community parks, and greenway/open space areas that serve the Heights District. Parks and recreation facilities are identified on Figure 18 and further described below.

*Figure 18. Existing Parks Map*




## Recreational Facilities within the Heights District

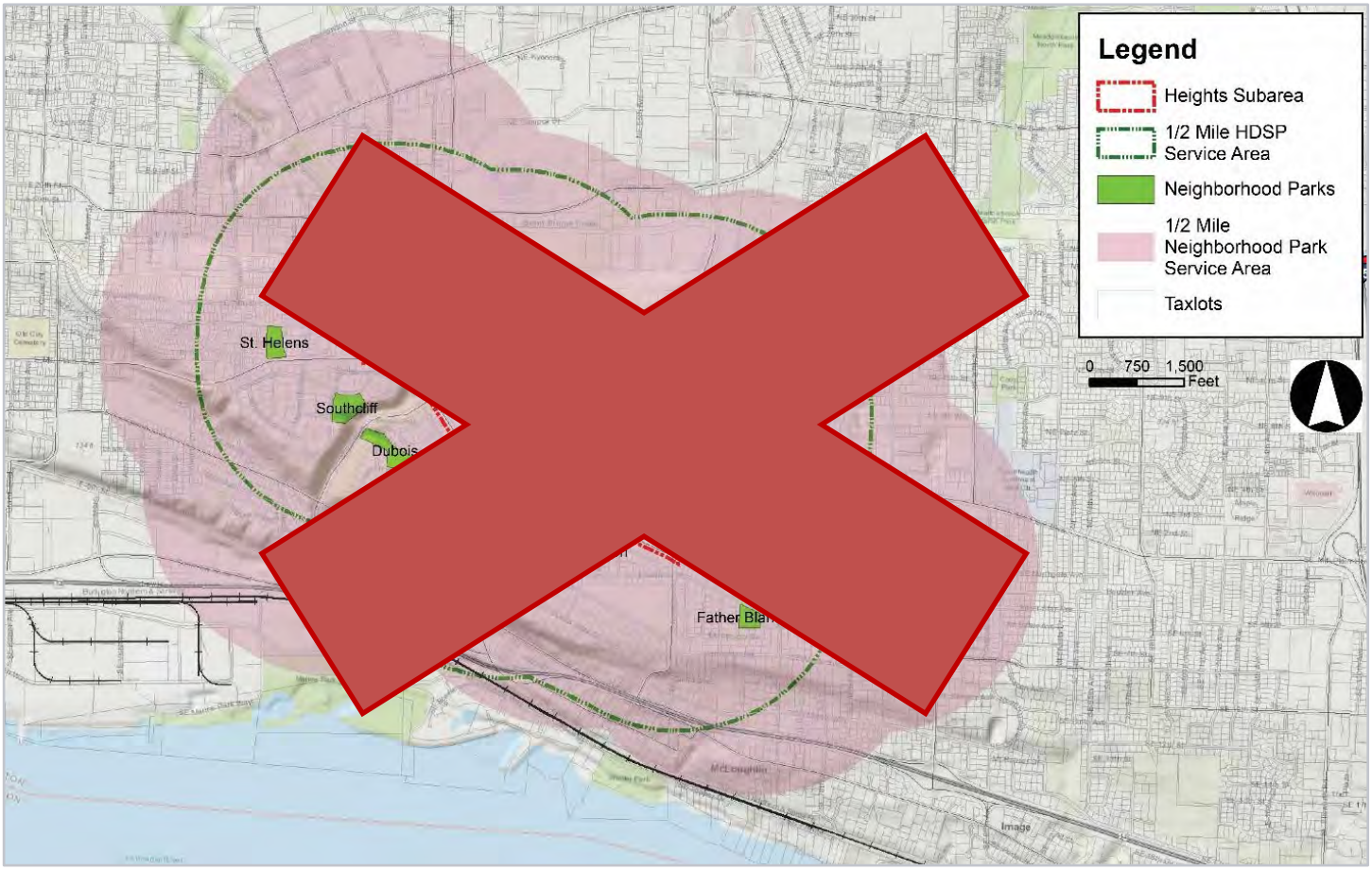
There are no ~~formal designated~~City-owned park~~s~~ facilities within the Heights District but a number of uses do support recreational activities. The Park Hill Cemetery, which is owned and managed by the City, occupies a 50-plus acre parcel in the center of the subarea. There are more than 25,000 burials on approximately 42.9 acres of the site and it is open to new interments. While the cemetery is not used for active recreation, it is valuable green space and is used for passive recreation such as walking. The subarea's two elementary schools (9.7-acre Martin Luther King and 16.8-acre Marshall) have school buildings, parking lots, open fields, playgrounds, and sports courts. The McLoughlin Middle School site occupies approximately 19.6 acres and has school buildings, parking lots, open and sports fields, a running track, and courtyard areas. That site also includes the Propstra Aquatic Center, which is owned and operated by Vancouver Public Schools (VPS) but is open to the public. None of these school sites have joint use agreements with VPRD for public park use but they do provide some green space and recreational facilities that benefit the community. It should be noted that, outside of an interagency agreement, public school facilities are not available to the general public during most daylight hours of the school year, and many schools provide after school care that further preclude public use of the grounds after typical school hours.

While not a parks and recreation facility, the Vanco Golf Range does provide recreational activities. The range is a privately-operated business that leases approximately 11.56 acres of the cemetery parcel. The facility is open to the public and includes 26 covered tees, eight grass tees, three practice greens, and one practice bunker.

## Neighborhood Parks Surrounding the Heights District

While there are no existing ~~public~~ neighborhood parks within the subarea, there are 11 neighborhood parks that serve the Heights District. They range from 1.9-acre General Anderson Park to 5.2-acre Dubois Park and generally provide non-organized recreation and access to basic recreational opportunities such as play equipment, benches, trails, picnic tables, and multi-use playfields. They also enhance neighborhood identity and preserve natural resource areas. Sam Brown Park is a 2.5-acre undeveloped neighborhood park site that is contiguous to the Burnt Bridge Greenway and provides habitat area and informal recreational open space and enhances neighborhood identity but could be developed to provide typical neighborhood park elements as well (City 2014).

*Figure 19. Neighborhood Park Map*



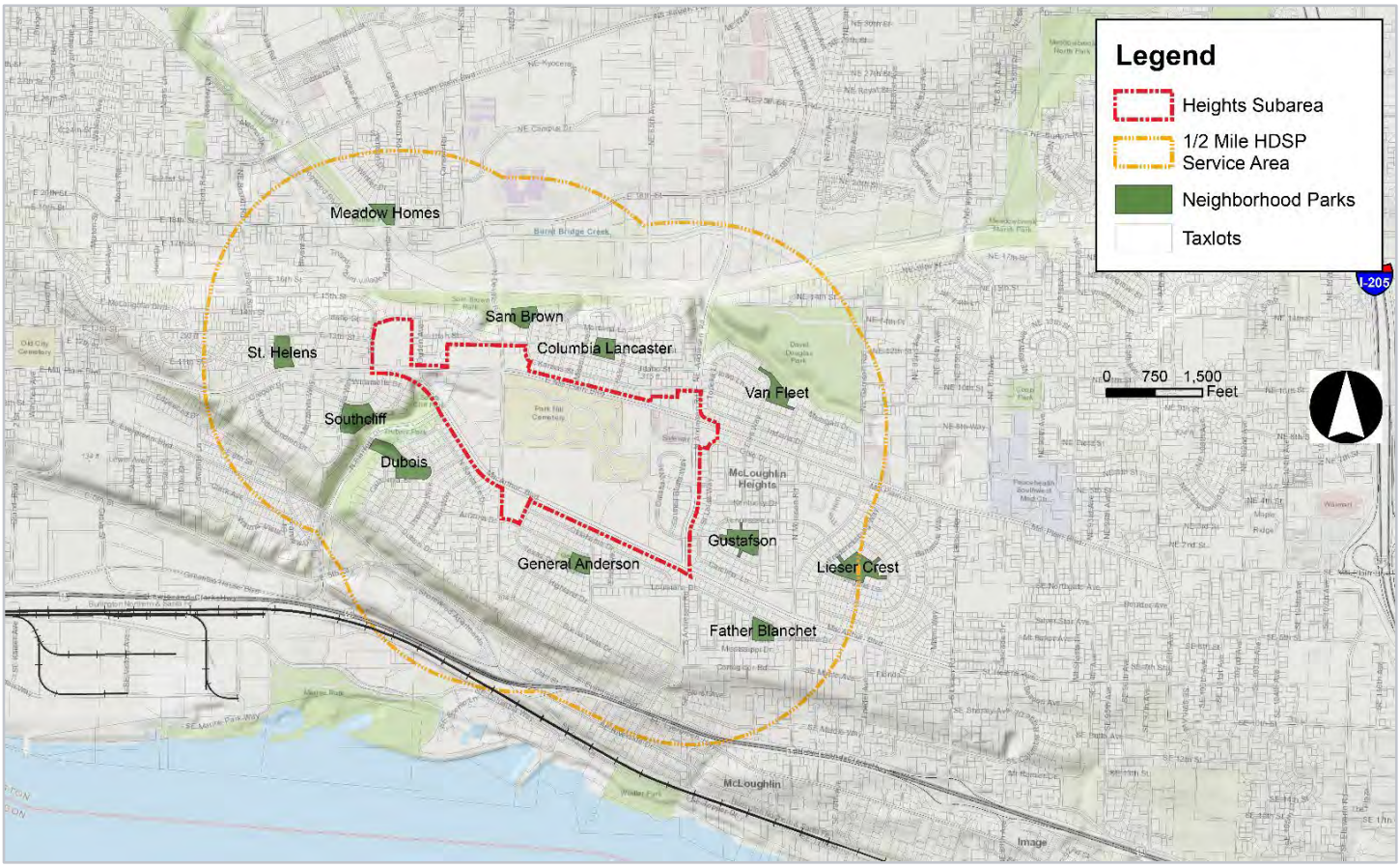



*Table 34. Neighborhood Parkland within 0.5 Miles ~~Service Area~~ of the Heights District*

| Developed Neighborhood Parks | | Park District | Acres | Distance (miles) | Features |
|---|---|---|---|---|---|
| 1 | Columbia Lancaster | B | 2.4 | 0.1 | Benches, picnic tables, open lawn, playground with swings |
| 2 | Dubois | B | 3.5 | 0.2 | Benches, picnic tables, open lawn, playground with swings |
| 3 | Father Blanchet | B | 2.5 | 0.3 | Benches, picnic tables, open lawn, playground with swings |
| 4 | General Anderson | B | 1.9 | 0.1 | Benches, picnic tables, open lawn, playground with swings |
| 5 | Carl Gustafson | B | 4.0 | 0.1 | Benches, picnic tables, open lawn, playground with swings, walking paths |
| 6 | Lieser Crest | B | 4.6 | 0.4 | Benches, picnic tables, open lawn, playground with swings, sports court with basketball, walking paths |
| 7 | Meadow Homes | B | 2.7 | 0.3 | Benches, picnic tables, open lawn, playground with swings |
| 8 | South Cliff | B | 4.4 | 0.2 | Benches, picnic tables, open lawn, playground with swings, walking paths |
| 9 | St. Helens | B | 3.0 | 0.2 | Benches, picnic tables, open lawn, playground with swings, walking paths |
| 10 | Van Fleet | B | 2.8 | 0.2 | Benches, picnic tables, playground with swings |
| **Undeveloped Neighborhood Parks** | | **Park District** | **Acres** | **Distance (miles)** | **Features** |
| 1 | Sam Brown | B | 2.5 | 0.1 | Habitat areas, undeveloped open space |
| **Total Neighborhood Park Acres serving Heights District** | | | **34.3** | | |

### Community Parks Surrounding the Heights District

There are 11 community parks that serve the Heights District that range in size from 5.3-acre Esther Short Park to 104-acre Marine Park. David Douglas Community Park is within 0.5 miles while the Vancouver Waterfront and Leroy Haagen community parks lie at the edge of the 3-mile service area.

*Figure 20. Community Park Map*

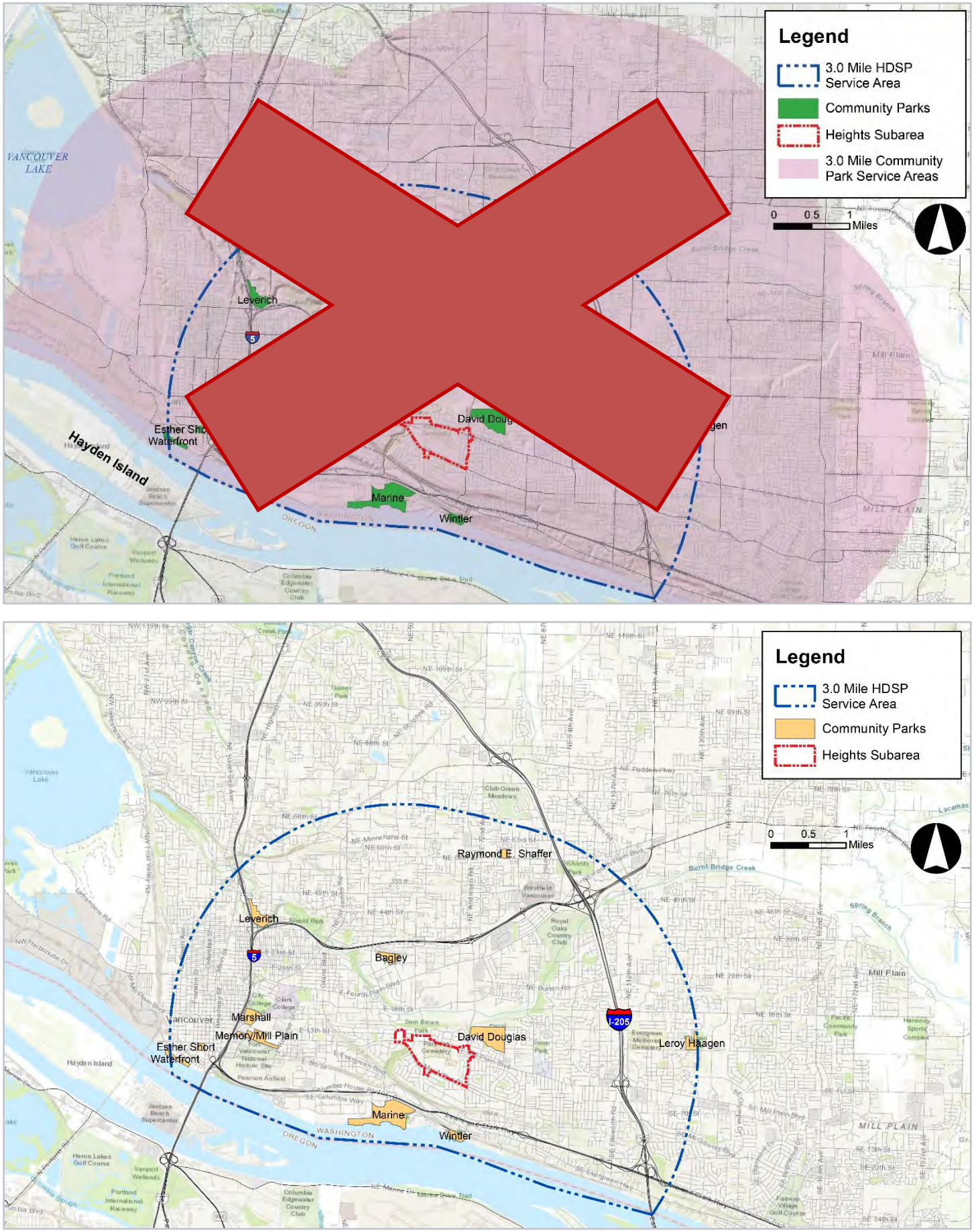


*Table 35. ~~Developed~~ Community Parkland within 3.0 Miles of the Heights District ~~Service Area~~*

| Developed Community Parks | | Park District | Acres | Distance (miles) | Features |
|---|---|---|---|---|---|
| 1 | Bagley | B | 16.2 | 0.9 | Benches, picnic tables, playground with swings, restroom, sports court with basketball, walking paths |
| 2 | David Douglas | B | 65.7 | 0.1 | Ball fields, benches, picnic tables, open lawn, picnic shelter, playground, restrooms, walking paths |
| 3 | Esther Short | A | 5.3 | 2.5 | Benches, gazebo, open lawn, picnic shelter/stage, playground with swings, restrooms, walking paths, water feature/fountain |
| 4 | Leroy Haagen | C | 17.3 | 2.9 | Benches, picnic tables, picnic shelter, playground with swings, restrooms, sports court, walking paths |
| 5 | Leverich | A | 28.5 | 2.2 | Benches, picnic shelter, playground with swings, restrooms, walking paths, disc golf |
| 6 | Marine | A | 103.7 | 0.6 | Ball fields, benches, picnic tables, boat launch, open lawn area, picnic shelter, playground with swings, restrooms, walking paths, water fountain |
| 7 | Marshall | A | 20.1 | 1.8 | Ball fields, open lawn area, picnic shelter, playground with swings, restrooms |
| 8 | Memory/Mill Plain | A | 29.5 | 1.7 | Ball fields, restroom |
| 9 | Vancouver Waterfront | A | 10.9 | 2.8 | Benches, picnic tables, open lawn areas, playground, restrooms, walking paths |
| ~~10~~ | ~~Waterworks~~ | ~~A~~ | ~~6.0~~ | ~~1.3~~ | ~~Benches, picnic tables, gazebo and picnic shelter, skate park, walking paths~~ |
| 10~~1~~ | Wintler | B | 14.0 | 0.7 | Beach access, benches, picnic tables, restrooms, walking paths |
| **Undeveloped Community Parks** | | **Park District** | **Acres** | **Distance (miles)** | **Features** |
| 1 | Raymond E. Shaffer | B | 10.1 | 2.6 | Habitat areas, undeveloped open space, walking trails |
| **Total Community Park Acres serving the Heights District** | | | **327~~1~~.3** | | |
| ~~**Total Community Park Acres in District B**~~ | | | ~~**106.0**~~ | | |

## Urban Natural Areas and Trails Surrounding the Heights District

There are several urban natural areas in the vicinity of the Heights District. Designated greenways along Burnt Bridge Creek, Blandford Canyon, and the Columbia River Renaissance Trail provide 291 acres of natural green space within 1.0 mile of the Heights District. Both the Burnt Bridge Creek and Columbia River Renaissance greenways offer multi-use trails that connect to additional greenways and open spaces, including the Clark County Regional Trail and Bikeway System. Additionally, ~~all~~ most neighborhood and community parks provide internal path networks.

*Figure 21. Urban Natural Area and Trail Map*


## Level of Service Standards

The existing LOS for each park type is determined by comparing ~~the existing population and~~ the acreage of the existing park inventory and the latest population data for a specified geographic area; in this case, the City of Vancouver Park District B. Within Park District B, there are currently 27 neighborhood parks, 6 community parks, and 13 urban natural areas to serve the existing population of 69,064 people.[13] Current LOS needs, or the acreage required to meet the stated park standards, is based on the existing park facilities and population within Park District B.

Parkland need in Park District B is identified in Table 36 below. Based on the existing neighborhood park land inventory and existing population, there is currently a shortage of 6.9 acres of neighborhood parks within Park District B. Similarly, there is an existing shortage of 73.1 acres of community park land. Because of the extensive area of the Burnt Bridge Creek Greenway, there is an abundance of urban natural areas in Park District B. ~~Because of the number of neighborhood parks within the subarea, there is a current excess of 4.61 acres of neighborhood parkland that could potentially accommodate 4,610 additional residents; however, the area has an existing shortage of 22.47 acres of community parkland (see Table 36). Because of the extensive area of the Burnt Bridge Creek Greenway, the subarea enjoys an abundance of urban natural areas. The existing capital facilities plan component of the parks plan does not call for any acquisitions or improvements within Park District B (the subarea) through 2020.~~

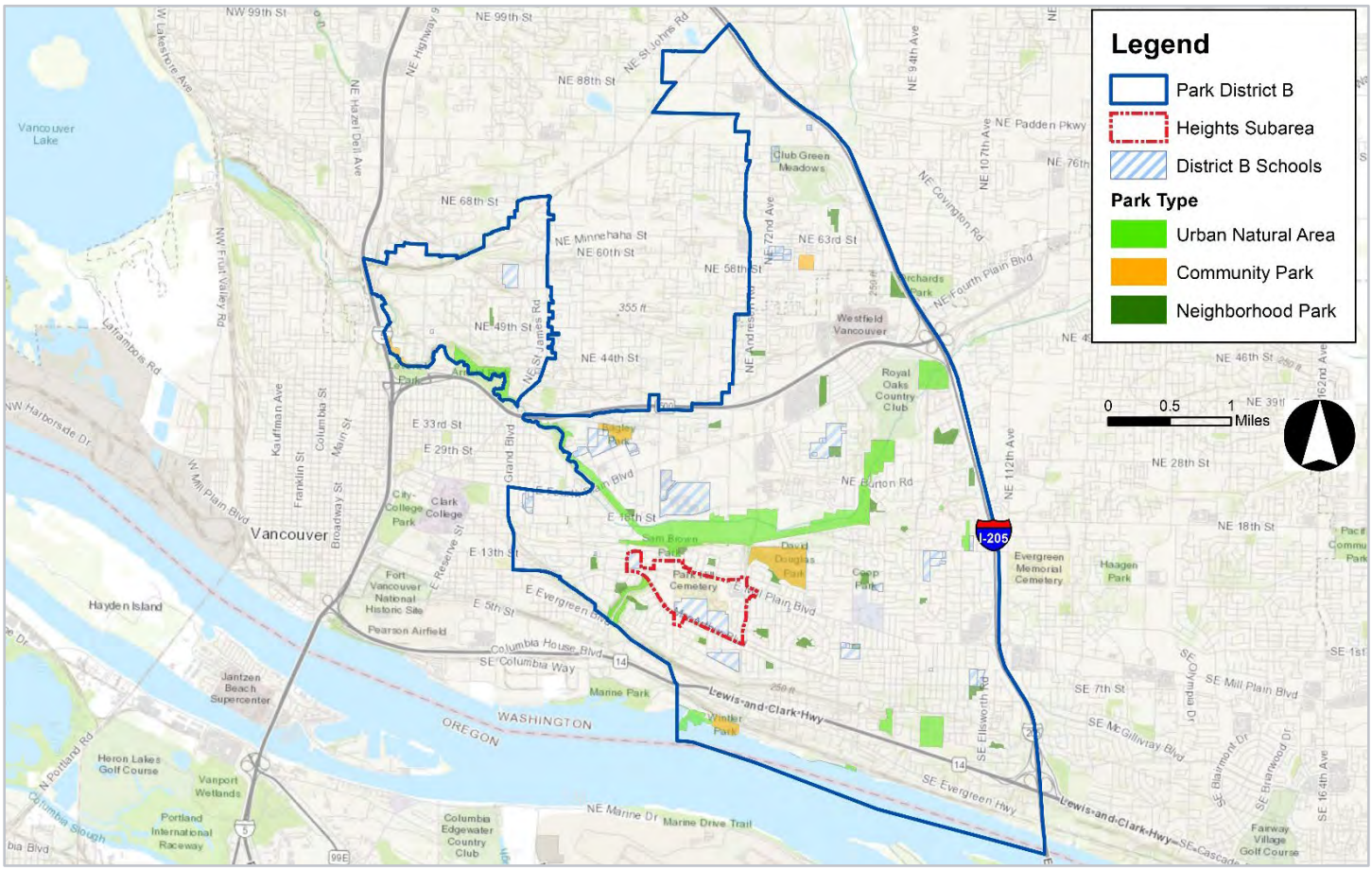
*Table 36. Parkland Needs in ~~Heights District Service Areas~~Park District B*

| Park Type | Total (Acres) | Population in Service Area | Existing Acres/ 1000 people | Standard (Acres/1000) | Gap (Acres/1000) | Existing Acres Needed[a] |
|---|---|---|---|---|---|---|
| Neighborhood | ~~34.3~~ 128.7 | ~~14,862~~ 69,064 | ~~2.3~~ 1.9 | 2.0 | ~~+0.3~~ -0.1 | ~~-4.6~~ 6.9 |
| Community | ~~327.3~~ 134.1 | ~~116,591~~ 69,064 | ~~2.8~~ 1.9 | 3.0 | ~~-0.2~~ -1.1 | ~~22.5~~ 73.1 |
| Urban Natural Area | ~~291.0~~ 615.2 | 69,064 | ~~4.2~~ 8.9 | 1.0 | ~~+3.2~~ +7.9 | ~~-221.70~~ -546.1 |

[a]Acres needed is expressed as a positive number if there is currently a deficit in parkland and a negative number if there is currently a surplus. Therefore, currently an additional 6.9 acres of neighborhood parks and ~~22.5~~73.1 acres of community park space is needed to meet LOS while there is a surplus of ~~neighborhood parks and~~ urban natural areas.
[b]Population data is based on the 2010 Census block information obtained from Clark County GIS (last updated October 19, 2016).~~22.5 acres of community park space is needed to meet LOS while there is a surplus of neighborhood parks and urban natural areas.~~

[13] Park District B population data was obtained from Clark County GIS, last updated on October 19, 2016 and based on the 2010 Census Block Group.

*Figure 22. District Wide Parkland- Park District B*




## Impacts

As a result of projected population increases, development under the Project Alternative or the No Action Alternatives would have the potential to impact parks and recreational facilities that serve the Heights District. All three alternatives will face situations where residents of Park District B could be underserved at development buildout and adopted park standards might not be met, particularly for neighborhood and community parkland. The existing deficit of neighborhood and community parkland ~~for the Heights District~~within Park District B would increase under all alternatives; however, this impact would be offset by the informal park space and recreational opportunities provided in the Park Hill Cemetery (under all alternatives) and the Vanco Golf Range (under the No Action alternatives), as well as additional park and open space amenities provided in the Project Alternative. Although the public schools and Propstra Aquatic Center provide some public access, they have extremely limited availability due to school activities. The following sections assess park and recreation facility impacts specific to each alternative.

### No Action Base Alternative

In the No Action Base Alternative, current land use and zoning will remain in place. No development or redevelopment is assumed to occur in existing developed areas and new development will occur only on the 4.13 acres of vacant land identified in the VBLM. No new dedication of parkland is anticipated under the No Action Base Alternative. Based on the LOS standards established in the parks plan, the No Action Base Alternative would be adequately served ~~by neighborhood parks and~~ urban natural areas. The existing deficit of neighborhood parks would increase by 1 acre for a total service gap of 7.9 acres and community park space would increase by approximately 1.5 acres for a total service gap of 74.6 acres. Table 37 provides an analysis of park space needs for the No Action Base Alternative.

*Table 37. No Action Base Alternative Park Analysis*

| Park Type | LOS Standard (Acres/1000 people) | Existing Acres Needed to Meet LOS[a] | Acres required to Serve Additional Population[b] | Acres provided in No Action Base | Service Gap (Acres)[c] |
|---|---|---|---|---|---|
| Neighborhood | 2.0 | ~~4.6~~ 6.9 | 1.0 | 0 | ~~3.6~~ 7.9 |
| Community | 3.0 | ~~22.5~~73.1 | 1.5 | 0 | ~~24~~74.6 |
| Urban Natural Area | 1.0 | ~~221.7~~ 546.1 | 0.5 | 0 | ~~221.2~~ 546.6 |

[a]Per City adopted LOS as identified in Table 36.
[b]The No Action Base Alternative anticipates an increase in population of 478 people.
[c]A negative number represents an excess in park land needed to meet the LOS standard and a positive number represents a deficit in park land to meet LOS standards.

## No Action High Alternative

Under the No Action High Alternative current residential units would remain, new development would occur on the same vacant parcels assumed to develop under the No Action Base Alternative, and the Tower Mall area would redevelop with residential and limited commercial development. No new dedication of parkland is anticipated under the No Action High Alternative. Based on the LOS standards established in the parks plan, the No High Alternative would be adequately served by urban natural areas. ~~An additional 3.6 acres of neighborhood park land and 34.8 acres of community park land would be required to meet the existing LOS standards.~~ The existing deficit of neighborhood parks would increase by 8.2 acres for a total service gap of 15.1 acres and the existing deficit of community park space would increase by approximately 12.3 acres for a total service gap of 85.4 acres to meet the existing LOS standards. Table 38 provides an analysis of park space needs for the No Action High Alternative.

*Table 38. No Action High Alternative Park Analysis*

| Park Type | LOS Standard (acres/1000 people) | Existing Acres Needed to meet LOS[a] | Acres required to serve additional population[b] | Acres provided in No Action High | Service Gap (acres)[c] |
|---|---|---|---|---|---|
| Neighborhood | 2.0 | ~~4.6~~6.9 | 8.2 | 0 | ~~3.6~~15.1 |
| Community | 3.0 | ~~22.5~~73.1 | 12.3 | 0 | ~~34.8~~85.4 |
| Urban Natural Area | 1.0 | ~~221.7~~ 546.1 | 4.1 | 0 | ~~217.6~~ 542 |

[a]Per City adopted LOS as identified in Table 36.
[b]The No Action High Alternative anticipates an increase in population of 4,113 people.
[c]A negative number represents an excess in park land needed to meet the LOS standard and a positive number represents a deficit in park land to meet LOS standards.

## Project Alternative

The overall use and activity levels of existing parks, urban natural areas, and recreation facilities that serve the Heights District will increase with the growth of residential and employment populations under the Project Alternative. The increase of 4,482 people anticipated in the Project Alternative would require additional park space to meet the needs of future residents and the LOS standards of the City. The Project Alternative includes the dedication and development of the parks and open space amenities listed in Table 39.

*Table 39. Proposed Parkland*

| Proposed Parks | Size (Acres) | Classification |
|---|---|---|
| Civic Park | 1.0 | Special facility |
| Neighborhood Park | 1.5 | Neighborhood |
| ~~Pocket Parks~~ | ~~0.5~~ | ~~Neighborhood~~ |
| ~~Linear Parks~~ | ~~0.5~~ | ~~Neighborhood~~ |
| ~~MacArthur Greenbelt Park~~ | ~~2.6~~ | ~~Neighborhood~~ |
| **Total Proposed Park Space** | **~~6.1~~2.5 Acres** | |

Note: Additional public or quasi-public open space may offer additional park spaces in individual development areas.

In addition to the proposed Civic Park and Neighborhood Park, the Project Alternative would also include a series of small pocket parks (approximately 0.5 acres total) integrated into the proposed residential areas, the MacArthur Greenbelt, an approximately 2.6 acre multimodal corridor, and the Loop, an approximately 0.5 acre linear park connecting proposed residential and commercial areas and other park facilities. While these facilities would not meet the City's standards from the parks plan for neighborhood parks, community parks, or urban natural areas, they would provide important open space amenities and recreation opportunities in the Heights District. Furthermore, these facilities would support ~~T~~the overall intent of the public realm and open space element of the Heights District Plan, which is to provide a variety of community and neighborhood spaces to enrich the quality of life for all residents and visitors. The parkland and open space amenities proposed under the Project Alternative would include playgrounds, trails, unprogrammed open spaces, planters, and space for neighborhood events. These amenities would primarily benefit the residents of the proposed development ~~and would be considered neighborhood park space~~. Pedestrian corridors with enhanced paving will link to parks and open space areas. The corridors would function as civic spaces for commuting and strolling and include lighting, furnishings, and art amenities which would help unify the development.

The civic park will include a plaza space, water feature, and adjacent retail supportive spaces that are expected to benefit residents within and surrounding the Heights District. The civic space would be classified as a special facility. No additional urban natural area is proposed in the Project Alternative.

Based on the LOS standards established in the parks plan, the existing parkland in the vicinity of the Heights District combined with the parkland proposed in the Project Alternative would result in adequate ~~neighborhood parks and~~ urban natural areas to serve existing and projected populations. The existing deficit of neighborhood parks would increase by 9.0 acres for a total service gap of 13.4 acres and the existing deficit of community park space would increase by approximately 13.5 acres for a total service gap of 86.6 acres to meet the existing LOS standards (see Table 40)~~An additional 36 acres of community park land would be required to meet the existing LOS standards. Table 40 provides an analysis of park space for the Project Alternative~~.

*Table 40. Project Alternative Park Analysis*

| Park Type | LOS Standard (acres/1000 people) | Existing Acres Needed to meet LOS | Acres required to serve additional population[b] | Acres provided in Project Alternative | Service Gap (acres)[c] |
|---|---|---|---|---|---|
| Neighborhood | 2.0 | ~~4.6~~ 6.9 | 9.0 | 5.1 | ~~0.7~~ 13.4 |
| Community | 3.0 | ~~22.5~~ 73.1 | 13.5 | 0 | ~~36~~ 86.6 |
| Urban Natural Area | 1.0 | ~~221.7~~ 546.1 | 4.5 | 0 | ~~217.2~~ 541.6 |

[a]Per City adopted LOS as identified in Table 36.
[b]The Project Alternative anticipates an increase in population of 4,482 people.
[c]A negative number represents an excess in park land needed to meet the LOS standard and a positive number represents a deficit in park land to meet LOS standards.

## Mitigation Measures

Implementation of the following mitigation measures would offset potential impacts to parks and recreation facilities associated with development under the Heights District Plan. ~~Development under any studied alternative would be required to meet City codes and pay park impact fees in accordance with VMC 20.915.050.~~

### Mitigation Measures Designed into the Project

The following park and recreation facility improvements are proposed within the Heights District Plan to offset potential impacts associated with the Project Alternative.

- **A 1-acre civic plaza in the center of the Redevelopment Area that supports surrounding commercial and retail uses. The civic plaza would be designed with an event plaza, market stalls, retail supportive seating and café space, interactive water feature, and an adjacent festival street that could be closed to vehicular traffic during events.**
- **An approximately 1.5-acre neighborhood park spanning both sides of Devine Road. The west side of the park would be dedicated to community garden plots and an entry gateway. The east side of the park would be an off-leash dog park.**
- **A series of small pocket parks to support age-appropriate play areas, integrated into the residential areas of the Heights District.**
- **The MacArthur Greenbelt would be a corridor greenspace offering passive open space along the redesigned MacArthur Boulevard. The greenbelt would include benches, art installations, and interpretive signage.**
- **Passive recreation and pedestrian amenities along different segments of The Loop throughout the Redevelopment Area.**
- **Enhanced connectivity to and from the Park Hill Cemetery and ongoing maintenance of the cemetery road network as open, public pathways for light recreation.**

### Existing Regulations and Other ~~Potential~~ Mitigation

Development under any studied alternative would be required to meet City codes and pay park impact fees in accordance with VMC 20.915.050.

In addition to existing regulations and the park and recreation facility improvements designed into the Heights District Plan, the City should pursue the following measures to further offset potential impacts.

- **Pursue the acquisition of additional parks and recreation lands when available. Acquisition and development funds may be produced through a combination of park impact fees, real estate excise tax, grants, and/or other sources.**
- **Redesign and develop David Douglas and Bagley Parks for community park amenities.**
- **The VPRD may consider alternative park standards within the project boundaries. Typical acre-to-population ratios for park standards may be lower and impact fees higher than in lower density suburban settings. A Heights District-specific standard would accommodate a more intense urban form and allow for smaller parks with a higher development standard.**
- **VPRD should continue to work closely with the City's Transportation Department to plan and create user-friendly pedestrian and bicycle systems and promote healthy lifestyle choices. This system should increase connectivity, improve the overall streetscape, enhance visual attractions to the project area, ensure public safety, and provide attractive parks, greenway, and open spaces and amenities.**

### Significant Unavoidable Adverse Impacts

With the implementation of the mitigation measures described above, no significant unavoidable adverse impacts to parks, recreation, and open space are anticipated.

# Air

This section assesses the potential impacts of the proposed project, the No-Action Alternatives, and related actions on air quality. This section describes the air quality environment at the project site and discusses general indications of air quality status and attainment status of the project vicinity. GHG emissions and climate change are evaluated separately under the Climate Change and Greenhouse Gas Emissions section.

## Affected Environment

This section provides an overview of federal, state, and local regulations applicable to future development and describes the existing conditions related to air quality within the Heights District.

### Applicable Federal, State, and Local Regulations

Three agencies have jurisdiction over the ambient air quality in the proposed project location: the EPA, Ecology, and Southwest Clean Air Agency (SWCAA). These agencies establish regulations that govern the concentrations of pollutants in the outdoor air. Air quality is generally assessed in terms of whether concentrations of air pollutants are higher or lower than ambient air quality standards set to protect human health and welfare. Ambient air quality standards are set for "criteria" pollutants (e.g., carbon monoxide, particulate matter [in two size ranges described later], nitrogen dioxide, and sulfur dioxide).

The U.S. National Ambient Air Quality Standards (NAAQS) address harmful pollutants and are established by the EPA. Geographic areas in which concentrations of a pollutant exceed the NAAQS are classified as nonattainment areas. Federal regulations require states to prepare state implementation plans (SIPs) establishing methods to bring air quality into compliance with the NAAQS and to maintain the compliance. Nonattainment areas that return to compliance are called maintenance areas.

Applicable local, state, and federal ambient air quality standards are displayed in Table 41.

*Table 41. Applicable Ambient Air Quality Standards for Criteria Pollutants*

| Pollutant | Terms of Compliance [a] | Concentration |
|---|---|---|
| **Total Suspended Particulate** | | |
| Annual Average (µg/m$^3$) | Geometric mean; not to exceed | 60 µg/m$^3$ |
| 24-Hour Average (µg/m$^3$)<br>WA State only; no federal standard | Not to be exceeded more than once per year | 150 µg/m$^3$ |
| **Inhalable Particulate Matter (PM10)** | | |
| Annual Average (µg/m$^3$) | Arithmetic mean; not to be exceeded | 50 µg/m$^3$ [b] |
| 24-Hour Average (µg/m$^3$) | The 3-year average of the 98th percentile of the daily concentrations must not exceed | 150 µg/m$^3$ |
| **Fine Particulate Matter (PM2.5)** | | |
| Annual Average (µg/m$^3$) | The 3-year annual average of daily concentrations must not exceed | 12 µg/m$^3$ |
| 24-Hour Average (µg/m$^3$) | The 3-year average of the 98th percentile of daily concentrations must not exceed | 35 µg/m$^3$ |
| **Sulfur Dioxide (SO2) (b)** | | |
| Annual Average (ppm) | Annual arithmetic mean of 1-hour averages must not exceed | 0.02 ppm [b] |
| 24-Hour Average (ppm) | 24-hour average must not exceed | 0.10 ppm [b] |
| 1-Hour Average (ppm) | 1-hour average must not exceed | 0.40 ppm [b] |
| 1-Hour Average (ppm) | The 3-year average of the 99th percentile of daily max 1-hour conc. must not exceed | 0.075 ppm |
| 1-Hour Average (ppm) | No more than twice in 7 consecutive days may 1-hour average exceed | 0.25 ppm [b] |
| **Carbon Monoxide (CO)** | | |
| 8-Hour Average (ppm) | The 8-hour average must not exceed more than once per year | 9 ppm |
| 1-Hour Average (ppm) | The 1-hour average must not exceed more than once per year | 35 ppm |
| **Ozone (O3)** | | |
| 8-Hour Average (ppm) | The 3-year average of the 4th highest daily maximum 8-hour average must not exceed | 0.075 ppm |
| 8-Hour Average (ppm)<br>Revised effective 12/28/2015 | The 3-year average of the 4th highest daily maximum 8-hour average must not exceed | 0.070 ppm |
| **Nitrogen Dioxide (NO2)** | | |
| Annual Average (ppm) | The annual mean of 1-hour averages must not exceed | 0.053 ppm |
| 1-Hour Average (ppm) | 3-year avg. of 98th percentile of daily max 1 hour averages must not exceed | 0.1 ppm |
| **Lead (Pb)** | | |
| Rolling 3-month Average | Rolling 3-month average not to exceed | 0.15 µg/m$^3$ |

Note: µg/m$^3$ = micrograms per cubic meter; ppm = parts per million

[a] All limits are federal and state air quality standards except as noted. All indicated limits represent "primary" air quality standards intended to protect human health.

[b] Washington State standards; Washington applies more stringent annual and 24-hour limits for $SO_2$ than in federal rules. There is also a federal 0.5 ppm 3-hour average "secondary" standard for $SO_2$ to protect welfare.

## Existing Conditions

Air quality in Southwest Washington has improved since the early 1980s, when the area was designated as a nonattainment area for carbon monoxide and ground level ozone concentrations. The Vancouver area is designated as a maintenance area for carbon monoxide and ozone and an attainment area for all other pollutants. The SWCAA maintains the carbon monoxide maintenance plan and the ozone maintenance plan for the Vancouver air quality maintenance area (AQMA). The Vancouver AQMA meets the current air quality health standards for both carbon monoxide and ozone, and the area is now in compliance with all federal air quality standards.

## Impacts

The City's implementation of the Heights District Plan (Project Alternative) would increase the density of development over the No Action Alternatives. Table 42 summarizes the differences in growth assumptions in the future for the Project Alternative and the No Action Alternatives.

*Table 42. Growth Assumptions under the Alternatives*

| | No Action Base Alternative | No Action High Alternative | Project Alternative |
|---|---|---|---|
| New Residential Units | 192 units | 1652 units | 1800 units |
| New Residents | 478 people | 4113 people | 4482 people |
| New Jobs | 19 jobs | 161 jobs | 490-510 jobs |

Impacts to air quality would occur under any of the alternatives as the result of construction emissions (e.g., emissions associated with construction vehicles, equipment, and activities) or under operation. The demolition of existing structures would require the removal and disposal of building materials that could possibly contain asbestos and lead-based paint. While no large industrial or commercial uses are anticipated under any of the alternatives, each alternative would see an increase in vehicle emissions associated with increased traffic.

~~SWCAA has control measures for regional air pollution control incorporated into the general air quality regulations. In particular, commercial and industrial emission sources are required to register or obtain an operating permit. Many transportation system improvements are reviewed to ensure that they do not contribute to or worsen air quality impacts. The SWCAA regulations will apply to individual developments or transportation projects that result from the implementation of any alternative.~~

### No Action Base Alternative

Impacts to air quality would occur as the result of the construction of site-specific development and, depending on the development, could occur as the result of operations. Additional traffic associated with new development would result in increased vehicle emissions. Based on the anticipated development intensity and vehicle trips generated, emissions under this scenario would be fewer than with the No Action High Alternative or the Project Alternative. However, this alternative would not include ~~BRT stations and~~ the bike/pedestrian facilities within the Redevelopment Area, as proposed under the Project Alternative. It is anticipated that vehicle emissions under this scenario would be lowest of the three alternatives.

SWCAA regulations and motor vehicle regulations will continue to apply to individual developments or transportation projects under this alternative.

### No Action High Alternative

The potential causes of impacts to air quality under this alternative are the same as under the No Action Base Alternative; however, the intensity of development would be greater, resulting in more impacts to air quality as the result of construction and vehicle emissions.

Based on the anticipated development intensity, trips generated under this scenario would be greater than under the No Action Base Alternative but only slightly less than the Project Alternative. However, this alternative would not include ~~BRT stations and~~ the bike/pedestrian facilities within the Redevelopment Area, as proposed under the Project Alternative. Per the traffic analysis, these improvements reduced the trip generation by 6 percent to account for multimodal trips. Impacts to air quality under this alternative would be similar to those under the Project Alternative.

SWCAA regulations and motor vehicle regulations will continue to apply to individual developments or transportation projects under this alternative.

### Project Alternative

The intensity of development under the Project Alternative would be higher intensity than the No Action Base Alternative, and slightly higher than with the No Action High Alternative.

The Project Alternative is designed to encourage a livable, mixed density, mixed-use urban neighborhood center while respecting surrounding neighborhoods. The proposed land use pattern is intended to promote public health and sustainability by encouraging non-motorized transportation and increasing the return on public investment for the upcoming C-TRAN BRT line.

The traffic analysis performed for the Heights District Plan indicates that the plan and proposed redevelopment would generate approximately 700 to 850 new vehicle trips during the AM and PM peak hours. With the proposed BRT stations and bike/pedestrian facilities within the Redevelopment Area, the trip generation was reduced by 6 percent to account for multimodal trips. The vehicle emissions and impacts to air quality under this alternative would be higher than under the No Action Base Alternative, but only slightly higher than under the No Action High Alternative.

SWCAA regulations and motor vehicle regulations will continue to apply to individual developments or transportation projects under this alternative.

## Mitigation Measures

### Mitigation Measures Designed into the Project

~~The existing federal and state regulations for regional air pollution control are incorporated into the SWCAA permitting program. Commercial and industrial emission sources are required to register or obtain an operating permit, and some transportation system improvements are reviewed by SWCAA to ensure that they do not contribute to air quality impacts. These regulations will apply to individual developments or transportation projects that result from the implementation of the Project Alternative, or development that occurs under the No Action Alternatives.~~

~~Under existing regulations, construction contractors would be required to comply with all relevant federal, state, and local air quality rules. In addition, implementation of required best management practices (BMPs) would reduce emissions related to the construction of the developments. Demolition contractors would be required to comply with the existing federal and state regulations related to the safe removal and disposal of any asbestos-containing materials.~~

~~Construction equipment and material hauling can affect traffic flow in a project area if construction vehicles travel during peak periods or other heavy-traffic hours of the day and pass through congested areas, thereby further impeding traffic flow.~~

The following policies included in the ~~subarea plan~~Land Use and Access/Circulation sections of the plan (updated to reflect the current plan) support a reduction in vehicle emissions.

*L-1 Establish a new HX (Heights District) mixed-use zone classification that promotes a flexible mix of residential, retail, and employment land uses and a walkable land use pattern, allowing living and working within walking distance of each other.*

*L-3 Encourage a pedestrian-scale environment and walkability through smaller blocks and narrow street rights-of-way.*

*L-6 Incentivize shared parking strategies that reduce the total number of stalls in the District.*

*C-3 Foster the regional bicycle network by creating protected bike lanes for both directions along all major arterials.*

*C-5 Create a fine-grained network of accessible sidewalks, pathways and bike facilities that include lighting and shelter to allow pedestrians, cyclists, and others users comfortable and direct access to and within the District. Capitalize on existing networks such as the internal cemetery streets and connections between Skyline Crest and nearby schools.*

The following policies included in the Environmental Sustainability section of the plan (updated to reflect the current plan) support energy efficiency and associated emissions reductions.

*S-4 Strive to exceed relevant sustainability benchmarks for new buildings and infrastructure, similar to what is required for LEED certification standards. All publicly owned buildings shall meet or exceed LEED Gold Certification.*

*S-6 Explore opportunities for district level solutions to waste management and energy production.*

### Existing Regulations and Other ~~Potential~~ Mitigation

The existing federal and state regulations for regional air pollution control are incorporated into the SWCAA permitting program. Commercial and industrial emission sources are required to register or obtain an operating permit, and some transportation system improvements are reviewed by SWCAA to ensure that they do not contribute to air quality impacts. These regulations will apply to individual developments or transportation projects that result from the implementation of the Project Alternative, or development that occurs under the No Action Alternatives.

Construction equipment and material hauling can affect traffic flow in a project area if construction vehicles travel during peak periods or other heavy-traffic hours of the day and pass through congested areas, thereby further impeding traffic flow. Under existing regulations, construction contractors would be required to comply with all relevant federal, state, and local air quality rules. In addition, implementation of required best management practices (BMPs) would reduce emissions related to the construction of the developments. Demolition contractors would be required to comply with the existing federal and state regulations related to the safe removal and disposal of any asbestos-containing materials.

No mitigation measures beyond the existing regulations and mitigation built into the project are necessary or proposed to address potential impacts associated with the proposal or alternatives.

### Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to air quality are anticipated under any of the alternatives.

## Water

This section assesses the potential impacts of the proposed project, the No-Action Alternatives, and related actions on water quality and quantity. There are no surface water resources (streams, lakes, or ponds) located within the subarea, and therefore this discussion focuses on groundwater only (see the Water Service section for a discussion of potable water and stormwater infrastructure). This section summarizes existing groundwater conditions in the project vicinity, identifies land uses with a higher potential for groundwater impacts, and assesses whether the Project Alternative or No Action Alternatives could change the risks to groundwater within and immediately adjacent to the subarea, with consideration of the existing regulatory framework.

### Affected Environment

This section provides an overview of federal, state, and local regulations applicable to future development and describes the existing conditions related to water resources within the Heights District.

#### Applicable Federal, State, and Local Regulations

At the federal level, water quality is controlled by the Clean Water Act (CWA) (33 US Code [U.S.C.] § 1251 et seq.) and the Safe Drinking Water Act (SDWA) (42 U.S.C. §300f et seq.). While the CWA and SDWA are enforced at the federal level by the EPA, they are administered at the state level by various state departments. In Washington, Ecology administers the CWA and SDWA.

Ecology also administers the National Pollutant Discharge Elimination System (NPDES) permit program. NPDES permits address water pollution by regulating sources that discharge to waters of the United States. The permit includes limits on discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not negatively impact water quality or people's health.

On the local level, water quality is protected by several ordinances codified under the municipal code. These include the City's erosion control ordinance (VMC 14.24), stormwater ordinance (VMC 14.25), and water resources protection ordinance (VMC 14.26).

Generally, for erosion and sediment control, property owners who conduct land- disturbing activities must comply with the requirements and best management practices (BMPs) established in Ecology's *Stormwater Management Manual for Western Washington*. The greater the land- disturbing activity, the more stringent the requirements.

In summary, all development in the City is governed by the VMC and development standards (including those in the Ecology manual), and is reviewed for conformance by the City through its development review process.

#### Existing Conditions

All drinking water in the City comes from local groundwater, and is supplied from wells tapping three aquifers: the Orchards, Troutdale, and Sand-and-Gravel aquifers (City 2018). The City is the third largest municipal provider of water in the state of Washington. As part of the SDWA, the City's water utility publishes an annual water quality report, which discloses the results of tests for more than 238 different substances. The 2018 report stated that all results were below the maximum levels set by federal and state agencies.

Groundwater can become contaminated through a process known as "base flow," which refers to when runoff at the surface infiltrates downward through the soil until it reaches an aquifer. An increase in impervious surfaces can also have a negative effect on groundwater recharge, as water is carried across surfaces or in stormwater infrastructure and away from the underlying aquifer.

The Heights District is positioned in the center of a wedge-shaped plateau, which is the highest area of the City. Drainage goes either north to the Burnt Bridge Creek Greenway or south through Blandford Canyon to the Columbia River. Soils on the site are primarily mapped as Lauren gravelly loam, 0 to 8 percent slopes (LbG), which is a non-hydric soil with high hydraulic conductivity. The estimated depth to groundwater is more than 80 inches (USDA-NRCS 2019).

While many urbanized areas in the City are characterized by a high percentage of impervious coverage, development in the Heights District is more characteristic of a suburban area where buildings are surrounded by green space and/or surface parking, rather than being located up against streets. The commercial and office areas are surrounded mostly by surface parking, while schools and residences are surrounded mostly by green space. In the subarea, building footprints account for approximately 15 percent of the land, with the rest being "open area" (surface parking or green space). Of this "open area," approximately 68 percent is green space (pervious), which includes the open space contained in Park Hill Cemetery and the various schools (see Appendix A).

The City's storm drainage system within the Heights District is focused on providing stormwater capture and conveyance for areas within the public right of way. On-site stormwater is handled by individual property owners. Many of the residential streets within the Heights rely predominantly upon infiltration to manage stormwater. Infiltration facilities, when properly designed and registered according to underground injection control requirements, can meet LID standards.

The water resources protection ordinance (VMC 14.26) establishes regulations for the protection of water resources within the City, including regulations for critical aquifer recharge areas in order to protect groundwater resources. The entire City is designated as a critical aquifer recharge area per VMC 14.26, and the protections under that ordinance apply to all areas within the City. Under VMC 14.26, the City prohibits the development of certain land uses known to have a higher risk of groundwater contamination (e.g. outdoor wood preservation, hazardous materials disposal sites, etc.).

The City further protects groundwater by designating areas within 1,900 feet of municipal water stations as special protection areas (SPAs) and further restricting land uses in them.

While the subarea is not located within a SPA, it is located within the 5-year and 10-year wellhead protection areas associated with an SPA for Water Station 4 (WS-4) located to the southwest of the subarea. Water wellhead protection areas are the area where groundwater flows to a water supply well.

## Impacts

Development would have the potential to impact groundwater quality. Under any of the alternatives, stormwater infiltration from development of the plan area could increase interflow and groundwater base flows, and has the potential to pollute groundwater. Groundwater can be impacted during standard construction activities, such as excavation, grading, and placement of foundations. Contaminated soil and/or groundwater may be encountered during excavation when properties in the study area are redeveloped under any of the alternatives. One site within the subarea is listed on Ecology's Confirmed and Suspected Contaminated Sites List (Ecology Site ID 3024), while two others were previously listed but have received a No Further Action decision from Ecology (Ecology 2019).

Some land uses are known to have a higher risk of groundwater contamination than other land uses. These include auto repair or wrecking facilities, dry cleaning facilities, municipal landfills, and some industrial or agricultural uses.

### No Action Base Alternative

Development projects would continue to be required under the VMC to construct on-site and related water system improvements necessary to support their development. However, this alternative would not benefit from the vision of MacArthur Boulevard becoming a demonstration green street with stormwater improvements.

### No Action High Alternative

This alternative would have the same impacts as the No Action Base Alternative, but may have a slightly higher impact as the level of development would be greater than under the base alternative. Development projects would continue to be required under the VMC to construct on-site and related water system improvements necessary to support their development.

### Proposed Alternative

Like the No Action Alternatives, development projects under the Proposed Alternative would continue to be required under the VMC to construct on-site and related water system improvements necessary to support their development. In addition to these site- specific improvements, runoff in the subarea would be improved in public areas and public rights of way through the stormwater infrastructure projects proposed under the subarea plan. Proposed improvements are included in the mitigation measures below.

## Mitigation Measures

~~Under any alternative, all development projects will be required to provide stormwater capture and conveyance on site in accordance with VMC 14.25 and 14.26. Most of the area is located within a wellhead protection area, and development may require compliance with protective measures and certain uses may be either prohibited or discouraged within especially sensitive areas (e.g., users of high risk contaminants such as wood preserving/treating). These types of higher risk uses are not included in the Project Alternative.~~

~~Development review would ensure compliance with City's requirements for surface water/stormwater design and construction and with Ecology's *Stormwater Management Manual for Western Washington*.~~

### Mitigation Measures Designed into the Project

Development of the proposed MacArthur Greenbelt would provide a continuous stormwater feature extending beyond Andresen Road. Capital improvements throughout the District would include low water use landscapes and bioswales in civic spaces, parks, open spaces, and streets. Under the Environmental Sustainability section of the plan, several policies relating to groundwater protection would be adopted under the City's Comprehensive Plan. Under development review, projects would be required to

demonstrate their compliance with these policies (updated to reflect the current District Plan), which include the following.

*S-4 Strive to exceed relevant sustainability benchmarks for new buildings and infrastructure, similar to what is required for LEED certification standards. All publicly owned buildings shall meet or exceed LEED Gold Certification.*

*S-5 Create landscapes that demonstrate and embody sustainability such as raingardens and drought resistant plant palettes that contribute positively to the ecosystem.*

*S-11 Create robust, innovative, and visually appealing stormwater management infrastructure as part of a site wide strategy to fully treat and manage the water quality impacts of runoff. The infrastructure should work in harmony with the local ecological system.*

In addition to the City's Comprehensive Plan, infrastructure improvements envisioned in the Heights District Plan will implement infrastructure goals and policies identified in the City's Capital Improvement Plan, stormwater management plan, and complete streets policy. These documents identify infrastructure improvements, including low impact development stormwater techniques and BMPs, to improve the safety of Vancouver's water infrastructure and systems.

### Existing Regulations and Other ~~Potential~~ Mitigation

Under any alternative, all development projects will be required to provide stormwater capture and conveyance on site in accordance with VMC 14.25 and 14.26. Most of the area is located within a wellhead protection area, and development may require compliance with protective measures and certain uses may be either prohibited or discouraged within especially sensitive areas (e.g., users of high-risk contaminants such as wood preserving/treating). These types of higher risk uses are not included in the Project Alternative.

Development review would ensure compliance with City's requirements for surface water/stormwater design and construction and with Ecology's *Stormwater Management Manual for Western Washington*.

Under any of the alternatives, mitigation may be necessary to address site-specific impacts that could occur, depending on the development proposed. The following mitigation measures could be required during property redevelopment:

- **Additional site investigations to determine the potential for contamination to be present on the property.**
- **Additional site investigations of soil and groundwater to evaluate the type, concentration, and extent of contamination, if present.**
- **Cleanup of contamination sources (e.g. removal of underground storage tanks, excavation of contaminated soil) in accordance with Ecology's current guidelines and regulations.**
- **Handling and disposing of contaminated soil and groundwater according to local and state regulations.**

### Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts to water quality have been identified as a result of any of the proposed alternatives.

## Plants and Animals

The purpose of this section is to evaluate the potential impacts of the proposed project, the No Action Alternatives, and related actions on plant and animal resources, including fisheries and aquatic wildlife. This section describes the plant and animal resources at the project site and assesses potential impacts to plant and animal resources that could occur because of the construction and operation of the Project Alternative and No-Action Alternatives.

### Affected Environment

This section describes the applicable regulations and the general habitat types and characteristics of the project site and the surrounding area.

#### Applicable Federal, State, and Local Regulations

##### Federal Endangered Species Act

The Endangered Species Act (ESA), as amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems on which they depend.

The ESA is administered jointly by USFWS (plants and most terrestrial and freshwater wildlife species) and by the National Oceanic and Atmospheric Administration (NOAA) Fisheries (most marine and anadromous species). The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions.

##### Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 U.S.C. 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986, and 1989). Under the MBTA, taking, killing, or possessing migratory birds or their eggs or nests is unlawful. Most species of birds are classified as migratory under the MBTA, with the exception of upland and nonnative birds such as house sparrows, European starlings, and rock doves.

### Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 prohibits the taking, possessing, or transporting of a bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), or their parts, nests, or eggs without prior authorization. This includes inactive nests as well as active nests. "Take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. "Disturb" is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior. In 2009, the USFWS promulgated a final rule on two new permit regulations that authorize under BGEPA the non-purposeful (incidental) take of eagles and removal of eagle nests in certain situations (50 CFR 22.26, 22.27).

### Vancouver Critical Areas Ordinance

VMC Chapter 20.740 (Critical Areas) establishes regulations that are protective of sensitive plant, fish, and wildlife resources. VMC 20.740.110 establishes fish and wildlife habitat conservation areas and associated riparian management areas and riparian buffers, which are protective of fish and wildlife habitat resources. VMC 20.740.140 establishes protections for wetlands and associated buffers, which are also indirectly protective of fish and wildlife resources that rely on wetland habitats. If critical areas are determined to be present or likely to be present on the site of a proposed development, a detailed habitat analysis (critical areas report) is typically required in order to establish the presence of critical areas, anticipated impacts of a proposed development, and what mitigation is proposed to address impacts to critical areas. Depending on the scope of the proposed activities, the following City reviews could be required.

- **Critical areas permit**
- **Shorelines permit**
- **SEPA review**

## Methodology

The characterization of the affected environment and the assessment of the potential impacts of the proposed project and the alternatives used the following methodology and data sources. Project scientists reviewed existing literature and reference material to identify resources within the project area that have the potential to be impacted by the Project Alternative and No Action Alternatives. Sources of publicly available information used to document existing conditions of plants and animal resources at the site include:

- **NOAA West Coast Salmon and Steelhead listings (NOAA 2019a)**
- **Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) on the Web database (WDFW 2019a)**
- **WDFW SalmonScape GIS database (WDFW 2019b)**
- **Washington Natural Heritage Program (WNHP) database (WNHP 2019)**
- **USFWS Information for Planning and Consultation (IPaC) database (USFWS 2019a)**
- **USFWS Critical Habitat Mapper (USFWS 2019b)**
- **USFWS Environmental Conservation Online System (USFWS 2019c, 2019e, and 2019g)**
- **USFWS National Wetland Inventory (NWI) (USFWS 2019d)**
- **USFWS Streaked horned lark species information page (USFWS 2019f)**
- ~~**USFWS Threatened and Endangered Species List (USFWS, 2019d)**~~
- **United States Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS 2019)**
- **Clark County GIS data (Clark County MapsOnline 2019)**
- **City of Vancouver Heritage Tree Inventory (City 2019)**

Information regarding the potential presence of special-status plant species came from the USFWS IPaC database and species list (USFWS 2019a) and from a review of the WNHP database (WNHP 2019). A list of species documented as occurring or potentially occurring in the project vicinity was generated based on the potential presence or absence of appropriate habitat for each species.

The USFWS website (USFWS 2019a) and the NOAA Fisheries website (NMFS 2019a) supplied information regarding the potential presence of special-status fish and wildlife species. Additional information was obtained from two online WDFW databases (PHS on the Web [WDFW 2019a] and SalmonScape [WDFW 2019b]) and from the 2008 PHS list (WDFW 2008).

Information regarding the potential presence of wetlands at the project site was obtained from reviews of the NWI (USFWS 2019c), soils data (USDA-NRCS 2019), and Clark County GIS database MapsOnline (Clark County MapsOnline 2019).

## Threatened and Endangered Species

A review of the USFWS IPaC database indicates that five federally listed threatened species have the potential to occur within the project area.

- **Streaked horned lark (*Eremophila alpestris strigata*)**
- **Yellow-billed cuckoo (*Coccyzus americanus*)**
- **Bull trout (*Salvelinus confluentus*)**
- **Golden paintbrush (*Castilleja levisecta*)**
- **Water howellia (*Howellia aquatilis*)**

According to the USFWS IPaC website, the primary information used to generate a species list is the known or expected range of individual species and additional areas of influence for a species. (Areas of influence include areas outside of the expected species range if the species could be indirectly affected by activities in the area, such as the placement of a dam.) The IPaC website also states that because species can move and site conditions can change, the species that occur on a list are not guaranteed to be found on or near a specified project site (USFWS 2019a). Therefore, it is unlikely that any of these species could or may occur within the Heights District. A description of each ESA-listed species is included in Appendix H.

### Priority Habitats and Species

The WDFW PHS on the Web database shows the presence of one priority habitat within the vicinity of the project area: biodiversity areas and corridor. This area is mapped in association with South Cliff Park/Dubois Park to the southwest and the Burnt Bridge Creek stream corridor to the north; both areas are located outside the project area, and this priority habitat is unlikely to be affected by either the proposed project or the No-Action Alternatives.

A review of the USFWS NWI database and Clark County MapsOnline wetland spatial data does not indicate the presence of wetland habitats anywhere within or near the project area.

## Impacts

As described in the affected environment section, the habitat functions of the Heights District are substantially limited by existing and past development. While nearly one-third of the project area consists of green open space (primarily the ~~parks, greenways, and cemeteries~~cemetery and schools), these areas do not provide the unique and complex habitat characteristics required by any of the priority plant or animal species known or with the potential to occur in the vicinity of the project. In addition, no exceptional or heritage trees have been listed in the Heights District.

Existing vegetation in the area consists primarily of grass, ornamental lawn plants, and trees. Animals are limited to species commonly found in urbanized environments, such squirrels, raccoons, small rodents, and pigeons.

### No Action Base Alternative

Under the No Action Base Alternative, development projects would continue to be required under the VMC to identify and mitigate any impacts to critical areas. As there are no identified critical areas in the project area, it is unlikely that this item would be needed.

Potential impacts include increased impervious surfaces and stormwater runoff and additional non-point source pollutants. However, site development would be required to meet the City's stormwater standards, and it is likely that new development would be held to higher regulatory standards than existing development in the subarea.

Existing grass lawns, shrubs, and trees may be cleared during future development in the study area; however, VMC Chapter 20.925 requires landscaping and screening for most residential, commercial, and industrial developments, which would mitigate any site-specific vegetation loss within the Heights District.

Under this alternative, environmentally friendly measures proposed under the Project Alternative would not occur. Several of these measures would likely have a positive impact on plants and animals in the project area.

### No Action High Alternative

This alternative would have the same impacts as the No Action Base Alternative, but may have a slightly higher impact as the level of development would be greater than under the base alternative. The assumed redevelopment of 50 percent of the Tower Mall site would likely have some benefits to priority species through improved stormwater runoff south of the project area, as any new development would require cleaning up debris/and or site contamination and compliance with City landscaping standards and stormwater requirements.

As with the No Action Base Alternative, this alternative would not include several measures included in the Project Alternative that are expected to have a beneficial impact on plants and animal habitat in the Heights District.

### Proposed Alternative

The Project Alternative would result in the greatest amount of redevelopment in the Heights District. Impacts associated with this alternative are the same types of impacts as with the No Action Alternatives, namely increased impervious surfaces and stormwater runoff, additional non-point source pollutants, and the removal of existing vegetation. As previously noted, there are no known heritage trees in the Heights District. If any are found, all heritage trees would be subject to the requirements of VMC 20.770.120. The Project Alternative is striving to incorporate and protect healthy mature trees.

Under the Project Alternative, the Vanco Golf Range would be converted to mixed uses, such as commercial and multi-family developments. The golf range provides open space that may be used by common urban species (e.g., squirrels), but does not support any priority plant or animal species, and its development therefore would not impact any priority species.

Landscaping under the Project Alternative would be required to meet the standards and guidelines enumerated in the Heights District design standards and guidelines. Under the Project Alternative, these standards would be adopted, and new developments would need to demonstrate compliance during design review. The new standards would have a beneficial impact on the amount of vegetation in the project area. However, no rare or priority plant species would be included as part of future landscaping. Plants used under this alternative, including those in the landscaped buffers and medians associated with new roadways, would consist of adaptive plant species listed on the Preferred Native and Adaptive Plant Species List under the design standards and guidelines.

New parks proposed under this alternative would create an estimated 6.1 acres of new park space. As there are no known or likely priority animal species in the project area, it is not known whether any would use these new park facilities. In addition, these would be urban parks – as opposed to natural areas – which are less conducive to priority species habitat. However, it is possible that bird species would use these spaces as resting points between the priority habitat areas associated with the Columbia River to the south, and the priority habitat areas associated with the Burnt Creek Bridge Greenway to the north.

## Mitigation Measures

### Mitigation Measures Designed into the Project

As there are no known or likely priority plant or animal species in the project area, no mitigation is needed to address impacts to these resources. The following measures included under the Project Alternative have the potential to have a positive impact on priority species outside of the Heights District.

- **Limit impervious surfacing**
- **Increase green infrastructure and reduce stormwater runoff**
- **Add new parks, open space, and community gardens**
- **Use native and adaptive plant species**
- ~~**Protect and enhance the urban tree canopy in accordance with VMC 20.770**~~

### Existing Regulations and Other ~~Potential~~ Mitigation

Development under any alternative would be required to protect and enhance the urban tree canopy in accordance with VMC 20.770. No other mitigation measures are needed or proposed, as there are no anticipated impacts to plants or animal species or habitat under the Project Alternative.

## Significant Unavoidable Adverse Impacts

There are no unavoidable significant adverse impacts to plant or animal habitat functions that are likely to occur as a result of implementing the Project Alternative or the No Action Alternatives.

CHAPTER 4

# DRAFT EIS COMMENTS AND RESPONSES

CITY OF Vancouver WASHINGTON

# Comments and Responses

This chapter includes all comments submitted on the Heights District Plan Planned Action DEIS, followed by a response to all substantive comments. Comments on the DEIS were accepted by the City from January 22, 2020 to May 20, 2020 through a public comment survey form, via email to City staff, and at the Planning Commission Public Hearing for the Heights District Plan. Over 60 comments were received. All comments received are included in the following pages and substantive comments are followed by a detailed response. As appropriate, responses include additional details to clarify the EIS analysis, references to text included in the EIS and/or Heights District Plan, and/or changes made in the FEIS. Some comments had multiple segments and are delineated with a, b, c, etc. Responses to these comments are delineated the same way (i.e. comment 1a and response 1a). To avoid repetition throughout the responses, standard responses were prepared to address similar comments received by multiple parties. These responses are included in the next section, prior to the individual comments and responses.

Comments are organized into three categories

- **Comments received via email to City staff**
- **Comments received through a public comment survey form**
- **Comments received as part of the Planning Commission Hearing on the Heights District Plan.**

The primary changes to the Heights District Plan and EIS that resulted from public comments include the following:

- **Removal of five church properties from the proposed rezone area in the Heights District Plan. As noted in the Land Use section of this EIS, because these properties are still included in the Heights District boundary and individual property owners could request site-specific rezones in the future, the rezoning of the church properties is still considered in the EIS analysis of impacts. The analysis included in the EIS does not result in any zone change for the church properties, it only analyzes the potential impacts of those zone changes should they be requested in the future by individual property owners or by other consideration.**
- **Clarification around the development standards and height restrictions in the proposed new HX zone. Additional details related to building heights and transitions to adjacent neighborhoods is included in the Land Use section of this EIS.**
- **The previously named, Neighborhood Gateway sub-district was renamed District Gateway. This change is reflected throughout the EIS.**

Acronyms and initializations are used throughout the comments and responses. See page vii of the EIS for a list of acronyms and initializations.

## Standard Responses

To avoid repetition, the City prepared detailed Standard Responses for the following ten issues that were commented on by multiple parties. Standard Responses are referenced in response to individual comments where applicable.

### Standard Response 1 - EIS Comment Period Extension

#### Comment

Commenters requested an extension of the comment period for the DEIS following the initial release of the DEIS on January 22, 2020 and again following the first 30-day extension of the comment period.

#### Response

The DEIS was issued on January 22, 2020 with an initial comment period closing on February 23, 2020. The 30-day DEIS comment period is the standard time period established by the state SEPA rules (codified under WAC 197-11-502). In response to public comments received and at the direction of the City Council, the City extended the comment period to March 22, 2020 to allow for additional time for the public to review the DEIS. Following that extension, additional public comments were received that requested further extension of the comment period. At the direction of the City Council, the City extended the comment period for another 60 days until May 20, 2020. The comment period for the DEIS closed on May 20, 2020.

### Standard Response 2 – EIS Comment Period Extension due to COVID-19

#### Comment

Following the Governor's Stay Home, Stay Healthy order, commenters requested an additional extension in the comment period with some commenters requesting a suspension in the process.

#### Response

Despite the disruption to our nation and community from COVID-19, the City strongly believes the 120-day comment period provided sufficient opportunity for the public to access and review all documents related to the DEIS, ask questions of staff, and send in their comments which are addressed in the Final EIS.

Even though City Hall was closed during a portion of the comment period due to COVID-19 and the Governor's Stay Home, Stay Healthy order, staff continued to work remotely and were available for questions and requests for information. Staff continued to provide hard copies of the Plan, supporting analyses, and DEIS to anyone that requested one.

## Standard Response 3 – Rezoning of Church Properties

### Comment

Commenters expressed concern regarding the effect of plan implementation measures involving the rezoning of several properties within the Heights District that are owned by religious organizations and used as houses of worship.

### Response

Based on public comments and at the direction of the Vancouver City Council, church properties have been removed from the rezone area included in the Heights District Plan. The Project Alternative description in the EIS (page 19) was revised to reflect this change. Because these properties are still included in the subarea and individual property owners could request site-specific rezones in the future, the rezoning of the church properties is still considered in the EIS analysis of land use impacts (Chapter 3, page 37). The analysis included in the EIS does not result in any zone changes affecting the church properties, it only analyzes the potential impacts of those zone changes should they be requested in the future by individual property owners or by other consideration.

If the Heights District Plan is adopted, the church properties will remain in their current zoning designation. The plan includes an implementation policy that indicates future rezones within the District boundary should be to HX in order to ensure redevelopment meets the intent of the Heights District Plan and includes provisions to protect the existing single-family neighborhoods surrounding the District (policy L-12 on page 19 of Heights District Plan). Should a site-specific rezone request be made in the future and if that request were approved by the City Council, the property would be subject to all development standards and provisions included for the HX zoning designation and specific provisions for the District Gateway sub-district. As noted on page 41 of the EIS, building height transition requirements are proposed for the District Gateway sub-district. These requirements will vary based on site-specific conditions, including but not limited to abutting or adjacent to single-family residential and adjacent or abutting different roadways based on classification (i.e. principal arterials, minor arterials, and collector arterials).

## Standard Response 4 – Police and Fire Response Times and Service Levels

### Comment

Commenters expressed concerns over the impact to police and fire service delivery based on the projected population increase included in the Project Alternative and requested additional details regarding how level of service standards would be maintained.

### Response

The analysis completed for the EIS related to police and fire service was qualitative with impacts evaluated based on the expected increase in population. Due to the incremental nature of the proposed population increase (i.e. it will happen over a 20-year buildout of the plan area), the City determined that a specific plan was not needed to mitigate identified impacts.

The VFD actively evaluates its performance and staffing as needed to ensure that City services are bring provided in an appropriate manner. As required by RCW 35.103.040, the VFD reports service level performance annually, which evaluates how the Department meets target response times for the highest priority calls. Based on this annual evaluation, the VFD assess if they are continuing to meet target response times as the city grows (including the growth anticipated as a result of the Heights District Plan). Any additional staffing or equipment needs required to address service level and meet target response times would be planned through the Department's capital facilities planning and City budgeting process, and as part of VFD's Standard of Cover. A Standard of Cover (also referred to as a Deployment Plan or Community Risk Reduction Plan) utilizes data, national standards and/or recognized best practices, and internal policies to provide a performance analysis and risk profile for a fire Department's protection area and plan for future goals. Most Standard of Covers utilize a model that looks at fire and Emergency Medical Service risk for the community, while others may take into account specific protection needs of a community such as wildfire threat, water hazards, or natural disasters.

Similar to the VFD, the VPD evaluates staffing, equipment, and facility needs on a regular basis through the City's strategic planning and budgeting processes. Through this process, the VPD evaluates whether its staffing and equipment needs are continuing to be met as additional population is added throughout the City (including within the Heights District). The VPD responds to calls based on priority rather than using response times as an evaluative tool for determining the appropriateness of its service delivery. This is because of factors such as traffic, road conditions, etc., which often influence response times and do not provide a clear picture of VPD's ability to respond. Priority is a value assigned to a call by the 911 call taker. Violence, whether a call is in-progress or not, whether the suspect is still present, and whether the call involves a threat to life or property are all factors in determining the priority level of the call. Calls with a Priority of 1 or 2 typically require an immediate response, while calls of a lower priority may be allowed to "pend" until units are available and higher priority calls have been addressed. Additionally, the VPD divides the City into sections called beats for purposes of response times, staffing, and resources. A beat is a geographic area typically patrolled

by one officer. The Department routinely evaluates the calls for service in a given geographic region and may increase staffing for that area or adjust the geographic boundaries of the beat to more evenly spread the workload for assigned officers.

Providing continued police and fire services in the Heights would be done in a manner consistent with services across the City. The VPD and VFD will continue to evaluate their needs across the city (including the increase in population in the Heights District) through the City's strategic planning and budgeting processes. Because the increase in population will occur incrementally over time and is included in overall population projections for the City planned for in the City's current Comprehensive Plan, this evaluation will enable VFD and VPD to assess, and as necessary to make adjustments in, staffing and equipment to ensure they can meet the service needs of the area. Growth projections for the City are reviewed annually by the City and used to adjust planning assumptions for a range of City services (fire, police, water, sewer, etc.).

## Standard Response 5 – Funding for Police and Fire Services

### Comment

Commenters asked how funding for police and fire services is allocated and how development in the Heights District will affect funding.

### Response

There is a proportional relationship between increased revenues resulting from new development and new residential and commercial users and the City's overall general fund budget. The majority (approximately 66 percent) of City tax revenues are dedicated to funding Police, Fire and other public safety services. As revenues increase from new development and new residential and commercial users, a portion of this revenue supports Police and Fire budgets and services.

## Standard Response 6 – Parking/Spillover Parking

### Comment

Commenters expressed concerns with the adequacy of the parking provided in the Heights District Plan and the potential for spillover parking into adjacent residential areas.

### Response

The Heights District Plan includes a parking strategy for the Tower Mall Redevelopment Area (see page 71 in the plan). The parking strategy does not rely on adjacent neighborhood streets to absorb parking needs for the Tower Mall Redevelopment Area specifically or for the District in general. Through the zoning standards that will be adopted to implement the Heights District Plan, new development will be required to provide adequate parking to serve its needs. The proposed parking strategy incorporates a variety of parking options and tools to manage parking demand, including:

- **A combination of parking lots, parking garages, and individual parking spaces to serve residents, employees, and visitors**
- **On-street parking on all new roads within the Tower Mall Redevelopment area to serve the needs of people visiting shops, offices, and special events**
- **Strategies to require housing and office developments to reduce demand for parking by encouraging transit use and active transportation such as walking, biking, and rolling**
- **A shared parking approach between daytime/weekday office needs, evening residential needs, and weekend event needs/visitor parking. The parking system will be managed efficiently to ensure parking is both available and well-used.**

In addition, policy recommendations (see policy C-10) in the plan call for limiting vehicle access from the new development to existing neighborhoods in order to maintain the character and safety of these areas.

Through the strategies, policies, and tools listed above, the plan seeks to ensure a "right-sized" parking approach that serves new development without unnecessarily driving up the cost of housing by requiring projects to build more parking than is needed.

Parking impacts associated with the Project Alternative (the Heights District Plan) are evaluated in the EIS beginning on page 61. The analysis includes an assessment of the potential for spillover parking and whether spillover parking is occurring to a degree that it increases parking congestion and makes it more difficult for residents to find on-street parking within close proximity to their homes. To offset potential parking impacts, the EIS provides mitigation measures based on the parking strategy included in the plan. Parking mitigation measures are identified on pages 62 and 63 of the EIS.

## Standard Response 7 – Building Height

### Comment

Commenters asked questions about the maximum building height evaluated in the EIS, specifically how the scale of buildings would impact adjacent single-family neighborhoods.

### Response

Under the Heights District Plan a maximum building height of 80 feet (which accommodates approximately 6 stories) is envisioned for the new HX zone. However, as planned, this height would only be allowed in the Activity Center sub-district in the center of the Redevelopment Area, away from

existing single-family residential neighborhoods. As envisioned in the plan and evaluated in the EIS, the new HX zone would also require transition areas with height reductions at the edges of the Redevelopment Area to limit impacts to existing neighborhoods. Proposed building heights and mitigation measures requiring adherence to the standards included in a new HX zone are identified in the EIS on page 42. Evaluation of aesthetic impacts is included in the Aesthetics, Light and Glare section in Chapter 3 of the EIS.

## Standard Response 8 – EIS Alternatives

### Comment

Commenters asked questions about the difference between the three alternatives evaluated in the EIS and the three concept plans evaluated by the public as part of the District Plan planning process. Commenters also asked why the No Action alternatives do not include concept plans and how the City Council chooses between alternatives in the EIS.

### Response

An EIS is prepared by agencies to comply with SEPA and the SEPA rules that are a part of the WAC and VMC. SEPA requires that an EIS consider different alternatives, including the "proposed action" and a "no action" alternative (see WAC 197-11-440). For the Heights, the proposed action is the adoption of the Heights District Plan and the redevelopment that is anticipated to occur as a result of the plan. The three alternatives analyzed in the Heights District Plan EIS include the Project Alternative (adoption of the Heights District Plan), a No Action Base Alternative, and a No Action High Alternative. For the Heights District Plan EIS, the City chose to analyze two no action alternatives (instead of one as required under SEPA) in order to reflect different potential development scenarios that could occur based on current market conditions under the existing Comprehensive Plan and zoning for the area covered by the Heights District Plan. The "no action" alternatives do not mean no development will occur, but instead that development/redevelopment is not based on a specific "action" taken by the City and would occur on a parcel by parcel basis reflecting market conditions and development plans of individual property owners. Development under the no action alternatives would not conform to an overarching concept for the area or be based on the proposed Heights District Plan. The alternatives analyzed in the EIS are described in Chapter 2 of the EIS, beginning on page 17. Public comment on the alternatives considered in an EIS is taken during the DEIS comment period.

Different alternatives are required in an EIS to inform decision makers of the environmental impacts of taking action or not taking action. The No Action alternatives are specifically provided to compare the impacts of the proposed action of adoption of the Heights District Plan and taking no action (not adopting the Heights District Plan). The City Council considers the environmental analysis included in an EIS in their decision on the underlying action (i.e. the Heights District Plan), but the Council does not take formal action on the EIS. An EIS is not adopted by the City Council, but rather published to inform a decision on the action or project alternative analyzed in the EIS.

The EIS alternatives included in the Heights District Plan EIS are different from the three concept plans developed during the Heights District Plan planning process. The process for development and evaluation of the three concept plans (Promenade, The Loop, and Grand Park) is described on page 2 of the EIS. More information on the full public process and documents associated with various phases of outreach are available in the Heights District Plan and on the Heights District Plan project website (https://www.cityofvancouver.us/ced/page/heights-district-plan). Based on community feedback, the concept plans were refined, and a preferred concept called the Grand Loop was developed, which incorporated elements from all three prior concepts. The Grand Loop concept forms the basis of the Heights District Plan and is part of the Project Alternative considered in the EIS.

Concept plans are not developed for no action alternatives because these alternatives are based on the City pursuing "no action". With no action, the Heights District Plan would not be adopted, and the area would develop based on existing zoning and current development standards.

## Standard Response 9 – City Budgeting/ Financial Impact of the Plan

### Comment

Commenters asked how adoption of the Heights District Plan would affect the City's budget and revenue moving forward.

### Response

The Heights District Plan planning process has been underway since April of 2018. Budgeting and funding required to complete the plan have already taken place and no additional funding or City revenue is required to adopt the Heights District Plan. Many of the future projects identified in the plan will be undertaken and funded by private development. Identified infrastructure improvements that may be funded by the City will be included in the City's Capital Improvement Plan and funding for those projects will be evaluated through the City's annual budgeting process.

## Standard Response 10 – School Impacts

### Comment

Commenters asked how the projected population increase under the Heights District Plan would impact school capacity.

### Response

Impacts to schools, including the anticipated number of students, are detailed on page 73 of the EIS. Residential development was assumed to be 1800 units, which includes 1,342 units in the Redevelopment Area. Based on the student generation rate provided by VPS, 1800 units would generate approximately 440 students across grades K-12. VPS provided the City with projected enrollment as well as the school capacity for each facility (Tables 31 and 32 on page 72 of the EIS). Based on the available capacity at each school, projected enrollment, and the incremental nature in which development is anticipated to occur under the Heights District Plan (i.e. 440 students would be incrementally added over 20 years), the VPS schools will be able to accommodate the new students. In addition, increases in the student population are reviewed annually by VPS, and additional capacity needs are planned through VPS's capital facilities planning. Under any alternative, new residential development in the Heights District is required to pay school impact fees per unit in accordance with VMC Chapter 20.915.060 to help offset additional demand for services in the Heights District.

## Email Comments

*The following comments were received via email to City staff.*

### Email Comment 1

-----Original Message-----
From: Jim [redacted]
Sent: Saturday, February 15, 2020 3:18 PM
To: Kennedy, Rebecca; Holmes, Eric
Cc: Glover, Linda; Paulsen, Erik; McEnerny-Ogle, Anne
Subject: Comments on "Heights DEIS"

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To: Rebecca Kennedy
Senior Planner

Please include these comments in the Official Record.

We have only recently had the opportunity to review the lengthy "Heights" DEIS. The draft plan would significantly and adversely impact existing single family residential neighborhoods, including our own neighborhood and home. Traffic congestion and safety concerns must be more comprehensively addressed. Multi family housing may not be reasonable given these and other issues.

The following are general comments. We hope to provide additional comments after further review. Until then, we adopt as our own the comments of the several Neighborhood Association Representatives offered before the Planning Commission.

A 1. The DEIS was issued on January 22, with comments proposed to be closed February 23.

A 2. The DEIS 30 days comment period is unreasonable for such a significant plan. It needs to be extended for at least 60 days.

B 3. Proposed zoning changes should not be considered or adopted until the "Heights Plan" is finally adopted. No zoning changes are required at this time. Zoning should "follow" whatever plan is finally adopted.

C 4. The March 2 City Council workshop on the "draft plan" is reasonable "for information only " but final Council action is premature.

Jim and Liz Luce
[redacted]

### Response to Email Comment 1 – Jim and Liz Luce

#### Response to Comment 1A

The comment period was extended to May 20, 2020. Additional details are provided in standard response 1.

#### Response to Comment 1B

The EIS must consider proposed zone changes included within the plan in order to assess potential impacts that could result from those zone changes. The zone changes evaluated in the EIS have been identified as a measure necessary to implement the district plan. The City Council, as the ultimate decision maker for the plan, will make a final decision on the plan and any implementation measures.

#### Response to Comment 1C

Comment noted. Council action was not taken at the March 2nd City Council workshop. Additional Council workshops and hearings are scheduled as noted in the FEIS Cover Letter.

## Email Comment 2

**From:** Janice Ritter [redacted]
**Sent:** Sunday, February 16, 2020 12:51 PM
**To:** Kennedy, Rebecca
**Cc:** [redacted]; 'Rebecca Wright'
**Subject:** Questions for City

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We appreciate the opportunity to opt in instead of forced into zoning restrictions.

I still have answers that I would like answered. Attached is the PowerPoint I mentioned at the Meeting on 2/11/2020.

**Questions:**

A **1. On Figure 8 shown on page 35 of Draft EIS or page 49 of the pdf version, for the Proposed Comprehensive Plan Map Amendments shows the blue area north of McArthur as Public Facility, but on Figure 9 showing the Proposed Zone Changes on the next page show area zoned as R-6. Why is not the area shown in blue on figure 9, not marked on yellow for Urban Low Density Residential (UL)? It is not marked for change to HX.**

B **2. Are you acquiring more easement or ROW from the Vancouver Heights United Methodist Church?**

C **3. How will traffic be handled when you close roads for special events?**

**Where will people park then?**

D 4. How does flexible work hours (quite common nowadays) affect your vision of "shared parking"?

E 5. How will the neighborhood parks and other recreational area discourage homeless use?

F 6. Will there be public bathrooms in the public realms and open spaces?

G 7. You activated alleys provide a plan to access garages. Trash, and recycling, but what are the plans for mail delivery?

H 8. Will these plans be contracted out as a Design/Build to shorten construction?

I 9. Is there a C-tran light rail in the future? Are the C-tran mass transit buses?

J 10. There are walking areas that run across the Blandford corridor from the Dubois Park to the other park on the other side. Will these paths be blocked because of the retaining walls?

K 11. The city did a poor job of planning the planting of trees along Devine Road from McArthur to Arizona. They are planted too close to the road and will cause future maintenance problems with their roots. Please provide a better arborist for all the plantings you plan to do.

L 12. What happens to the VFW in the rezoning?

M 13. Are you planning solar panels?

N 14. There seems to be a misquote from a public meeting concerning a Saturday Market on the corner of Devine and Arizona.

**Your DEIS show the possible location somewhere in the middle of Tower Mall, but with the zoning of the Methodist church, we are concerned that it may be at Devine and Arizona.**

O **15. There are other projects besides the Heights District, like the ones on the west and east side of Vancouver.**

- **a. How do these other projects affect the proposed timeline and budget?**
- **b. Has the Heights District become a priority?**

P **16. If your plan is to have a walkable community, then why are you removing 2 paths from the cemetery?**

## Response to Email Comment 2 – Janice Ritter

### Response to Comment 2A

The area north of MacArthur Boulevard shown on Figure 8 in the EIS with a Comprehensive Plan designation of Public Facilities includes McLoughlin Middle School and Marshall Elementary School. These properties currently have a Public Facilities Comprehensive Plan designation and no changes to this designation are proposed. Only those properties identified with hatchmarks on Figure 8 are proposed for Comprehensive Plan amendments. The Public Facilities designation allows for residential zoning designations.

### Response to Comment 2B

Additional right-of-way may be required to implement the improvements proposed to MacArthur Boulevard. Right-of-way requirements will be addressed as part of future development.

### Response to Comment 2C

The Heights District Plan includes the construction of a new internal street network within the Tower Mall Redevelopment Area. This includes a "festival street" that can be closed for temporary and weekend activities and events like farmer's markets and outdoor gatherings. The festival street represents a very small portion of the new internal street network in the Heights and a small amount of the new on-street parking that will be provided once these streets are built. The majority of the internal street network and on-street parking within the Heights will remain open during events. In addition, the plan calls for a shared parking approach between daytime/weekday office needs, evening residential needs, and weekend event needs/visitor parking. The parking system will be managed efficiently to ensure parking is both available and well-used and to provide additional visitor parking on weekends and during events.

Specific requirements of special events are handled on a case by case basis through the City's Event Planning office. Special events that require a street closure or use of public rights-of-way must submit a special event permit and include a traffic control plan in their application.

### Response to Comment 2D

The implementation of the Heights District Plan will include preparation of a shared use parking plan, which will consider proposed land uses and parking trends.

### Response to Comment 2E

The parks and open areas included in the Heights District Plan that will be managed by the City will be governed by the same rules and policies that govern all park spaces throughout the City. The parks will be open to all members of the public during open park hours and closed to all members of the public during closed park hours. The City does not ban any user group from using public facilities as long as the rules and policies established for that facility, such as prohibiting camping in public parks, are being followed.

In addition, the plan includes a policy to incorporate CPTED principles in the design of public open spaces (policy O-13). CPTED includes design elements that discourage negative behaviors by limiting low-visibility spaces, maintaining sight lines, including adequate lighting, and integrating activity generators that keep eyes and feet on the street, among others.

### Response to Comment 2F

The park facilities included in the Heights District Plan have different classifications based on standards included in the City's Comprehensive Parks, Recreation, and Natural Areas Plan (see Table 39 on page 88 of the EIS). The Civic Park would be classified as a special use facility, which may include public restrooms. The Neighborhood Park would be classified as a neighborhood park, which do not typically have public restrooms. The other open spaces included in the Heights District Plan are small pocket parks to serve residential areas and linear parks and greenways. These types of open spaces do not meet specific park classifications identified in the Parks Plan and are not anticipated to have public restrooms.

### Response to Comment 2G

Locations of mailboxes will be addressed during review of individual site developments and will meet all applicable requirements of the U.S. Postal Service.

### Response to Comment 2H

Design and construction methods will be dictated by individual developers and are not known at this time.

### Response to Comment 2I

C-TRAN is developing a bus rapid transit line on Mill Plain Boulevard with planned stations at or near the Redevelopment Area. No plans for light rail are included in the Heights District Plan.

### Response to Comment 2J

Blandford Drive is outside the Heights District but is identified in the Heights District Plan as a key connector from the District to the south (page 31 of the Heights District Plan). The potential pedestrian and bicycle improvements identified in the plan (page 32 of the plan) and in the EIS (page 62 of the EIS) are conceptual and would require additional analysis prior to implementation. Maintaining the existing crossings of Blandford Drive would be considered at that time.

### Response to Comment 2K

Comment noted. Development within the Heights District will be following landscape design standards and best management practices to ensure that street trees and plantings are appropriate for the region, contribute to managing stormwater runoff and reduce future conflicts with the built environment.

### Response to Comment 2L

The Heights District Plan does not propose to change the zoning on the Veterans of Foreign Wars property. However, because this property is still included in the District and an individual property owner could request a site-specific rezone in the future, the rezoning of the Veterans of Foreign Wars property is still considered in the EIS analysis of land use impacts (Chapter 3, page 38). The analysis included in the EIS does not result in any zone changes affecting the Veterans of Foreign Wars property, it only analyzes the potential impacts of the zone change should it be requested in the future by an individual property owner or by other consideration.

### Response to Comment 2M

The Heights District Plan does not require the installation of solar panels. However, solar orientation was considered in the proposed land use plan for the Redevelopment Area. Furthermore, environmental sustainability policies are included within the Plan. See page 36 in the Heights District Plan.

### Response to Comment 2N

A specific location for a Saturday Market is not identified in the EIS. Page 89 of the EIS indicates the proposed civic park, located in the center of the Redevelopment Area, would be designed to support market stalls, but no decision regarding the presence or location of a future market has been made.

### Response to Comment 2O

Following adoption of the Heights District Plan and corresponding implementation measures, development would occur based on market conditions. Planning for future development in the Heights District is a priority for the City and is why the City undertook the Heights District planning process.

### Response to Comment 2P

The internal roadway network in the Park Hill Cemetery will be maintained under the Heights District Plan and can accommodate an open public pathway used for light recreation (plan policy O-4). There currently are no dedicated pedestrian paths within the Park Hill Cemetery. Any modifications or relocations of the cemetery road network would seek to expand and improve pedestrian access and mobility.

## Email Comment 3

On Feb 19, 2020, at 3:10 PM, Richard Gales [redacted] wrote:

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good Afternoon Ms. Lebowsky:

Back on February 8th of this month I submitted an email letter to your office with two important questions related to the Heights District Plan. I have not heard back from your office, so I wanted to resubmit, and add an additional question for clarity.

The critical piece missing from the many meetings and documents is how City Council will make decisions and/or compromises on one of the three "alternatives".

- No Acton Base
- No Action High
- Project Alternative

It is important to know our leaders are making transparent decisions based on clear guidelines, thresholds and priorities impacting our neighborhoods, and the recorded input is clearly reflected in your decisions. Having guidelines for how your decisions will be made seems like the only prudent and transparent approach to decisions impacting our collective future.

**QUESTIONS**

A 1. I would like to know how the City can be the property owner, permit grantor, zoning regulator for their own development, and produce their own Environmental Impact Study without a conflict of interest?

B 2. Is the City Council and Planning Commission willing to define how they will make decisions on this, and other projects, so the process of decision making is open and transparent with defined guidelines, thresholds and priorities informed by the listening? If so, how can citizens gain access to these documents?

C 3. There are three "alternatives" noted in the EIS document for the Heights Plan that provide very different levels of development:

- No Acton Base
- No Action High
- Project Alternative

The community was invited to vote on three "concept plans" which included the **Promenade**, the **Loop** and the **Grand Park**. However, there was no mention in the EIS report that these three concepts plans are specific to the Project Alternative. In addition, there are no "concept plans" for the No Action Base or the No Action High alternative. It is very confusing to have three "alternatives" with three "concept plans" all relating to the Project Alternative.

- If there are three equally valid and potential "alternatives" up for consideration, can the City explain why there were no "concept plans" developed for anything but the Project Alternative?

It is clear the City is interested in meeting housing needs for the future, generating tax revenue, and making improvements to our community. How you go about accomplishing these goals is more important than the goal itself.

Thank You!

Rick Gales

## Response to Email Comment 3 – Richard Gales

### Response to Comment 3A

The SEPA rules include specific requirements for lead agencies. WAC 197-11-926 specifies that if an agency initiates a proposal it is the lead agency and responsible for SEPA compliance. Cities make decisions all of the time that potentially impact properties that the public owns without presenting an inherent conflict of interest, because the decision-makers have a duty to act in the best interest of the overall community. By controlling property within the District, the City is best positioned to ensure that future developments on such properties be designed and utilized in ways that will benefit the surrounding neighborhoods and community overall.

### Response to Comment 3B

Decision making procedures for the City Council and Planning Commission on land use planning projects, such as the Heights District Plan, are codified in VMC Chapter 20.210. Operations and procedures for the Planning Commission are located in VMC 20.220; Operations and procedures for the City Council are located within the City Charter. These procedures include requirements for public hearings to ensure an open and transparent process.

The City Council will consider adoption of the Heights District Plan at a duly-noticed public hearing following public testimony on the Plan, using the same criteria that the Planning Commission did in making its recommendation regarding the Heights District Plan at a public hearing in February 2020. Sections 20.285.050 and 20.285.070 of the zoning code requires amendments to the Comprehensive Plan text and map, such as adoption of the Heights Subarea Plan, to be consistent with the balance of applicable policies of the Vancouver Strategic Plan, and Vancouver Comprehensive Plan. Applicable Strategic Plan policies to be considered include Goal 6: Facilitate the creation of neighborhoods where residents can walk or bike to essential amenities and services- "20 minute neighborhoods", and Goal 8: Strengthen commercial, retail, and community districts throughout the city. Applicable Comprehensive Plan policies include Policy CD-2, Efficient development patterns; CD-4, Urban centers and corridors; CD-5, Mixed use development; CD-6, Neighborhood livability; CD-8,Design; CD-9,Compatible uses; CD-10, Complementary uses; CD-12, Integrated area planning; CD-14, Sustainability; H-1, Housing options; H-5, Housing placement near services and centers; EC-2, Family-wage employment; EC-5, No net loss of employment capacity; and PFS-1, Service availability. The City Council must consider these and any other applicable policies, but is allowed flexibility in weighting and balancing the policies. The Council will also consider written and oral testimony from the public and interested parties at the public hearing.

### Response to Comment 3C

See standard response 8 related to EIS alternatives.

## Email Comment 4

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 · Olympia, Washington 98504-7775 · (360) 407-6300
711 for Washington Relay Service · Persons with a speech disability can call 877-833-6341

February 21, 2020

Rebecca Kennedy, Long Range Planning Manager
City of Vancouver
Community & Economic Development
PO Box 1995
Vancouver, WA 98668

Dear Rebecca Kennedy:

Thank you for the opportunity to comment on the draft environmental impact statement (DEIS) for The Heights District Plan as proposed by City of Vancouver. The Department of Ecology (Ecology) reviewed the information provided. Ecology's previous comments submitted October 22, 2018 on the scoping, still apply to the project described (see enclosure). After further review, Ecology has the following additional comment(s):

A **TOXICS CLEANUP PROGRAM: Nicholas Acklam, Unit Supervisor**
**(360) 407-6347 | nicholas.acklam@ecy.wa.gov**

The proposed planned action area is located at a toxic cleanup site (Custom Care Cleaners) where hazardous substances have been or are suspected to have been released to the environment. The cleanup of this toxic cleanup site is regulated under the Washington Model Toxics Control Act (MTCA), Chapter 70.105D RCW, and implementing regulations contained in Chapter 173-340 WAC. The site has been designated by Ecology as Cleanup Site ID 3024; Facility Site ID 1049.

As currently known to Ecology, hazardous substances (stoddard solvent, perchloroethylene, and DF-2000) have been used or stored at this facility. The nature and extent of hazardous substances released to the environment has not yet been adequately determined (WAC 173-340-350). A cleanup action has not yet been selected (WAC 173-340-360) or implemented (WAC 173-340-400). Cleanup standards have not yet been determined (WAC 173-340-700).

Ecology recommends that pollution in the environment be cleaned up in compliance with WAC 173-340 prior to the construction of the proposed project to ensure the protection of human and health and the environment. For this independent cleanup conducted under WAC 173-340-515, the cleanup would be complete when a no further action opinion letter is issued for toxic cleanup site under WAC 173-340-515(5)(b).

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(MLD: 202000407)
Enclosure

cc: Nicholas Acklam, TCP
Chris Montague-Breakwell, WQ

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 · Olympia, Washington 98504-7775 · (360) 407-6300
711 for Washington Relay Service · Persons with a speech disability can call 877-833-6341

October 22, 2018

Rebecca Kennedy, Long Range Planning Manager
City of Vancouver
Community & Economics Development
PO Box 1995
Vancouver, WA 98668

Dear Ms. Kennedy:

Thank you for the opportunity to comment on the determination of significance/scoping (DS/Scoping) for The Heights District Plan. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):

B **WATER QUALITY: Chris Montague-Breakwell (360) 407-6364**

For future projects developing under the Planned Action:

Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.

Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.

The following construction activities require coverage under the Construction Stormwater General Permit:

1. Clearing, grading and/or excavation that results in the disturbance of one or more acres **and** discharges stormwater to surface waters of the State; and
2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more **and** discharge stormwater to surface waters of the State.
   a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, **and** discharge to surface waters of the State; and

3. Any size construction activity discharging stormwater to waters of the State that Ecology:
   a) Determines to be a significant contributor of pollutants to waters of the State of Washington.
   b) Reasonably expects to cause a violation of any water quality standard.

If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.

You may apply online or obtain an application from Ecology's website at: http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.

Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action.

If you have any questions or would like to respond to these comments, please contact the appropriate reviewing staff listed above.

Department of Ecology
Southwest Regional Office

(MLD:201805445)

cc: Chris Montague-Breakwell, WQ

## Response to Email Comment 4 – Department of Ecology, Southwest Regional Office

### Response to Comment 4A

The toxic cleanup site is referenced on page 95 of the EIS. Mitigation measures to evaluate the potential for contamination and address cleanup are identified on page 96. The Ecology Site ID was added to the toxic cleanup description on page 95 and a statement indicating cleanup should occur in accordance with Ecology's current guidelines and regulations was added to the mitigation measures on page 96.

### Response to Comment 4B

Comment noted. Mitigation measures on page 96 of the EIS require compliance with the City and Ecology's stormwater and erosion control regulations.

## Email Comment 5

**From:** Richard Gales [redacted]
**Sent:** Sunday, February 23, 2020 10:43 AM
**To:** Kennedy, Rebecca
**Subject:** Heights District Plan EIS Questions



Hello Rebecca-

I am writing to you with my questions related to the Heights EIS.

Thank You!

Rick Gales

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One of my primary concerns related to the EIS is why there are three alternatives noted, the No Action Base, the No Action High Alternative, and the Project Alternative, but the Heights District Plan never offered alternatives until they appeared in the January 22md EIS.

A
- Why were these three options not put on the table before January 22nd, so neighbors could comment on something other than the full development with three concept plans?

B
- Since there were three options noted, what guides and thresholds will the City council use to decide which option is most appropriate given the community feedback about minimizing density, limiting traffic, and greater demand for emergency services?

C
- Is the City Council and Planning Commission willing to define how they will make decisions on this project and others, so the process of decision making is open and transparent with defined guidelines, thresholds and priorities informed by the listening? If so, how can citizens gain access to these documents?

The City effort to create and promote the benefits of the Heights Plan, noting the Plan has **"no unavoidable adverse impacts,"** suggests there is far more opinion than fact in the EIS to promote the development in the best interest of the City. Many neighbors have spoken up countering the opinion, pointing out the adverse impacts from traffic to crime. The people of the Heights will be the ones impacted the most if the District Plan does not work as planned, emergency services can't meet demand, and traffic control is as poor as it is currently. With no back up plan identified, and reality seldom following pre-determined pathways for success, citizens of the Heights have a great deal to lose if and when things don't go to plan.

The City effort to create and promote the benefits of the Heights Plan, noting the Plan has **"no unavoidable adverse impacts,"** suggests there is far more opinion than fact in the EIS to promote the development in the best interest of the City. Many neighbors have spoken up countering the opinion, pointing out the adverse impacts from traffic to crime. The people of the Heights will be the ones impacted the most if the District Plan does not work as planned, emergency services can't meet demand, and traffic control is as poor as it is currently. With no back up plan identified, and reality seldom following pre-determined pathways for success, citizens of the Heights have a great deal to lose if and when things don't go to plan.

**Emergency Service Delivery**

The EIS report states under the Project Alternative 4,482 new residents (page 62) will be added along with 490-510 individuals holding jobs in the area. The faster pace of development in this alternative could result in "fire service delivery needs could outpace the growth of the department staffing and equipment to respond to increased call demand. However, the VFD anticipates being able to maintain target response times and plan for sufficient staffing and equipment to respond to any increase in calls associated with the Project Alternative." (page 61)

D
- What specific plan is in place to maintain VFD response times with an increased population of nearly 5,000 people if staff and equipment needs are inadequate, and funding is not keeping pace with the needs?

E
- What is the threshold for what is "adequate" and what is not in terms of staffing, equipment and response times for VFD?

The EIS (page 61) mitigation plan states "The compact form of development close to existing VFD services could result in more efficient service delivery.

F
- What plan does the City have documented if the compact form of development does not result in more efficient service delivery, causing harm to citizens?

G
- What is the backup Plan if staff and equipment do not keep pace with the population increase and harm to citizens is real?

Redevelopment in the Heights District Plan will result in additional tax revenues through a variety of sources. "A portion will accrue to the City and VFD which would **help** offset the increase demand for fire and emergency services."

H • What financial modeling has been done to indicate the anticipated portion of tax revenue from the development will be adequate to support VFD and its ability to maintain target response times, provide adequate staff and equipment under rapid development? Where can citizens access this data?

I • What additional (guaranteed) funding is available to support VFD beyond the anticipated offset from additional taxes to ensure adequate resources are available to VFD relative to thousands more people in the Heights?

J • If there are no additional funding sources guaranteeing adequate funding levels for VFD, the funding for the mitigation is purely speculative. Why should citizens rely on speculative funding sources for emergency services in this EIS report?

K • The development Plan is based on the convergence of developers to build the structures, people and retail re-locating to the Heights and filling vacancies, demand to generate retail success, tax revenue to partially fund services. What is Plan B if one or more critical factors fail to meet the current expectations, assumptions are off, and real time conditions do not allow for the mitigation success as planned?

**Police**

According to the Police Executive Research Forum, "Fewer people are applying to become police officers, and more people are leaving the profession, often after only a few years on the job." They also note "the workforce crisis is affecting law enforcement agencies of all sizes and types—large, medium, and small; local, state, and federal. And it is hitting departments in all parts of the country."

Vancouver faces these same challenges.

The Heights Development Plan does not appear to take this national trend into consideration, anticipating VPD can maintain target response times despite difficulties in maintaining current staff levels with retirement, and the current attrition rates of officers.

**Development Impact Questions**

No Action High Alternative- Greater increase in population and employment (roughly 4,113 people and 1612 jobs- *no mention of workers, visitors or consumers adding to the numbers*) would result in a higher demand for police services and increased call volumes."

Project Alternative- This option would "result in approximately 4,482 additional people and 490 to 510 new jobs." The faster pace of redevelopment "could result in police service needs that outpace the departments growth, yet VPD "anticipates being able to maintain target response times and plan for sufficient staffing and equipment to respond to any increase in calls associated with the Project Alternative. (page 61)

L • What specific plan is there to maintain VPD response times with an increased population of nearly 5,000 people if staff and equipment needs are proven to be inadequate, and new officer hiring and equipment does not keep pace with needs?

M • Does the EIS opinion have data or a documented plan to support how VPD will be able to meet service needs?

N • What additional (guaranteed) funding is available to support VFD beyond the anticipated offset from additional taxes to ensure adequate resources are available to VFD relative to thousands more people in the Heights? The key to this question is "guaranteed" funding allocations.

O • If there are no additional funding sources guaranteeing adequate funding levels for VFD, the funding for the mitigation is purely speculative. Speculative funding should not be considered a solution.

P What is the threshold for what is adequate and what is not in terms of staffing, equipment and response times for VPD? If funding or staffing ability are unable to keep pace with the increase in population, how will the City guarantee delivery of police services to keep the community safe at adequate levels that are equal or better than the current service level?

Q • Is there an reliable metric available to the public defining equipment and staff requirements for graduated population increases in the Heights that informed the opinion VPD "anticipates" (verb. regard as probable; expect or predict) being able to maintain target response rates?

R • The development Plan is based on the convergence of developers to build the structures, people and retail re-locating to the Heights and filling vacancies, demand to generate retail success, tax revenue and VPD ability to respond despite a national shortage of new police officers. What is Plan B if one or more critical factors fail to meet the current expectations, assumptions are off, and real time conditions do not allow for the mitigation success as planned?

**Water**

"Future development under the Project Alternative or the No Action Alternatives would have the potential to affect water pressure in the Heights District." (page 66)

"Development anticipated under the Project Alternative would increase peak demand from existing conditions by approximately 50% to 3,298 gpm." (page 66)

"The increased density and intensity of development anticipated under Project Alternative would result in greater demand of the water supply and distribution system and improvements would likely be required to provide adequate water pressure." (page 66)

S
- Mitigation possibilities include replacing the transmission line in Blandford Drive with a new 30" diameter transmission main. Does the developer pay for this mitigation, or do ratepayers cover the cost of this mitigation?

T
- Who covers the cost for a new transmission line (T-27) paralleling Mill Plain to the north connecting Water Station No.5 to 87th Avenue?

U
- Upgrades to the current system appear necessary to deliver water to the new development, and maintain adequate water pressure for hydrants and existing homes. How are these costs going to be covered?

V
- The EIS notes "no significant unavoidable adverse impacts on the water supply system are anticipated." What about adverse impacts related to potential rate increase to pay for the upgrades and mitigation efforts. These seem to be adverse impacts from the tax payer point of view. How is it that only system impacts are noted as adverse?

W
- The mitigation plan looks at a limited range of impacts, often specific to systems, discounting broader negative impacts to citizens. Why is this view so limited, giving the impression the plan has the impacts minimized when they are clearly not?

**Sewers**

Peak hourly sanitation demand for the No Action Base Alternative is 1,750 gpm, and for the No Action High Alternative is 2,600 gpm, both of which can be handled by the 5.3 MGD additional capacity available at Marine Park." (page 68)

"Although the Project Alternative would increase the peak discharge to the sanitary system, the relative difference between the No Action Alternatives us not significant enough to increase the diameter of the conveyance pipe." (page 68)

X • If something changes and the assumptions no longer reflect the ability of the current system to manage the waste as planned, who will cover the costs for mitigation?

Y • The EIS notes "no significant unavoidable adverse impacts on the sewer system are anticipated." What happens if the assumptions are wrong and something unforeseen occurs requiring costly mitigation?

Z • Who pays for mitigation efforts that are unforeseen?

**Parks**

It has been common for parks to have no water for the grass in the summer months, and equipment in existing parks removed, or left worn or damaged due to limited funding to maintain parks.

AA • How will adding new park spaces, on already stretched budgets, allow for maintenance and enhancements to new parks, recreation facilities and assets?

AB • Are current park impact fees, grants, general fund fees and real estate excise taxes able to fully fund our current parks to the level desired? Please explain.

AC • Are these additional funding sources guaranteed to provide adequate funding levels for parks, or are these sources speculative?

AD • Are these same sources able to cover the costs associated with new parks in the Plan? If not, how does the City plan to maintain new parks if current resources are inadequate?

AE • Many people regard cemeteries as sacred places, not playgrounds or parks. Trampling grave markers and using headstones for seating can be viewed as disrespectful. How can the City designate a cemetery as a park given the sanctity of burial grounds and include these spaces as recreational areas?

## Response to Email Comment 5 – Richard Gales

### Response to Comments 5A and 5B

See standard response 8, related to EIS alternatives.

### Response to Comment 5C

See response to email comment 3B above.

### Response to Comment 5D

Regarding VFD response times, see standard response 4. Regarding funding for City services, see standard response 5.

### Response to Comment 5E

From a SEPA perspective, the threshold that is used to evaluate impacts is whether or not the impact is "significant" and if so, whether or not it can be mitigated. The SEPA Rules from the Department of Ecology state that significant means "a reasonable likelihood of more than a moderate adverse impact on environmental quality." To make the determination of significance in the Heights EIS, the analysis included a review of existing (VFD response times and whether the increased population would impact those response times (see the Fire and Emergency Medical Services section in the EIS, beginning on page 68.

The City Council determines the adequacy of the VFD through its oversight of the VFD including adoption of the budget. Section 1.04 of the City Charter specifies that the City shall provide for fire service.

### Response to Comment 5F

See standard response 4 related to service levels for the VFD, including details on the VFD's annual evaluation of staffing and equipment needs.

### Response to Comment 5G

The Heights District Plan and EIS do not specifically identify a backup plan. If this situation were to occur the City would need to evaluate the situation and determine a course of action. Through the annual service level evaluation, the VFD will be able to review if service levels are continuing to be met as the City grows. See standard response 4 for additional details.

### Response to Comment 5H

The City has completed financial modeling to project tax revenues associated with future development in the Heights District – please see Appendix K to the Heights District Plan. The VFD budget is established during the budget process through the Consolidated Fire Fund. It is anticipated that funding to support the VFD services across the City will continue to be allocated in this way. It is also important to note that VFD staffing and equipment needs are assessed based on the population of the entire service area (currently approximately 250,000 people). While the Heights District Plan proposes an increase in population in one area of the city, it does not represent an overall increase in population beyond what has already been planned for in the City's current Comprehensive Plan.

Additional details on the VFD's evaluation of performance and staffing needs is included in standard response 4.

### Response to Comment 5I

While it is challenging to predict exact funding in the future, the VFD receives dedicated funding through the City budget and as part of Rural Fire District 5 proportionally. It is important to note that VFD's system of 10 (soon to be 11) stations are designed to work together to meet response time targets as call volumes vary by time of day, and over time as population of the fire district grows. Additional details on funding City services is provided in standard response 5.

### Response to Comment 5J

The SEPA EIS did not identify a specific impact to fire service that required a specific mitigation measure (such as a new station or new piece of equipment). The mitigation is identified qualitatively based on the current tax system in the City and is not speculative.

### Response to Comment 5K

If development does not happen as anticipated under the Heights District Plan, the increased demand on the VFD would not occur and the required mitigation would not apply.

Regarding VFD evaluation of service levels, see standard response 4.

### Response to Comment 5L

Regarding VPD response times, see standard response 4. Regarding funding for police service, see standard response 5.

### Response to Comment 5M

Impacts to the VPD were evaluated based on an estimated increase in population. The City determined that a specific plan was not needed to mitigate identified impacts, as the provision of continued police services in the Heights will be done in a manner consistent with services across the City. See standard response 4 for additional details related to police response times and service levels and funding for City services is addressed in standard response 5.

### Response to Comment 5N

See response to Comment 3I regarding VFD funding.

The current budget for the VPD includes a 2020 staffing plan that added positions over a five year period (2016-2020), positioning the Department to serve the increased population of Vancouver. Included in this staffing plan is adding units to address property crimes, traffic, homeless outreach, patrol officers, and neighborhood police officers to support an emphasis on community policing, as well as non-sworn positions to support the overall addition of positions and service to the community. Over the five years of the 2020 staffing plan, 42 sworn positions were added to the VPD budget. The VPD is funded in the General Fund, which relies on a variety of funding sources, including property and sales tax revenue. While there is no guarantee what these revenues will be in the short term, the City of Vancouver anticipates being able to continue funding public safety at its current level within the funding sources we currently utilize.

Regarding funding for police service, see standard response 5.

### Response to Comment 5O

The SEPA EIS did not identify a specific impact to police service that required a specific mitigation measure (such as a new station, equipment, or personnel). The mitigation is identified qualitatively based on the current tax system in the City and is not speculative.

### Response to Comment 5P

Police services is defined as a Tier II concurrency item by the Comprehensive Plan and there is no formal level of service established for police services that applies to specific development or actions. The City's Comprehensive Plan establishes a goal of 1.2 officers per thousand citizens. The City uses this as a gauge to determine staffing levels. VPD also evaluates staffing, equipment, and facility needs on a regular basis through the City's strategic planning and budgeting processes. Through this process, the VPD will be able to evaluate if staffing and equipment needs are continuing to be met as additional population is added throughout the City (including within the Heights District). See standard response 4 for additional details. Regarding funding, see standard response 5.

### Response to Comment 5Q

As noted in response to comment 3P, the City has a goal of 1.2 officers per thousand citizens.

### Response to Comment 5R

If development does not happen as anticipated under the Heights District Plan, the increased demand on the VPD would not occur and the required mitigation would not apply.

### Response to Comment 5S

As stated in the EIS, this improvement is identified in the City's current Comprehensive Water System Plan that was finalized in 2015. The project is a necessary improvement to address pressure deficiencies and balance system pressures. It was identified as a needed improvement prior to and separate from the Heights District planning process, and will occur regardless of the development proposed as part of the Heights District Plan. This improvement is funded through existing utility funds - an enterprise fund that is supported by and pays for improvements that benefit users of the utility, in this case water utility rate payers. Therefore, the majority of costs associated by this project will be funded by water utility rate payers.

### Response to Comment 5T

Like the transmission line in Blandford Drive, this improvement is identified in the City's 2015 Comprehensive Water System Plan as a necessary improvement to address pressure deficiencies and balance system pressures regardless of development of the Heights District. Therefore, this improvement will not be developer funded and will be funded through existing water utility funds.

### Response to Comment 5U

Upgrades to the current water system are not necessary to deliver water to the new development, only expansion of the system is necessary through the addition of new piping throughout the development. Water service infrastructure to support future development is typically installed by developers at their expense. Additionally, new water service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system (source, supply, and storage capacities). Improvements that are necessitated by future development associated with the Heights District Plan will be developer funded.

### Response to Comment 5V

As noted above and included as a mitigation measure in the EIS, new water service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system. Impacts to utility rates would not be anticipated as rates are set by overall system needs and not individual developments.

### Response to Comment 5W

The intent of the EIS is to evaluate a range of potential impacts for different elements of the environment as required by the SEPA, and identify how the proposed project could impact environmental systems, city services and infrastructure, population and surrounding land uses, etc. While the impacts associated with water and sewer service are specific to those systems, other sections of the EIS address potential impacts to other elements including surrounding land uses and population, etc. Additionally, as noted above and included as mitigation in the EIS, new water/sewer service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system.

### Response to Comment 5X

If conditions change throughout the City in such a way that the citywide sewer system is impacted, this would be addressed through the City's capital facilities planning and improvements would be funded through utility funds. If, at the time of development review for a project proposed in the Heights District, additional infrastructure improvements are required to support that specific proposed development, the developer would be required to fund those improvements or the development would not be allowed to proceed. Additionally, it is important to note that state law requires cities to plan for and provide adequate sewer service.

### Response to Comment 5Y

The overall sewer needs of the City are assessed through the City's General Sewer Plan, capital facilities planning and requirements of individual developments are assessed at the time of development review. Because of the relatively small increase in sewer demand resulting from the Heights District in comparison to the overall sewer treatment needs of the City, impacts to the sewer system would be highly unlikely and this is reflected in the conclusions in the EIS.

### Response to Comment 5Z

See response to Email Comment 3X.

### Response to Comment 5AA

The City anticipates budgeting funds for the park spaces included in the Heights District Plan as well as working with private partners to fund a maintenance agreement. The City uses a similar process at the Waterfront Parks.

### Response to Comment 5AB

Current impact fees will not fund the parks included in the Heights District Plan. However, real estate excise taxes, grants and other sources could be utilized. The City funding needed will depend on the negotiated maintenance agreements with private development partners.

### Response to Comment 5AC

Additional City resources as well as private partnership funds are anticipated to establish a strong maintenance program in the Heights District.

### Response to Comment 5AD

New funds would be budgeted for the park spaces included in the Heights District Plan, coupled with future private partner funding.

### Response to Comment 5AE

The plan does not designate the Cemetery as a park, and the intent of identifying it as a passive recreation space is to recognize the way it is currently used and preserve this use while continuing to respect its primary purpose as a resting place and burial ground.

## Email Comment 6

**From:** Kristin Hammond
**To:** Kennedy, Rebecca
**Subject:** you were fabulous
**Date:** Wednesday, February 26, 2020 9:57:24 PM

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Kudos to the city of Vancouver, you are a wonderful representative. Giving me a timeline of 5 years, before ground will be broken, and 20 to completion, makes me 78 when the project begins and dead by the time it's completed. Perfect! I will rest much easier.

I went to Mac High, graduated from Bay in '64 and moved back to Vancouver 16 years ago into DuBois Park ( formerly Braewood), which was just getting started in the 60's. I loved the neighborhood then and I love it even more as a resident. Changing the dynamics of this area is upsetting because, as my daughter has said, "it's the safest neighborhood I've ever seen." She has actually told her kids (7 & 5) they can go around the block without her. (She lives in Portland and never lets them out of her sight).

I know change is inevitable, but I love not being impacted... the heights has changed very little since I was a child, and for this reason I dread seeing an additional 1340 residents across the street. Please make the buildings attractive, not like the ones west of I-5 on the river front. If I have to look at a big housing complex, make it something I'd like to move into, an architectural beauty.

Have a wonderful day,
Kris Hammond (the lady that wanted to know about parking)

Sent from my iPad

## Response to Email Comment 6– Kristin Hammond

Comment noted. Development in the Heights District will be required to comply with design standards codified in the VMC. These standards will implement the Urban Design Framework developed with the Heights District Plan (see Appendix D to the EIS).

Email Comment 7

**From:** Jim [redacted]
**Date:** March 2, 2020 at 11:47:35 AM PST
**To:** [redacted]
**Subject:** Jim Luce - Preliminary /DraftPolicy Issue and Questions Regarding The Heights District Plan

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

DRAFT 2/3/2020

To: City Council
Rebecca Kennedy
From: Jim Luce
Re: Preliminary Issue and Questions Regarding the "The Heights Project"

**Will " New Urbanism"(1) work in a Mature Single Family Residential Neighborhood**

The Heights District Plan is a "mini- Oranco Station( https://en.m.wikipedia.org/wiki/Orenco_Station_ Hillsboro, Oregon) of "new urbanist development" but without the benefit of a large mass of undeveloped land, and with the handicap of being located in an existing 70 year single family residential community

A threshold policy question for the Council is whether a "new urbanist development" is appropriate for the Heights in the interest of creating a "mixed income/housing" Project.

The Planning Department hypothesis is that there is enough land to make this work. . My opinion is that while it could work well in an undeveloped area - Cascade Park – it will not work in the Heights.

Only after that first question is answered should the second question be answered: Should theCouncil designate the Heights as a "Urban Center or Corridor" consistent with the "New Urbanism" policy.

These are 2 different question

**Questions on the Draft EIS**

A 1. Has the Heights Project been benchmarked against any comparable size residential/commercial development? Which ones? Does the EIS reflect these benchmarks? If not, why not?

B 2. Height "restrictions " are 6 stories ( Page 40. The same as Oranco Station)
a. What is "the height" of 6 stories in feet.
b. Is this for only the "hotel." Or residential as well?
c. Explain how 6 stories is consistent with a single family residential neighborhood? when largest existing multi story is 2 stories.

C 3. Will housing be allowed in the "innovation zone" fronting on MacArthur?Devine and Mill Plain on the north?.

D 4. What is total number of single family residential homes currently in the Heights District?

E 5. How many new residential units (1342?)
a. Are these within the Tower Mall footprint, measured by Devine -MacArthur-Boulevard?
b. And how many parking spaces within this footprint.
c. How does the EIS measure the potential "spill over parking" to existing residential neighborhoods?

F 6. How many school age children are estimated for 1342 residential units?

G 7. Has the VSD planned for these students in the new schools?

H 8. Affordable housing is required for 25-40% of housing.

I 9. Please explain "the affordability example" based on the "real Median Income" for a family of four. What would their income be?

J 10. Is the "Affordability Index" measured for our City – Vancouver – only or for the Portland Metropolitan area?

J 11. Why is it measured this way?

J 12. Does it have to be measured this way? What would the income levels be if measured for Vancouver only?

K 13. The draft EIS says "home ownership" is possible? What percentage? Is this based on the "affordability index"

L 14. The Plan provides only 3 Options – The Preferred Alternative includes nearly all infrastructure improvements while the No Action Base and the Base do more to retain the residential character of the neighborhood.

L 15. Why only these 2 Options

L 16. Were other alternatives considered by the Planning Department or Citizens Advisory Committee?

L 17. Did the Citizens Advisory Committee make a written recommendation or affirmatively support any of the 3 Options?

L 18. Does the DEIS appendix include notes fro the CAC meetings?

M 19. The Heights Plan is based upon a policy of "mixed income communities." P23 of the DEIS ascribes this to "The City of Vancouver." Is this a City policy or a Planning Department policy which it is encouraging the City to adopt?

N 20. The same is true for "mixed income housing policy" Is this a Planning Department proposal, an existing City Policy, or a Planning Department recommendation for the entire City of Vancouver?

O 21. Should "the churches" be included or left out with an "option" to-opt-in at a later date? What impact would the "opt-in" at a later date have? Would zoning allow developers be able to build 6 story residential unit and has the DEIS considered the visual, traffic and other impacts this would have on the existing neighborhoods?

## Response to Email Comment 7 – Jim Luce

### Response to Comment 7A

The EIS evaluates the impacts associated with three alternatives - the Project Alternative (adoption and implementation of the Heights District Plan) and two No Action alternatives. The impacts associated with each alternative are identified in Chapter 3 of the EIS. No other comparisons or benchmarking was done for the project and none is required by SEPA.

### Response to Comment 7B

The maximum building height evaluated in the EIS is 80 feet (6 stories) for the new HX zone. See additional details in standard response 7.

### Response to Comment 7C

The Project Alternative description in the EIS includes a description of each Character Zone included in the Heights District Plan (see page 22 of the EIS). The "Innovation Hub" is described as an "eclectic mix of existing uses, health supportive services, and office/employment. However, the Innovation Hub area is within the Redevelopment Area proposed for rezoning to HX (see Figure 9, page 40 in the EIS). As noted on page 41 of the EIS under "Compliance with Applicable Ordinances", the HX zone will allow residential uses.

### Response to Comment 7D

Existing uses within the plan boundary are identified in the Land Use section of Chapter 3 of the EIS. In total, there are 232 existing residential units in the Heights District, of which two are single-family homes north of the fire station (see page 31 of the EIS).

### Response to Comment 7E

The Heights District Plan contemplates a total of 1,800 residential units (see Project Alternative description, beginning on page 19 of the EIS) and would include a mix of housing types, including attached single family residences. Of these, 1,342 would be located in the Redevelopment Area (the area bounded by Devine Road, MacArthur Boulevard, and Mill Plain Boulevard, as well as the area currently in use as Vanco Golf Range) (see Table 6 in the Project Alternative section of Chapter 2 of the EIS). Required parking for the Project Alternative is identified on page 61 of the EIS, which includes a total of 2,113 parking spaces. The plan estimates that 2,160 parking spaces would be provided within the Redevelopment Area (see page 40 of the Heights District Plan). Additional parking would be required for any residential units outside of the Redevelopment Area.

See standard response 6 related to spillover parking.

### Response to Comment 7F AND 7G

See standard response 10, related to school impacts.

### Response to Comment 7H

The EIS does not include a requirement for affordable housing. The Heights District Plan indicates a target of 25-40% of all housing to be affordable to households with incomes below the Area Median Income, and a minimum of 250 units affordable to households earning at or below 60% of Area Median Income (page 20 of the Heights District Plan), which is generally reflective of the incomes in and surrounding the Heights District Plan boundaries.

### Response to Comment 7I

Income characteristics and what it means for housing to be “affordable” are summarized on pages 25 and 35 of the Visioning and Analysis Summary (Appendix A of the EIS). Affordability is also discussed in the Equity, Jobs, and Housing section of the Heights District Plan (beginning on page 20). A typical standard used to determine housing affordability is that a household should pay no more than 30% of their household income on housing.

The Area Median Income is defined as the midpoint of a region’s income distribution – half of families in a region earn more than the median and half earn less than the median. For housing policy, income thresholds set relative to the area median income identify households eligible to live in income-restricted housing units and the affordability of housing units to low-income households.

The U.S. Department of Housing and Urban Development (HUD) defines and calculates different levels of area median income for geographic areas across the country by household size. Clark County, Washington is part of the Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area, which consists of the following counties:

- **Clackamas County, OR**
- **Columbia County, OR;**
- **Multnomah County, OR**
- **Washington County, OR**
- **Yamhill County, OR**
- **Clark County, WA**
- **Skamania County, WA**

The general concept of a metropolitan or statistical area is that of a core area containing a substantial population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. The title of each metropolitan statistical area consists of the names of up to three of its principal cities and the name of each state. Each metropolitan statistical area must have at least one urbanized area of 50,000 or more inhabitants. The HUD calculated 2019 area median income for the Portland-Vancouver-Hillsboro, OR-WA Metropolitan Statistical Area for a family of four persons was $87,000.

### Response to Comment 7J

Area Median Income as calculated in the analysis for the Heights District Plan is the Area Median Income for the Portland-Vancouver-Hillsboro Metropolitan Statistical Region. It is done this way in order to be consistent with the Federal Housing and Urban Development Department standards for calculating income for purposes of federal funding. Vancouver incomes are lower than the regional average. If income levels were measured for Vancouver alone, the Area Median Income would be lower than what is shown in the Heights District Plan.

### Response to Comment 7K

The Heights District Plan includes a policy (D-2 on page 21 of the Plan) to create opportunities for home ownership at a range of prices. There is not a percentage identified in the plan for home ownership. However, the policy statement is intended to encourage future development to provide rental and ownership opportunities to support market-rate and affordable housing. One example of a housing type that is conducive to home ownership is attached townhomes, which are specifically envisioned by the Plan.

### Response to Comment 7L

The three alternatives analyzed in the EIS provide three different potential development scenarios - the Project Alternative includes development consistent with the Heights District Plan and the two No Action alternatives include development under two different scenarios were the City to take "no action" (i.e. no adoption of the Heights District Plan). Because the No Action alternatives are based on the City taking no action, these alternatives would not involve any infrastructure improvements beyond those identified in the city's capital facilities plan and/or any infrastructure improvements required by a developer. It should be noted that there is no guarantee that the No Action alternatives would retain the existing neighborhood character. Development would occur parcel by parcel with no overarching framework or associated guiding principles, and the transportation and infrastructure improvements identified under the Project Alternative would not take place. No additional alternatives were considered in the development of the EIS. See standard response 8 for additional details related to the EIS alternatives.

The CAC did not review or provide input on the EIS alternatives. CAC meeting information is included on the Heights District Plan project website (https://www.cityofvancouver.us/ced/page/heights-district-plan).

### Response to Comment 7M

There is no reference to mixed-income communities on page 23 of the DEIS. Mixed-Income Based Housing is identified on page 20 of the FEIS under Plan Vision and Principles as the “Overarching Guiding Principle”. Mixed-income housing is also referenced on page 37 of the FEIS under the Population and Employment impacts of the Project Alternative. No specific mixed-income housing or community policies are referenced in the EIS; however, the Heights District Plan does include policies related to mixed-income housing and providing a range of housing types (page 21 of the Plan). Policies in the Heights District Plan, including the policies related to mixed-income housing, are not city-wide policies and would only apply to the Heights District.

### Response to Comment 7N

As noted in response to Comment 4M, no specific mixed-income housing or community policies are referenced in the EIS and the Heights District Plan is not recommending any new city-wide policies. Any new policies in the Heights District Plan would only be adopted for the Heights District. Mixed-income housing policies are listed on page 21 of the Heights District Plan.

### Response to Comment 7O

Based on direction from the Vancouver City Council, the draft Heights District Plan was revised to reflect an assumption that the church properties were removed from the rezone area included in the Heights District Plan would not be rezoned as part of the plan implementation, but would remain within the boundaries of the plan. Although individual church properties may be rezoned in the future upon request, such action is not contemplated by the Plan. See additional details in standard response 3.

Visual, traffic and other impacts associated with development under the Heights District Plan are addressed throughout Chapter 3 of the EIS.

## Email Comment 8

**From:** Pamla Wolf
**To:** Jim
**Cc:** McEnerny-Ogle, Anne; Glover, Linda; Kennedy, Rebecca; Hansen, Bart; Holmes, Eric; eric.paulsen@cityofvancouver.us; Lebowsky, Laurie (City Council); Fox, Sarah
**Subject:** Re: Request for a 60 Day Extension of Time beyond March 22 to Review and Adequately Comment on the Heights District Plan Draft EIS
**Date:** Friday, March 6, 2020 1:54:46 PM

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

On Fri, Mar 6, 2020 at 1:53 PM Pamla Wolf <[redacted]> wrote:

On Fri, Mar 6, 2020 at 1:30 PM Jim <[redacted]> wrote:

To: Rebecca Kennedy
Long Range Planning Manager

Re: Extension of Time to Comment on Heights District Plan DEIS

From: Jim Luce

On behalf of myself and other concerned citizens residing within the boundaries of the "Heights District Plan," I respectfully request an additional 60 days comment period beyond the existing March 22d comment period deadline.

The Heights District Plan which we are reviewing is a complex and technical document of more than 500 pages, including appendices. It significantly and irrevocably affects our single family residential environment in the following and other ways.

a. Proposing 1340 new residential units with inadequate parking.
b. Enabling 6 story structures in a predominately residential Residential neighborhood.
c. Increasing the existing deficit of community park space by 36 acres.
d. Making major changes to existing traffic patterns

As lead agency the City of Vancouver has discretion to extend the comment period under WAC 197-11-455 and we respectfully request that it do so.

James Luce
[redacted]

## Response to Email Comment 8 – Pamla Wolf

See standard response 1 related to comment period extensions.

## Email Comment 9

**From:** Kate Fernald [redacted]
**Sent:** Friday, March 6, 2020 10:59 PM
**To:** Kennedy, Rebecca
**Cc:** Holmes, Eric; McEnerny-Ogle, Anne; Glover, Linda; Hansen, Bart; eric.paulsen@cityofvancouver.us; Fox, Sarah; Lebowsky, Laurie (City Council); Stober, Ty; bill.turlay@cityofvancouver.us
**Subject:** Extension Request for DEIS for The Heights Project

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

To whom it may concern:

A On behalf of myself and other concerned citizens residing within the boundaries of the "Heights District Plan," I respectfully request an additional 60 days comment period beyond the existing March 22d comment period deadline.

The Heights District Plan which we are reviewing is a complex and technical document of more than 500 pages, including appendices. It significantly and irrevocably affects our single family residential environment in the following and other ways.

a. Proposing 1340 new residential units with inadequate parking.
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c. Increasing the existing deficit of community park space by 36 acres.
d. Making major changes to existing traffic patterns

As lead agency the City of Vancouver has discretion to extend the comment period under WAC 197-11-455 and we respectfully request that it do so.

Kate Fernald
[redacted]

## Response to Email Comment 9 – Kate Fernald

See standard response 1 related to comment period extensions.

## Email Comment 10

**From:** Pamla Wolf
**To:** Jim; Kennedy, Rebecca; Hansen, Bart
**Subject:** C.C
**Date:** Friday, March 6, 2020 2:28:22 PM



Im asking you to please give our DuBois neighborhood a 60 day extension regarding the final decision due March 22...pertaining to the Tower Mall property...a few of us still have questions that have not been addressed and/or statements we don't understand..

Thank you for your consideration...

Pamla Wolf

## Response to Email Comment 10 – Pamla Wolf

See standard response 1 related to comment period extensions.

## Email Comment 11

**From:** Jim
**To:** Kennedy, Rebecca
**Cc:** Holmes, Eric; McEnerny-Ogle, Anne; Glover, Linda; Hansen, Bart; eric.paulsen@cityofvancouver.us; Fox, Sarah; Lebowsky, Laurie (City Council)
**Subject:** Request for a 60 Day Extension of Time beyond March 22 to Review and Adequately Comment on the Heights District Plan Draft EIS
**Date:** Friday, March 6, 2020 1:30:28 PM

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To: Rebecca Kennedy
Long Range Planning Manager

Re: Extension of Time to Comment on Heights District Plan DEIS

From: Jim Luce

On behalf of myself and other concerned citizens residing within the boundaries of the "Heights District Plan," I respectfully request an additional 60 days comment period beyond the existing March 22d comment period deadline.

The Heights District Plan which we are reviewing is a complex and technical document of more than 500 pages, including appendices. It significantly and irrevocably affects our single family residential environment in the following and other ways.

a. Proposing 1340 new residential units with inadequate parking.
b. Enabling 6 story structures in a predominately residential
Residential neighborhood.
c. Increasing the existing deficit of community park space
by 36 acres.
d. Making major changes to existing traffic patterns

As lead agency the City of Vancouver has discretion to extend the comment period under WAC 197-11-455 and we respectfully request that it do so.

James Luce
[redacted]

## Response to Email Comment 11 – James Luce

See standard response 1 related to comment period extensions.

## Email Comment 12

> On Mar 7, 2020, at 7:32 PM, Dave Schmoldt [redacted] wrote:
>

Dear Rebecca,

I am requesting a 60 day extension (beyond March 22) to review and respond to the Heights District Plan Draft EIS.

I could tell at the neighborhood meeting where you presented that a lot of work has gone into the plan, but I was surprised by the more than 500 pages, including appendices. This is going to be a challenge to get through. The environmental impacts that I can already see are as follows:

a. Density—Proposing 1340 new residential units.
b. The urban impact of allowing 6 story structures in a predominately residential area.
c. Planning for inadequate parking.
d. Not providing enough usable park space. It appears that this will add to the existing deficit of community park space by 36 acres.
e. Increased traffic that does not appear to be adequately planned for.

My understanding is that the City of Vancouver has discretion to extend the comment period under WAC 197-11-455 and I respectfully request that you do so.

Sincerely,

Dave Schmoldt
[redacted]

## Response to Email Comment 12 – Dave Schmoldt

See standard response 1 related to comment period extensions.

## Email Comment 13

**From:** Terry Phillips
**To:** Kennedy, Rebecca
**Cc:** Holmes, Eric; McEnerny-Ogle, Anne; Glover, Linda; Hansen, Bart; eric.paulsen@cityofvancouver.us; Fox, Sarah; Lebowsky, Laurie (City Council); ty.Stober@cityofvancouver.us
**Subject:** Request for a 60 Day Extension beyond March 22 for Review and Adequate Comment on the Heights District Plan DEIS
**Date:** Monday, March 9, 2020 6:11:53 PM

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I respectfully request an additional 60 days comment period beyond the existing March 22nd comment period deadline.

The Heights District Plan is an extremely complex and technical document of more than 500 pages, including appendices. It significantly and irrevocably affects our single family residential environment in many ways:

a. Proposing Hi-Density development (1340 new residential units) with inadequate parking.
b. Enabling 6 story structures in a predominately residential low-density Residential neighborhood.
c. Increasing the existing deficit of community parks in the city.
d. Major changes to existing traffic patterns adding significant trips to a low density existing neighborhood.

As lead agency, the City of Vancouver has discretion to extend the comment period under WAC 197-11-455 and is respectfully requested.

Terry Phillips

## Response to Email Comment 13 – Terry Phillips

See standard response 1 related to comment period extensions.

## Email Comment 14

-----Original Message-----
From: Jim [redacted]
Sent: Friday, March 20, 2020 1:50 PM
To: Eiken, Chad; Kennedy, Rebecca; Holmes, Eric
Cc: McEnerny-Ogle, Anne; Fox, Sarah; Stober, Ty; Hansen, Bart; Glover, Linda; Lebowsky, Laurie (City Council); Paulsen, Erik; Calley Hair
Subject: I Respectfully Request the City "Toll/Suspend":the May 20 Comment Deadline for Heights Plan DEIS .

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Rebecca

My understanding is that the City is in a virtual lockdown and business as usual is suspended.

Further, the Corona Virus has made it impossible for me, as much as I would like to, to focus and comment on the Heights DEIS, and I know that others are similarly situated.

For this reason, I respectfully request that the City "toll/suspend" the May 20 deadline for comments to the Heights Plan DEIS until a time TBD when business returns to normal and to do so by formal notice to myself, the Heights Coalition, the Columbian and other interested parties that the City knows are following this process.

Parenthetically, I assume that other City processes similarly situated are also "tolled/suspended" until a later date TBD.

Stay safe,

Jim Luce
[redacted]

## Response to Email Comment 14 – Jim Luce

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 15

**From:** Dave Schmoldt
**To:** Kennedy, Rebecca
**Cc:** Holmes, Eric; Fox, Sarah; Glover, Linda; Hannon, Julie; Lebowsky, Laurie (City Council); McEnerny-Ogle, Anne; Paulsen, Erik
**Subject:** Additional Request Re: 60 Day Extension Request beyond March 22 to Respond to the Heights District Plan Draft EIS
**Date:** Monday, March 23, 2020 11:10:00 PM

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CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Rebecca,

With the Coronavirus requiring social isolation, it is difficult to meet the review deadline. I want to get a print out of the document from the City and go to all the meetings on the Heights District Plan, but I don't feel that is prudent or possible currently. I also would like to meet with my neighbors and other neighborhood associations, but that really can't be done in an effective way currently.

Given the disruption occurring due to the Coronavirus, I request that all review periods and milestone due dates be extended and recalculated based on the number of days we have to socially isolated until the virus has run its course.

Thank you for your consideration.

Sincerely,

[redacted]

## Response to Email Comment 15 – Dave Schmoldt

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 16

Chad

Thank you for your response to our request to further extend the May 20 deadline for DEIS comments.
I understand that - as you say - you are "not inclined" to further extend the comment period.

The COVID emergency hss changed the landscape and our request.
Our new request is to defer further work on the Heights Plan until May
22, one year from the date when comments would have been due.

We do recognizing that the City management and City Council are facing very different and higher priorities than the Heights Plan, and doing so with reduced revenue for this and other projects that can be deferred.

Many who would, for example, have otherwise commented are preoccupied with children because the schools are closed. Or they lost their jobs and are busy looking for work, or seeking unemployment. Or looking for money to pay rent or make mortgage payments.

To be clear, while we see the "Heights Plan" as very important in the long run, we are sure that significantly reduced City revenues and other higher City priorities can allow deferral for 1 year.

A prompt reply is respectfully requested

Jim Luce

## Response to Email Comment 16 – Jim Luce

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 17

**From:** Kate Fernald
**To:** Jim
**Cc:** Elken, Chad; Kennedy, Rebecca; Holmes, Eric; Heights Coalition; McEnerny-Ogle, Anne; Paulsen, Erik; Glover, Linda; Stober, Ty; Fox, Sarah; Lebowsky, Laurie (City Council); Hansen, Bart; Jeanne Farber
**Subject:** Re: Heights Request City that Defer "Height Plan" Work for 1 Year
**Date:** Monday, April 13, 2020 3:40:11 PM

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon, all,
I'd like to second Jim's suggestion to defer further work on the Heights Plan. It is very frustrating and disappointing to see some believe May 22, 2020 is still a reasonable deadline for feedback given this global pandemic.

As Jim so aptly pointed out, young families just like mine are in over our heads right now. Small business grants, payroll protection programs, loan applications, mortgage extensions and tax payment deferrals are just a few of the COVID-19-related inconveniences that absorb our time and energy. We are literally focused on analyzing the next steps we need to take so that we may continue to afford a home and put food in the mouths of our children. At no time in my life have I ever been more consumed by the worries of providing basic necessities. This irreverent response from the City that fails to acknowledge the impact COVID-19 has on our community and our ability to provide thoughtful feedback is heartbreaking. Are we to be ruled by a despotic government unafraid to exercise its absolute power over the people, or are we to be valued citizens contributing to a direct democracy?

This is the important post in which fortune has placed you, Mayor, Council and City Planners: holding the balance and preservation of a harmonious relationship which may only continue between the City and its citizens when the people's right to contribute meaningful commentary is honored by deferring work on the Heights Plan until the global pandemic is past.

I believe there is leadership within the City that will do what is right for Vancouver. I believe there is leadership that values Vancouver's citizens. Please, make the right choice in these unprecedented times where people's actions will undoubtedly be remembered; defer the Heights Plan so we may all focus on what is most important.

Sincerely,
Kate Fernald

## Response to Email Comment 17 – Kate Fernald

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 18

**From:** Sandi McClary [redacted]
**Sent:** Thursday, April 23, 2020 10:25 PM
**Cc:** McEnerny-Ogle, Anne; Hansen, Bart; Fox, Sarah; Stober, Ty; Glover, Linda; Lebowsky, Laurie (City Council); Paulsen, Erik; Holmes, Eric; Eiken, Chad; Kennedy, Rebecca
**Subject:** Heights Project Consideration

Dear Vancouver Leaders,
In light of the massive disruption caused by the worldwide COVID-19 pandemic, it seems appropriate that the City Council would place a hold on going forward with the Heights Project for at least one year while all stakeholders can take time to re-evaluate the plan. The EIS should be considered with fresh eyes given the impact of density on the health of the population at large. I urge you to defer moving forward on any aspect of the plan for at least one year or until the economy stabilizes and the impact of high density on spread of contagious diseases can be thoroughly evaluated.
Sincerely,
Sandi McClary
[redacted]

## Response to Email Comment 18 – Sandi McClary

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 19

**From:** Kate Fernald [redacted]
**Sent:** Friday, April 24, 2020 8:57 AM
**To:** Kennedy, Rebecca
**Subject:** Heights Plan DEIS Question



Good morning, Rebecca,

With The Columbian's article on COVID's impact on City revenue, it got me wondering about the Heights Plan. Does the DEIS define how each project / alternative will impact the City's budget? If so, where? If not, can you help me find the answers?

I sure would love to learn they varying dollar amounts each project option is forecasted to bring the City.

I'd imagine the Low Income Housing Tax Incentives, subsidies and forecasted property taxes will vary widely across the 3 project options (project, no action high and no action base) but it'd be helpful to see the actual anticipated numbers.

Like you, I care deeply for our Vancouver, and I want to make sure the City has financial resources to pay our first responders etc.

Thank you for any insight you can provide,
Kate Fernald

## Response to Email Comment 19 – Kate Fernald

The EIS compares the "Project Alternative," which is the vision outlined in the draft Heights District Plan, to No Action Base and No Action High alternatives. The no actions were analyzed in order to understand, measure and assess the potential impacts of the Project Alternative. This means that they are what would happen if the area developed under current regulations and market conditions, without the guidance and updated regulatory framework (zoning, design guidelines) and investments (parks, roads, open spaces) that are proposed in the Project Alternative. For the purpose of the EIS, the no action alternatives were assumed to not involve any City financial contribution beyond addressing existing infrastructure deficiencies.

For the Project Alternative, information on costs and anticipated revenues generated is outlined in the last Heights Update to Council on March 2, 2020. Both costs and revenues are estimated over the 25-year implementation timeline for the project alternative. It is also worth noting that the majority of these costs will not come from local funding like other projects of this nature (Esther Short Redevelopment, Waterfront redevelopment), implementation investments will be made by private development partners (through impact fees and requirements to build needed public infrastructure as part of individual development projects), and state and federal grants, in addition to locally-funded improvements.

## Email Comment 20

**From:** Kate Fernald [redacted]
**Sent:** Friday, April 24, 2020 9:43 AM
**To:** Kennedy, Rebecca
**Subject:** Heights Plan DEIS Questions

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello again, Rebecca,
Here are a few more questions that have come up for me regarding the Heights Plan DEIS.

A 1.What funding sources did the City use to purchase Tower Mall? Do the funding sources have any deadline requirements that impact the "Heights Plan" deadlines like DEIS feedback due date?

B 2. Are there any development deadlines the City must meet to qualify for the Housing Finance Commission's Low-Income Housing Tax Credit?

C 3. What type of subsidies will the city receive in each project alternative for building mixed-income housing?

If you can help me find these answers in the DEIS or provide the answers, I'd be so grateful!

Hope this finds you healthy and well, and, as always, thank you for your outstanding hard work. I hope you know how lucky the City is to have you!

Kate Fernald

## Response to Email Comment 20 – Kate Fernald

### Response to Comment 20A

The City purchased the Tower Mall property with one-time general fund dollars in 2017, based on Council direction and approval. This was local funding and there are no specific deadline requirements associated with the funding.

### Response to Comment 20B

The City does not apply for housing tax credits or build or operate affordable housing. Therefore, any deadlines associated with Low-Income Housing Tax Credits are not applicable to the EIS or adoption of the Heights District Plan.

### Response to Comment 20C

The EIS analyzes the impacts associated with the Project Alternative (adoption of the Heights District Plan, associated implementation measures, and future development as proposed in the Plan). The Heights District Plan does not identify a financing strategy to achieve the mixed-income housing goals outlined in the Plan. Financing of future projects will be identified on a project by project basis in conjunction with future development partners. Therefore, there are no subsidies associated with the Project Alternative.

## Email Comment 21

**From:** [redacted]
**Sent:** Monday, April 27, 2020 5:47 PM
**To:** Kennedy, Rebecca
**Subject:** Heights Plan - # of residential units & other

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Rebecca,

I hope this email finds you well and safe.

I'm sure you've been either copied on or looped into many of the communications about extending the DIES comment period. The request is simply to freeze the clock since we were given the extension and the "stay home" order. I wanted to shoot you an email to let you know that the feedback I'm getting from neighbors is that they aren't satisfied with either the response or the timeliness of the responses. Given that the clock is ticking when the comment period ends, could you ask your colleagues to make sure the get back to people (even it's to say they need a couple days)?

As far as the overall Plan goes, I believe the outstanding areas neighbors are fretting about are based around the number of residents/mix, and the parking situation. I wanted to give you some insight as to what the area's of concern are for the Coalition and neighbors that contact me for help or to vent.

A 1. About the number of residents – is there a minimum number of units or people living up at the Tower Mall area that are required to make the Plan work? I know the unit count was 1800 and was dropped to 1300. It's my understanding that the 500 will go somewhere else in the sub-area. Can you clarify/confirm that?

B 2. About the mix – affordable/regular housing. I've seen 25-40% At what point in the process is that solidified as the goal? The ambiguity of the spread is cause for unrest and pushback.

   a. Affordable Housing – Seeing that housing for Seniors has been mentioned is really exciting. Can you provide clarity to what % of the affordable housing would be for older adults?
   b. What type of affordable housing will be going in? Can you definitely say it won't be section 8? Any clarity that removes the ambiguity would really help.

C 3. Parking – 2200 spots for 4500 residents, retail and commercial employees and customers is scary. Especially given the sensitivity of the Westside Bike Project and the impact of losing those parking spaces. Is there any room to modify the allotted parking?
   a. If so, when is the opportunity for public testimony to Council or Planning commission to get more parking spots in the plan?

D • I understand conceptually that the idea is that people will use transit, bike or walk, and maybe 20-30 years from now that will be the case. But in todays world, people drive. And they want to be able to park reasonably close to their home, office or where they shop.

Folks feel they need to work to get the above clarified and in writing before the Plan is approved and moves forward. Being that the world is on lockdown, we can't meet, we are all super stressed out, trying to work things out during the pandemic while the clock ticks away is unnerving.

I look forward to hearing back from you. And, just wanted to be completely transparent with you about what's happening and being discussed out here in the neighborhood.

Warmly,
Michelle

## Response to Email Comment 21 – Michelle Briede

See standard response 2 related to comment period extensions based on COVID-19.

### Response to Comment 21A

The number of residential units included in the plan is based on a market analysis prepared in conjunction with the plan (see Appendix D to the Heights District Plan) and the number of units required to support the commercial and retail uses also proposed in the Plan. While there is not a minimum number of residential units required to make the plan work, the number of units included in the plan is based on an analysis of other successful mixed use developments locally, regionally and nationally, as well as interviews with local developers who understand the Vancouver market. The 500 units removed from the Redevelopment Area during the planning process were not added to other areas within the District.

### Response to Comment 21B

The affordable housing targets included in the Heights District Plan reflect the income and renter/homeowner mix desired by the City to ensure new development in the District is consistent with the income and ownership mix of existing adjacent neighborhoods and continues to be an inclusive place where people of a variety of incomes can afford to live. The affordable housing targets also reflect an analysis of other successful mixed-income projects, and the mix of rents and housing types that will be needed to support retail and commercial uses proposed for the District. Additionally, because the City does not control many of the properties in the District, and therefore cannot compel other property owners to provide any affordable housing, a range was the most appropriate way to reflect the City's goals. This range is included in the Draft Heights District Plan, and would become official upon adoption by City Council.

The affordable housing targets do not specify a specific type of housing, but are intended to accommodate a range of options as the area builds out over time. Regarding Section 8 housing, the Federal Fair Housing Act prohibits discrimination in housing based on source of income. It is illegal to ban Section 8 vouchers, which constitute a subsidy that bridges the gap between the cost of housing and the amount someone can afford to pay based on a person paying no more than 30 percent of their income for housing. Paying more than 30 percent of income for housing is the trigger for being "rent burdened," which is a federal standard for when someone is paying more for housing than they can realistically afford while also meeting other expenses. Section 8 vouchers are not based on a specific income, but people qualify based on area rents and what they can afford to pay based on their income and the 30 percent threshold. Many people in our community qualify for Section 8 vouchers simply because our housing prices are high relative to median incomes.

### Response to Comment 21C

The parking standards proposed in the Heights District Plan are in line with what is required in the rest of the City, where parking for multi-family units range from 1 per unit to 1.5 per unit, depending on the location, and 1 per unit for single family houses. This is just the required minimum, and developers can and often do build more parking depending on the population they are targeting. Parking minimums will be codified in the VMC as part of the new HX zone. The public can continue to comment on the parking recommendations included in the Heights District Plan through the plan adoption process. If the plan is adopted, the next phase of the project is the development of implementation measures, including the HX zone standards, which will require separate Planning Commission and City Council public hearings with additional opportunities for public input. Those hearings are not yet scheduled, but will be advertised per City public notice requirements.

The EIS analyzed potential parking impacts and includes mitigation measures to offset those impacts. See pages 62 and 63 of the EIS.

### Response to Comment 21D

See response to email comment 21C above, which addresses parking standards.

## Email Comment 22

**From:** [redacted]
**Sent:** Thursday, May 7, 2020 5:45 PM
**To:** Kennedy, Rebecca
**Cc:** 'Paul Pedone'; 'Jim'
**Subject:** Heights District Plan - Draft Environmental Impact Statement, dated January 22, 2020.

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear Rebecca:

We want to comment on the Heights District Plan Draft Environmental Impact Statement, dated January 22, 2020.

We are dismayed that under the current emergency conditions, the City is proceeding with the referenced plan. We urge the City to suspend action until the COVID Emergency, and the widespread financial fall-out to private and public sectors, has definitively ended. At that point, the City should take stock of the city's financial condition and outlook, to identify the highest priority expenditures, and should also consider the financial condition of Vancouver neighborhoods and families.

I am copying Paul Pedone of the Southcliff Neighborhood Association to keep him in the loop. I will also send copies to all City Council members.

Thank you for adding this email to the official record.

Ann T. Donnelly, Ph.D. and Michael F. Donnelly, Ph.D.
[redacted]

## Response to Email Comment 22 – Donnelly

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 23

May 7, 2020

Director Chad Eakin
Attn: Rebecca Kennedy
City of Vancouver, Washington

Re: Comments on "The Heights District Plan" Draft Environmental Impact Statement

Dear Director Eakin

I respectfully offer the following comments on the City of Vancouver, Washington's (City) Heights District Plan "Draft Environmental Impact Statement (DEIS), dated January 22, 2020.

A 1. The City, for reasons previously described in an e mail to Planning Director Chad Eakin, and responded to by him on May 1, should indefinitely suspend further work on the DEIS.

B 2. As noted by Council member Sarah Fox in an April 27, 2020 e mail to me, this is not an appropriate time for the City to pursue long range planning

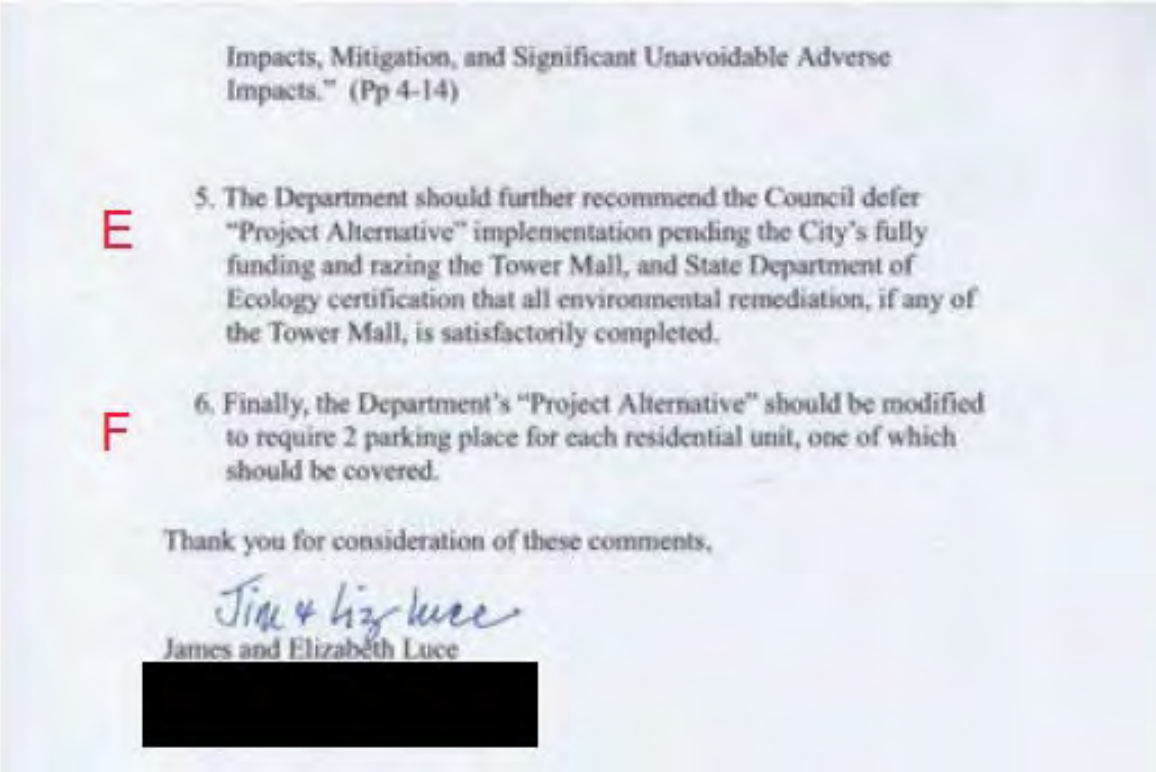
"Dear Jim,
Thank you for sending me your thoughts on the Heights project. I agree now is not the time to pursue any of the city's long range plans. I am certain that we will revisit the legislative priorities and calendar when we are all allowed to return to public life. This is very tough on so many of us.

I hope that you and Liz are staying healthy and safe?

Best,
Sarah

C 3. There is also a financial imperative for suspending work. Planning Department funds come from the General Fund and the City faces a revenue shortfall of $30-60 million. Funds spent on finishing the DEIS and making any recommendation to the City Council can at this time be better spent on higher priorities.

D 4. If the Department nonetheless proceeds, and proposes its preferred "Project Alternative," it should recommend Council approval only on the Council's first fully funding the infrastructure improvements the DEIS recommends, including those referenced in the "mitigation measures" described in "Summary of Environmental



Impacts, Mitigation, and Significant Unavoidable Adverse Impacts." (Pp 4-14)

E 5. The Department should further recommend the Council defer "Project Alternative" implementation pending the City's fully funding and razing the Tower Mall, and State Department of Ecology certification that all environmental remediation, if any of the Tower Mall, is satisfactorily completed.

F 6. Finally, the Department's "Project Alternative" should be modified to require 2 parking place for each residential unit, one of which should be covered.

Thank you for consideration of these comments,

Jim & Liz Luce

James and Elizabeth Luce

[redacted]

## Response to Email Comment 23 – Jim and Liz Luce

### Response to Comment 23A

See standard response 2 related to comment period extensions based on COVID-19.

### Response to Comment 23B

Comment noted.

### Response to Comment 23C

Comment noted.

### Response to Comment 23D

The infrastructure improvements included in the Heights District Plan and identified as mitigation measures in the EIS will be included in the City's Capital Improvement Plan and will be considered in future budget discussions by City Council. Although individual developments will be responsible for public improvements, the City intends to fund key public infrastructure such as certain internal streets and public spaces, including parks. Additionally, new service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system. Infrastructure improvements identified as necessary to support existing City deficiencies (such as a water transmission line in Blandford Drive) would be required regardless of development in the Heights District. These improvements are funded through existing utility funds which are enterprise funds. Enterprise funds are funds that are supported in general by users of the service. Therefore, the majority of costs are supported by utility rate payers.

### Response to Comment 23E

Mitigation measures to evaluate the potential for contamination and address cleanup are identified on page 96 of the EIS. The Ecology Site ID was added to the toxic cleanup description on page 95 and a statement indicating cleanup should occur in accordance with Ecology's current guidelines and regulations was added to the mitigation measures on page 96.

### Response to Comment 23F

The parking standards proposed in the Heights District Plan are in line with what is required in the rest of the City, where parking for multi-family units range from 1 per unit to 1.5 per unit, depending on the location, and 1 per unit for single family houses.

## Email Comment 24

**From:** Pamela Myles
**To:** Kennedy, Rebecca
**Subject:** The Heights District Project
**Date:** Tuesday, May 12, 2020 4:42:09 PM



To Rebecca and all concerned,
We have made our voices heard before, but we understand that the city is accepting public comment on the Draft of the Environmental Impact Statement, so we wanted to share our opinion once again.
As residents of Northcrest Neighborhood who will be deeply impacted by the Heights project, we have a number of concerns.

However, first we want to thank you for including Northcrest in helping to determine the zoning code requirements for the property north of Mill Plain along with Northcrest Church and the city. (pg. 76) Since this area sits on the edge of our neighborhood, we have high stakes in how this is developed. We would much prefer it be left as is, as well as the fire station area across Devine. But at least you are giving us a say in what will happen to this property. We are also happy that nearby churches are left out of the rezoning process at this time.

We were also impressed that you will be seeking out minority and women owned businesses to locate in the renewed area as well as locally owned and operated restaurants, food markets, etc., and that there will be affordable housing. We are impressed that every effort will be made to build with environmentally sound and sustainable materials and to provide a park like setting with a canopy of trees.

Since we are the Neighborhood Gateway most affected by this project, and the plan expresses it wants to limit access to neighborhood streets to "maintain the character of existing neighborhoods",
(C 10, pg. 25), we are extremely concerned about parking and traffic. We live close to Devine, and it is hard to imagine, even with access to parking from Devine for the proposed housing there, how traffic will be managed unless there can be a regular traffic light. It is already a busy road, really a small thoroughfare down to Fourth Plain through Stapelton. With 1300 plus new residences in the area, we imagine chaos on little Devine Road. This will probably mean that many cars choose to drive our neighborhood streets to try to get away from all the traffic. And with residences where Northcrest Church is now, which will eventually come to pass, we can see the overflow parking spilling onto our streets. Though it feels as though the city has made up it's mind (and we know we will have some say down the road on zoning of this area), we still strongly urge that the project be kept on the south side of Mill Plain. We also find that adding parking to Mill Plain by the Project thus thus narrowing the four existing lanes will just add to the traffic woes. We can't imagine traffic coming to a halt every time someone wants to pull in or out of a parking spot. We know the city is hoping for lots of transit use, but people love their cars. We are highly against putting parking on this major thoroughfare!

We also continue to be concerned with building heights. As our struggle with Covid 19 continues, perhaps there is a message about population density for us all. We retired here about ten years ago because it was such a lovely quiet neighborhood. We know most all the neighbors from walking our dogs twice a day. Our neighborhood has very little traffic and

there are many people who walk our streets daily with never a worry about traffic. We know there has already been some downsizing of the number of residences planned. Even with them downsized, with some being three bedroom, we know that there will be many many more people than residences, and that means many many more cars. Please continue to rethink and re-plan to lessen the coming traffic clog that will be inevitable to all the surrounding neighborhoods, especially, Northcrest!

Thank you for giving some consideration to our concerns.

Sincerely,
Pam and Kevin Myles

## Response to Email Comment 24 – Pam and Kevin Myles

Regarding traffic impacts, the traffic impacts associated with the Project Alternative, as well as proposed mitigation measures to offset potential impacts, are addressed in the Transportation section of Chapter 3 of the EIS (beginning on page 50).

The Heights District Plan includes recommendations for a variety of transportation system improvements that will address increased traffic generated by new development as well as existing congestion issues, including:

- Roundabouts at MacArthur and Andresen and MacArthur and Devine
- A new traffic signal at the MacArthur /Lieser/St. Helens intersection
- Improving signal timing along Mill Plain Boulevard and at the intersection of Andresen Road and 18th Street

In addition to addressing congestion, roadway improvements are proposed for Mill Plain, Andresen, Devine, and MacArthur that will provide safer, more comfortable options for people walking, biking, and rolling. These improvements will also modify the street design to reduce traffic speeds by narrowing travel lanes (Mill Plain and MacArthur) and reducing the number of travel lanes (Andresen). Other safety improvements to existing streets will include new and improved crossings at intersections to increase safety for people walking and rolling. Policy recommendations and implementation strategies in the plan (see plan policy C-10 and the Neighborhood Traffic Impacts Implementation Strategy) call for limiting vehicle access from the new development to existing neighborhoods in order to maintain the character and safety of these areas, monitoring neighborhood streets for any changes in traffic volumes and speeds as development occurs, and addressing any traffic safety issues through traffic calming and other design improvements if challenges emerge. The forthcoming Mill Plain Bus Rapid Transit line will also provide frequent transit service connecting the Heights to major employment centers in Downtown Vancouver and Columbia Tech Center (CTC) in east Vancouver, including the Clark College CTC campus.

Regarding building height, see standard response 7.

## Email Comment 25

May 14, 2020

Director. Chad Eakin
Ms. Rebecca Kennedy
Mr. Eric Holmes
City of Vancouver
415 W. 6th Street
Vancouver, WA 98660

RE: Comments on "The Heights District Plan" Draft Environmental Impact Statement

In the May 8 Columbian ("City Budget Shortfall delays bike lanes project on Columbia Street--Transportation Fund shrinks due to I-976, pandemic's impact"), Mayor McEnerny-Ogle is quoted saying "I don't know what our revenue is going to be." By that statement, she acknowledges the City is rightfully concerned about the potentially devastating effects of the COVID-19 economic disaster on city budgets. As a result, repairs to existing infrastructure are halted indefinitely (e.g., pavement resurfacing, traffic lights, sidewalks).

If budgetary concerns have already halted repairs to existing streets and sidewalks used by residents daily, why then would a costly project such as the Heights District Plan (a new development) not also be delayed? Who would think it wise to continue spending money on something so non-essential when it is acknowledged we don't have enough money to pay for essentials such as roadway repairs?

The deadline for the Environmental Impact Statement (EIS) for the Heights District Plan is May 20. In a time of such unprecedented economic upheaval and uncertainty, it feels reckless of City leaders to continue a project that is non-essential. While this may indeed be a good project for revitalizing the Tower Mall area, it would likely still be a good project once the economy has recovered from the yet-to-be-determined economic devastation brought upon us by the COVID-19 pandemic. Until such time, City leaders should make the responsible decision to postpone the EIS and put the Heights Plan on-hold until it is prudent to continue.

Thank you for consideration.

Regards,

Kim Lee

[redacted]

## Response to Email Comment 25 – Kim Lee

See standard response 9 related to City budgeting and financial implications of the plan.

## Email Comment 26

Dear Rebecca and other Draft EIS responders:

Thank you again for your years of work on planning The Heights District project and the time spent on public engagement. I do appreciate Rebecca's hard-working efforts and the many others who have worked alongside her. I also appreciate the COV allowing many opportunities for citizen input and for the City Council and Planning Commission listening to the citizens and making some changes along the way in response to input.

I am writing to share some thoughts and concerns and to also ask questions re: more details for the following items in response to the Draft EIS for the Heights District Sub-area plan.

A 1. Fire/EMT and Police Coverage:

Public safety is a number one priority. Assurances are given in the DEIS on page 61 and 63 that "no significant unavoidable adverse impacts to fire and emergency services and police services are anticipated" given "implementation of mitigation measures". However, it is widely known via local and national news and local community presentations that police departments are having a difficult time finding recruits. VPD is no different. Presently, Vancouver can not get enough police recruits to cover attrition needs plus expand the size of the police force to meet increasing needs due to population growth. How can the public safety needs be met in the Heights area with 4,000-5,000 more residents in a concentrated area? Please be specific on the plans to guarantee being able to hire enough police recruits and train them in time to meet the need when it currently is not happening. The wait time to get into the training academy is another factor. These 2 critical factors must be addressed even if the funds are available for hiring.

Secondly, the VFD is running on a lean staff and relies on overtime to be able to meet staffing needs according to local firefighters. Then re: VFD response time, although improvement has been made on meeting the response target according to the latest available reports from 2019 relative to 2017-2018, the target response time of 7:59 minutes is still not being met in all areas of Vancouver. The VFD annual report was shared July 1, 2019 with City Council and and was also referenced in the Columbian on July 6, 2019. The Columbian article notes that the funding for key components of addressing better response times will require the passage of A Stronger Vancouver. What if A Stronger Vancouver does not pass in the election? What if the projected increased tax revenue from The Heights Plan falls short? Then what is the contingency plan to achieve the necessary funding to pay for the additional personnel and resources needed due to rapid population growth in the Heights?

I am also curious to know what the projected impact will be to public safety response time and coverage in Central Vancouver with the additional projected population

increase when the next future redevelopment occurs in a few years at the COV Public Works site within 1.3 miles of the Tower Mall redevelopment. Please share the possible impacts that could occur with overlapping development of two locations in close proximity.

B 2. Song Birds:

Loss of the presence of song birds can occur during construction and development according to a spokesman at the Portland Audubon Society. Park Hill cemetery provides a rich habitat for many birds including the area that has been re-zoned and slated for redevelopment into multi-family housing. I know this project is designed to be "green" and "earth friendly." There are no mitigation measures mentioned in the Draft EIS in the Plant and Animal section, pg. 84-87, to protect the habitat for the birds in the long term construction and development phase. Noted is the plan to increase the tree canopy, pg. 87, but that will take years. Please share what mitigation will occur during construction and development.

One possible suggestion is the fact that the Portland Audubon Society plans to begin including Clark County in offering their Backyard Habitat Certification Program, which will start with small numbers here. Although a limited opportunity, this could be one means of partially ensuring that song birds remain in the Heights at current levels if current and future neighbors participate. The Heights Plan may want to look at this program, as well as others, for additional ideas on how to make the redevelopment more bird friendly. This would include, but not be limited to, the planned landscaping. This may have been partially considered but was not a detail I found in the EIS.

C 3. Cemetery space:

I have a hard time understanding how COV can trade limited city cemetery space for high density housing. I think it is short sighted vision, unless you know the world is coming to end in 90 years, or that no-one will want to be buried in a cemetery. Both current and future generations will have limited options for burial grounds when you take away the cemetery space at Park Hill Cemetery. Park Hill is the only city owned cemetery available for new internments. You can not bring the cemetery space back when you run out of land in 50-100 years! How will COV mitigate a deficit of cemetery space in 5 generations?

A desirable feature of the Heights Plan is having everything you need in a 20 minute walkable zone. People often want their loved ones interned nearby. They don't want a long commute across the city or to the outskirts of the county. Citizens need and want cemetery space inside the main part of Vancouver where they live.

What if the death rate increases more rapidly than expected, such as we are currently facing in our nation with Covid-19? 93,000 people have died in the US since March 1st of Covid-19! It is well known that Covid-19 affects a much higher percentage of the elderly citizens who are more likely to be buried than cremated. Covid-19 came along

after the COV made the plans to change the zoning of some of the cemetery space to multi family housing. As you can see, COV can not predict the future based on the past, even recent past. Furthermore, trends change just as fashion changes and often recycles back. I suggest COV take a pause on moving forward with the development on the former Park Hill cemetery property, and re-evaluate and look at options for developing new cemeteries within the City of Vancouver before taking action.

Finally, I do think a cemetery is a sacred place to most and has been so for generations. To have people use a cemetery and refer it as a park, and to incorporate it into a residential neighborhood, seems not only incongruent but disrespectful. If the Heights Plan with multi-family housing does move forward at the former cemetery portion, please share how you will address the concern about maintaining Park Hill Cemetery in a respectful manner.

D 4. Building Height:

After hearing testimony at City Council meetings of the neighbors adjacent to the new schools being built, I am concerned about the building height causing shadows. Additionally, I have been concerned about the loss of an open skyline. The new schools are only 2-3 stories high so the impact is going to be greater with 4-6 stories high. The open skyline is one of the natural and wonderful elements in this area, and until the past few years, most of Vancouver. I hate to lose open views of the sky when you look horizontally, without the need to crane your neck to look up perpendicular. Sunlight, open space and sky have a positive impact on overall health, mentally and physically. It is nature's gift and a valued benefit to most.

Another question I have is why the plan is to go 4-6 stories high, when many of the new multi-housing buildings near Uptown and the Downtown Mill Plain area or Evergreen Blvd are only 3-4 stories high. Why must COV build taller buildings in the Heights? I know the answer to building height is likely tax revenue since the COV or a developer needs enough units to make the revenue exceed the cost of the project and meet the investment goal. Is tax revenue the primary reason for the building height? If so, please be direct and just say so.

E 5. Financial Analysis: Cost Breakdown

I have wondered for many months about the financial details. It is not spelled out in any detail in the DEIS. I was told once that it was being worked on and would be presented in Jan/Feb 2020 at a City Council meeting or workshop, but I did not ever hear or see any budget or details. Please share specific line items in the Heights Plan proposed budget, even if it is general categories such as buildings, streets, infrastructure, and landscaping. Who is paying for what, COV or the developer? Who owns what and how is the income/revenue divided between the COV and building contractors?

F 6. Home Ownership vs. Renting

I am pleased to read that the COV has heard a call for more home ownership opportunities in the new Heights Plan. Home ownership benefits and adds stability to the homeowner and neighborhoods. Win-win. Please share some details on how many more units are now designated for home ownership compared to the original plan.

Furthermore, I would like details on how the COV plans to look for additional opportunities and partnership programs to assist greater numbers of our new neighbors becoming home owners vs. renters. Habitat for Humanity homes were recently built in Father Blanchet neighborhood. Are there other programs that would fit into the Heights Plan to assist in home ownership? Specifically, has COV explored looking for programs that would assist with down payments, as this is often the key factor that prevents even middle class working families from becoming home owners?

G 7. Senior Housing and Needs:

Please give more specifics on the number of units being considered for senior housing. This is the type of housing that the current neighborhoods have indicated is most needed. It is very interesting to note that in Heights Plan documents, seniors are the age group mostly likely to move to Vancouver. I have not heard this age group featured as much in community presentations. They should be given more consideration. Seniors have somewhat different needs and interests so how are those being specifically incorporated into the Heights Plan with regard to safety features, accessibility, amenities, and design of the units and the overall plan? Note that I am not primarily referring to being ADA accessible, but multiple facets.

Of course one of the biggest concerns that has been voiced by many, including in the presentations or open houses is the likely increase in property taxes and the impact it will have on senior neighbors with fixed incomes who may be priced out of their homes. It is clear many may not qualify for tax deferral programs, but just miss the cut off income wise, and therefore be forced to sell before they wish and lose their long time home. What other options besides the tax deferral program can COV offer so this does not occur?

H 8. Fiscal Responsibility: Economic Changes and Potential Overbuilding

Firstly, Covid-19 has clearly impacted the economy. Obviously no one yet understands and sees the full impact, nor will we for awhile. How is COV addressing this unforeseen economic downturn going forward with the Heights Plan? I know it may take time to address this topic, but think it must be considered as well as any other economic changes that may occur in the next few years.

Covid-19 is only one illustration of a major economic downturn. Many of us recall the recession in 2008-2009 which took years of recovery. What is the contingency plan for the Heights Plan for dealing with these changes in the economy over the 20 year build

out as there are bound to be some? Wise investors plan ahead to weather the inevitable economic storms of the future. Public tax payer funds are being used in this project and as stakeholders, we ought to know the contingency plans City planners have in place. We don't want to end up with large numbers of vacancies in the future causing financial losses to the COV and then be passed on to the tax payers. Tax payers may potentially suffer from budget cuts or have their taxes raised.

Secondly, I became baffled in Jan/Feb 2020 when I started hearing in multiple public meetings the number of units in the "pipeline" in Vancouver. This number varied depending on who was sharing it: the mayor, a City Council member, a city planner, etc., but ranged from approx. 6K-8K units. When I asked how long it would take to build these units, I was informed most would be built within the year or a year and a half. Even with some delays, you could expect the current units in the pipeline to be built in 2 years. I was also told to keep in mind new units are always being added to the pipeline. As stated in the Heights Plan and in public meetings, the number of new housing units needed per year is approx. 2K. In the EIS the number is lower if you look at pg. 34. It states citywide population increase is expected to be 40,095 over 19 years from 2011-2030, which is 2,110 new residents/year. Each new resident would not need their own housing unit. Why is COV potentially overbuilding? Wouldn't this contribute to a higher vacancy rate? Won't this have a negative impact on our economy and reduce the tax gains? Please address the financial implications of the higher rate of units being built vs the projected need.

9. Covid-19 Public Health Implications:

Again, this is a new and unexpected change with unknown future health implications. However, it is here. It is a fact that Covid-19 is more prevalent in higher density communities and a much higher risk of serious illness and death for seniors. Given these two facts, what plans will COV be considering to address these new and potentially life threatening concerns in high density housing pockets of Vancouver?

10. Progress Reports on Mitigation Measures:

How will the public be kept informed of mitigation measures put in place? What agency oversees required mitigation is done and done properly? Is it a third party or does COV oversee itself? If the latter, how will COV avoid a conflict of interest? Are there any inspection reports and documentation required that will be shared with the public throughout the construction process?

In conclusion, thank you in advance for your time to respond. It is respectful and good to include the community in working together on the Heights Plan as it impacts all of us in the Heights area neighborhoods, many of whom have lived here for decades.

Kindly,

Sandy Gales

## Response to Email Comment 26 – Sandy Gales

### Response to Comment 26A

See standard response 4 related to police and fires service delivery.

Regarding police staffing, the Community Resource Team that was activated in 2015/2016 helped to develop a staffing plan looking forward to 2020. This staffing plan included Police Service Technicians) as well as sworn officers. As the City progress into the next biennium, VPD will continue to assess staffing needs and hire as the Department is able. VPD takes pride in the selection process for hiring new and lateral-entry officers. The process is slow by design to allow background investigators ample time to thoroughly examine each candidate. It is a process that has resulted in the selection of highly qualified officers to serve the community, and one the Department cannot afford to compromise for the sake of expediency.

Circumstances beyond the Department and City's control have limited police academy class sizes. Getting student officers into the Police Academy can take months after they are hired. To mitigate this, VPD hires a mix of lateral and new officers. Lateral officers are deployable to the street in a relatively short amount of time as they have already attended an academy.

To handle lower level calls, VPD has expanded use of Police Service Technicians. These personnel respond to calls that don't require the presence of an officer – often "cold" calls where there is little or no suspect information. Appropriately utilizing our Police Service Technicians has provided relief to our sworn officers, enabling them to focus on being proactive and responding to higher priority calls for service.

Our Neighbors On Watch (NOW) volunteer team has over 125 volunteers. They are a valuable resource in maintaining community visibility and being an extra set of eyes to assist in reporting crime, deterring crime by their presence, and patrolling in commercial/retail areas.

The Department has the flexibility to adjust its resources to meet the needs of the growing community. The projected increases in population will drive VPD to continue analysis of crime and allocation of personnel.

### Response to Comment 26B

The majority of the Park Hill Cemetery parcel will remain undisturbed as a result of development envisioned in the Heights District Plan. The parcel of land that includes the cemetery is over 50 acres with approximately 42.9 acres used for the cemetery. This acreage will remain as a cemetery and existing vegetation will be retained. The cemetery parcel also includes the Vanco Golf Range, which is proposed for redevelopment in the Heights District Plan.

### Response to Comment 26C

The parcel of land that includes the cemetery is over 50 acres with approximately 42.9 acres used for the cemetery. The 42.9 acres will remain as a cemetery for existing and new interments and has additional capacity for an estimated 80 years. Improved connections to the cemetery and improvements to the internal roadway network are proposed to promote passive recreation while respecting the cemetery's primary function as a resting place and burial ground. The cemetery parcel also includes the Vanco Golf Range, which is proposed for redevelopment in the Heights District Plan.

### Response to Comment 26D

See standard response 7 related to building heights. The proposed maximum building height is based on the height required to achieve the proposed land use (residential, commercial, and office) capacity, as well as based on input received from the public, Heights CAC, and local developers through the planning process.

### Response to Comment 26E

Cost estimates for changes to existing and proposed streets and public spaces is included in the Fiscal Impact Analysis (Appendix K to the Heights District Plan). The funding source for future projects included in the Heights District Plan will depend on the specific project. Private developers will be responsible for public improvements in conjunction with individual developments and the City intends to fund key public infrastructure such as certain internal streets and public spaces, including parks. The EIS also identifies some utility infrastructure improvements that the City will be responsible for (such as the water transmission line in Blandford Drive) that will be needed to address existing system deficiencies, regardless of development of the Heights District. These improvements will be funded through existing utility funds.

Funding for transportation-related improvements for new internal streets and adjacent arterial streets will likely be from a combination of sources, including private developers through construction of required improvements and through the payment of development impact fees, as well as some City-funded improvements and funding through state and federal grants if awarded.

Buildings will be paid for by private development entities. Publicly owned facilities will require some public investment, which will also be determined in a future phase of implementation.

In addition, public parks and open spaces and infrastructure investments that cannot be tied to specific developments will require some level public funding. Funding sources for these improvements will be identified through the implementation process.

### Response to Comment 26F

The Heights District Plan does not provide a specific goal for home ownership and the City cannot regulate ownership. The plan establishes policies that are meant to encourage the development of a variety of housing types that provide rental and ownership opportunities. Specifically, townhouse-type residences (attached, on individual lots) are one type of housing that is envisioned by the plan. The City does not currently have any program that can provide down payment assistance, but the City's multi-family tax exemption program could, if extended to the redevelopment area, be used to reduce property taxes on multi-family residences (including condominiums) for 8-10 years.

The City can encourage home ownership opportunities through the selection of development partners and projects that add home ownership products to the Heights District. Policy recommendations in the Heights District Plan related to homeownership goals and attainable housing, as well as public-private partnerships, provide guidance on this topic (see Equity, Jobs, and Housing policies in the plan).

### Response to Comment 26G

The Heights District Plan does not provide a specific goal for senior housing. The plan establishes policies that are meant to encourage the development of a variety of housing types, including housing to support the unique needs of seniors.

The City can support the development of senior housing opportunities through the selection of development partners and projects that add senior housing options the Heights. Policy recommendations in the plan related to income-based housing, senior housing and attainable housing provide guidance on this.

The Heights District Plan would not require specific tax increases in order for the vision to be implemented, but new development would incrementally increase the City's overall tax base. Taxes are based on property value and levy rates and the plan does not include actions that directly impact either.

### Response to Comment 26H

The Heights District Plan planning process has been underway since April of 2018. Budgeting and funding required to complete the plan have already taken place and no additional funding or City revenue is required to adopt the Heights District Plan. The infrastructure improvements included in the Heights District Plan and identified as mitigation measures in the EIS will be included in the City's Capital Improvement Plan and will be considered in future budget discussions by City Council. Although individual developments will be responsible for public improvements, the City intends to fund key public infrastructure such as certain internal streets and public spaces, including parks. The economic impacts of COVID-19 are unknown at this time. Depending on the economic effects, the Heights District may take longer than 20 years or more to build out. As with all long-range planning documents in the City, the City will continue to monitor the implementation of the Heights District Plan and could make adjustments in the future if warranted.

The market analysis prepared for the Heights District Plan (Appendix D to the plan) indicates a residential vacancy rate in the City of approximately 5 percent. The analysis further indicates that over the last decade the vacancy rate has been decreasing as rent prices have been increasing, which can indicate a constrained housing market and rising housing costs. The number of residential units proposed throughout the City is largely determined by private development and the real estate market. If recent trends continue, additional housing will continue to be needed to meet population projections and keep housing prices affordable. However, the pace at which these units are added will depend on market factors and could potentially be slowed due to an economic downturn as a result of COVID-19.

### Response to Comment 26I

The City will continue to monitor and consider recommendations from public health officials related to COVID-19. If at any time, public health recommendations warrant a change in the policy recommendations included in the Heights District Plan, the City can amend the plan through the text and map amendment procedures described in VMC 20.285. Current recommended best practices by health officials apply equally to groups and individuals whether they live in high- or low-density residential communities and, as evidenced by the effective control of COVID-19 in many highly populated countries and cities, density is not necessarily a good predictor of how the virus will spread.

### Response to Comment 26J

The mitigation measures included in the EIS will be specified in a planned action ordinance following adoption of the Heights District Plan. The planned action ordinance will specify the mitigation required by future development and those measures will be reviewed and implemented as part of development review applications for future development proposals in the District. Development review procedures, including provisions for public notice are included in VMC, Title 20, Land Use and Development Code. Additionally, mitigation measures related to the adoption of new codes or standards and amendments to existing policy documents will occur in accordance with the provisions in VMC 20.285, Text and Map Amendments, including opportunities for public input and public hearing requirements.

## Email Comment 27

**From:** Sandi McClary [redacted]
**Sent:** Wednesday, May 20, 2020 5:01 PM
**To:** Kennedy, Rebecca
**Subject:** EIS Comments for Heights Project

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Comments on the EIS for Heights District

A 1. Potential traffic continues to be an unresolved issue in the EIS, even after being raised as a concern numerous times in the Citizens Advisory Committee. Of course, traffic is not at capacity now. We have not added over 4000 new residents. "No avoidable adverse impacts" based on a current study is insufficient information to appease our concerns that our adjoining neighborhoods will not be impacted by "cut through" traffic as well as gridlock on MacArthur.

B 2. The cost of developing a sufficient water supply for the new development is concerning. How will this affect the taxes of those Vancouver taxpayers not living in the Heights redevelopment area? The EIS does not contain sufficient information that the water mitigation plan will be workable.

C 3. Most important of all, the impact of urban density on human health is painfully obvious through the spread of Covid-19. Adding a dense housing area is the exact opposite of a sensible idea. Those in surrounding areas will be adversely affected by this density being imposed upon us.

Sandi McClary
[redacted]

## Response to Email Comment 27 – Sandi McClary

### Response to Comment 27A

The traffic analysis in the EIS is based on the projected buildout of the District and considered the additional residents proposed in the Heights District Plan (Project Alternative).

### Response to Comment 27B

As noted in the EIS in the Water Service section (beginning on page 73), the City of Vancouver water utility currently has adequate water supply available to support development in the Heights District without additional capital investment. However, onsite water infrastructure improvements will be required to serve future development.

Water service infrastructure to support future development is typically installed by developers at their expense. Additionally, new water service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader City system (source, supply, and storage capacities). The EIS identifies some infrastructure improvements (such as the transmission line in Blandford Drive) that are required to address existing system deficiencies, regardless of development of the Heights District. These improvements will not be developer funded and will be funded through existing utility funds which is an enterprise fund. Enterprise funds are funds that are supported in general by users of the service. Therefore, the majority of costs associated with improvements not tied to future development are supported by utility rate payers. Water utility infrastructure is not paid for by taxes.

### Response to Comment 27C

Comment noted.

## Email Comment 28

**From:** Jack McClary [redacted]
**Sent:** Wednesday, May 20, 2020 4:38 PM
**To:** Kennedy, Rebecca
**Subject:** Heights District EIS comments

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Comments for the Heights District Plan

A 1800 units can result in as many as 2700 cars, (at 1.5 cars /unit). Parking has not been clearly defined and designated at the housing property. Area home owners are very concerned that their streets will become the parking site for these cars. No sidewalks are available in this area so school children will be forced to walk well out in the traffic area of the street at great risk to their lives.

B The increase in population will put great pressure on playgrounds and parks.
Restrooms at these parks does not exist and no plans are provided for addition of restrooms to these areas.

C Water pressure variance is not adequately expanded to cover the 1800 added units.

D Sewer size of existing area infrastructure put in before WW II is not adequate to handle 1800 more living units.

Jack McClary
[redacted]

## Response to Email Comment 28 – Jack McClary

### Response to Comment 28A

See standard response 6 related to parking.

### Response to Comment 28B

Mitigation measures to offset potential impacts to parks are identified on pages 89 and 90 of the EIS. Measures include a series of small pocket parks to support age-appropriate play areas, integrated into the residential areas of the Heights District.

Regarding the provision for public restrooms, the park facilities included in the Heights District Plan have different classifications based on standards included in the City's Comprehensive Parks, Recreation, and Natural Areas Plan (Parks Plan) (see Table 39 on page 88 of the EIS). The Civic Park would be classified as a special use facility, which may include public restrooms. The Neighborhood Park would be classified as a neighborhood park, which do not typically have public restrooms. The other open spaces included in the Heights District Plan (small pocket parks to serve residential areas and linear parks and greenways) would provide open space amenities in the Heights District, but would not be classified as a community park, neighborhood park, or special facility (as outlined in the Parks Plan) and are not anticipated to have public restrooms.

### Response to Comment 28C

The EIS identifies water infrastructure improvements to support development proposed under the Project Alternative. These improvements include projects identified in the City's water system plan to address pressure deficiencies and balance system pressures regardless of development of the Heights District. Water mains servicing the Heights District are adequately sized to support a development of this magnitude without a noticeable impact to system pressures. See the Water Service section of the EIS beginning on page 73.

### Response to Comment 28D

The EIS identifies sewer infrastructure improvements to support development proposed under the Project Alternative. See the Sewer section of the EIS beginning on page 75.

## Email Comment 29

**From:** [redacted]
**Sent:** Wednesday, May 20, 2020 11:58 PM
**To:** heightsdistrictcoalition@gmail.com; Kennedy, Rebecca
**Subject:** Heights Project

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

We have lived here in the Heights for over 60 years and have seen lots of change some for better some not so good. Change is usually good only when done correctly and hopefully for the benefit of all involved. We were happy that the city bought the old Tower Mall property until we all heard and saw the city's plan for it. The parking, the traffic, adding parking along Mill Plain Blvd. & Macarthur Blvd and the 3 story buildings in the neighborhood? This is the city we all love but you have failed us on a few fronts to name a few, The Navigation Center, West side mobility project or New I-5 Bridge; We have attended several town hall meetings, Church meetings, neighborhood meetings and City Hall meetings. From the beginning, the City's efforts to inform all neighbors involved was minimal to say the least. We have been restricted as of late in voicing our opinions due to this very unexpected quarantine. This seems like another agenda that has good intensions but when we as a united community (Heights Coalition) plus all of our neighbors have serious concerns you should listen to us and not turn our beautiful neighborhoods into Portland? We ask that the City postpone the decisions on this project for 1 year. Not exactly sure where they will find investors after this Covid 19 experience?

Bobby Roberts
[redacted]

## Response to Email Comment 29 – Bobby Roberts

See standard response 2 related to comment period extensions based on COVID-19.

## Email Comment 30

**From:** Kate Fernald [redacted]
**Sent:** Wednesday, May 20, 2020 9:27 PM
**To:** Kennedy, Rebecca; Eiken, Chad
**Subject:** The Heights District Plan Draft Environmental Impact Statement Commentary



May 20, 2020

Director Chad Eiken
Attn: Rebecca Kennedy
City of Vancouver, Washington

Re: "The Heights District Plan" Draft Environmental Impact Statement Comments

Dear Director Eiken,

We respectfully offer our commentary on "The Heights District Plan" Draft Environmental Impact Statement.

1. Due to the City's projected $30-60 million dollar deficit, the City should postpone any further work on and investment in The Heights District Plan.

A

   a. If postponing further work on The Heights Plan has any tangible, negative impact on the City or its budget, then the FEIS should explain how and why.

   b. Likewise, if continuing with The Heights Plan and adoption of the "Project Alternative" impacts the City's financial revenue, those numbers and an explanations of how and why should be clearly, transparently articulated in the FEIS.

2. The Department should recommend City Council reopen the "Comprehensive Plan: 2011-2030." The Department's intention to reopen and amend the "Comprehensive Plan" is already discussed ("Affected Environment, Impacts, Mitigation" p. 34-35). Because the

B

"Comprehensive Plan" can be reopened and amended, the Department should further recommend City Council do away with designating The Heights as an "urban center." the "Comprehensive Plan's" notion to redefine The Heights' character from "a 'hometown feel' within the big city" (Appendix D P. 110) to an "urban center" is unsupported by current Heights residents, and Stanford's 10 year research study shows mixed-income housing developments that are unsupported by their wealthy, higher-income residents ultimately fail (https://www.gsb.stanford.edu/insights/affordable-housing-good-neighborhood).

C

3. The Department should request City Council to commit to fully funding infrastructure improvements recommended in the DEIS before approval.

D

4. The Department should make safety a key priority by recommending City Council commit to fully funding hiring enough first responders to meet the anticipated population growth before they approve the project.

E

5. If the Department pursues The Heights District Plan regardless of citizen's outcries against it, then we respectfully request the following modifications to the "Project Alternative:"

   a. Further reduce the number of residential units (1340 is not low enough).

   b. Restrict all new housing developments within The Heights boundaries to exclusive use by Vancouver's fastest growing population – people aged 65 and older ("Visioning and Analysis Summary Report" p. 23). Because "growth in the number of seniors will result in demand for housing types specific to seniors, such as . . . age-restricted developments" (p. 23) The Heights Plan should meet and cater to this need.

   c. Modify parking requirements to 2 parking spots per residential unit.

Thank you for your time and thoughtful consideration.

Joe and Kate Fernald
[redacted]

## Response to Email Comment 30 – Joe and Kate Fernald

### Response to Comment 30A

See standard response 9 related to the City's budgeting process.

### Response to Comment 30B

Comment noted.

### Response to Comment 30C

The infrastructure improvements included in the Heights District Plan and identified as mitigation measures in the EIS will be included in the City's Capital Improvement Plan. Improvements identified to support future development are typically installed by developers at their expense. Additionally, new service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system. Infrastructure improvements identified as necessary to support existing City deficiencies (such as a water transmission line in Blandford Drive) would be required regardless of development in the Heights District. These improvements are funded through existing utility funds which is an enterprise fund. Enterprise funds are funds that are supported in general by users of the service. Therefore, the majority of costs are supported by utility rate payers.

In addition, the Implementation Plan section of the Heights District Plan includes a policy about phasing improvements to existing arterial streets to enhance neighborhood livability. The language included in the plan is as follows:

Improvements to existing arterial streets should be phased to reduce congestion impacts and impacts to adjacent neighborhoods. The MacArthur-Lieser-St. Helen's intersection, while not in the District, has a significant impact on the LOS in the District and diversion into neighborhoods, and should be a top priority that is implemented prior to the Andresen roadway retrofit or the installation of a roundabout at the intersection of MacArthur and Andresen. Similarly, the MacArthur/Andresen roundabout and Andresen roadway retrofit should happen concurrently; travel lanes on Andresen should not be reduced until or as part of implementation of the intersection improvements.

Improvements to existing streets and intersections are included in the City's 6-Year Transportation Improvement Program, which prioritizes them for funding and implementation.

### Response to Comment 30D

See standard response 4 related to maintaining response times and service levels for the Vancouver Police and Fire Departments.

### Response to Comment 30E

The City Council will make the final decision on the residential units and mix of development types, as well as the proposed zoning recommended in the Heights District Plan. If the City Council adopts the Heights District Plan with the current recommendations, parking requirements for future development will be codified in the VMC as part of the new HX zone. The development and adoption process for the HX zone standards would occur after adoption of the Heights District Plan as part of the implementation process. This process would involve additional public outreach, including public hearings before the Planning Commission and City County.

Regarding senior housing, the Heights District Plan establishes policies that are meant to encourage the development of a variety of housing types, including housing to support the unique needs of seniors. Much of the Heights District is in private ownership and the City is not able to restrict the type of housing provided on private property as long as it meets the density and development standards of the zoning district.

## Email Comment 31

**From:** Dave Schmoldt [redacted]
**Sent:** Wednesday, May 20, 2020 12:20 PM
**To:** Kennedy, Rebecca
**Cc:** Holmes, Eric; Eiken, Chad
**Subject:** Citizen Response to Draft EIS for the Heights District Plan



Dear Rebecca,

Due to COVID-19, we would have appreciated more time to respond to you on this. We would have liked to have had more possibility of interacting with our neighbors, but given the current comment deadline, here are our comments to the EIS for the Heights District Plan. Please make them part of the permanent record and share with City Planning and City Council. We hope you will find our comments beneficial and actionable in continuing to help refine the Heights District Plan so the future development will be a jewel for the the City of Vancouver and its citizens.

A 1. We support the concept of continuing to increase the desirability of living, working, and recreating in the city of Vancouver.

B 2. We are grateful the city purchased the Tower Mall property and is putting in so much time, effort, and thought into the plan including soliciting substantial community feedback.

C 3. The Promenade concept with a pedestrian/focused greenway through the redevelopment area enabling a "Grand Park" concept sounds very appealing.

D 4. The improvement to the road infrastructure and bicycle paths are most welcome.

E 5. We believe with what we are experiencing with COVID-19 that the plan should be adjusted. Our strong recommendation is the density of the Heights District Plan be reduced and the assumption of reliance on public transportation be eliminated. Increased requirements to HVAC systems be added with enhanced air filtration systems. Additionally, assumptions around retail and restaurant spaces should be determined

after the post-COVID world establishes our new norms.

F 6. The plan should be adjusted to having the maximum height of the development be four stories and still maintaining the stepped down approach next to the current neighborhoods. Most of the photos in the EIS are of three and four story buildings. They look reasonable, but six stories would be too imposing and not fit in with the existing neighborhoods.

G 7. The development needs to keep an aesthetic that goes well with single bedroom communities. We recommend more of a residential look and feel, more like a village.

H 8. The parking assumption for each living unit needs to be two parking spaces with one being covered. Although the City may feel more people should use public transportation, it is just not a preferred choice by its citizens. Now with COVID, it shows that public transportation is not a safe and healthy choice.

I 9. The existing green spaces along MacArthur and the cemetery should not be counted in the calculation for green space and parks for this redevelopment. The redevelopment needs to stand on its own and provide the needed park and recreation space.

J 10. It is not clear what the Innovation Space is for. We recommend the City remove this so you can use the space to reduce the height of the redevelopment structures.

K 11. We request that before proceeding further the City commit to (a) leveling Tower mall (b) obtaining Washington Department of Ecology environmental clearances and (c) construct the infrastructure (MacArthur Blvd, the 'roundabout' at MacArthur and Andresen etc).

L 12. Our final request is that the City find a way through zoning and permitting that the affordable housing not be built first. **Please ensure the high end units are built first**. We do not accept that the City can't control how this redevelopment rolls out. The surrounding communities should not have to accept the possibility that the high end units will never be built. We implore the City to step up to this level of planning and supervision. Please do not solely rely on the opinions of consultants who likely will never live here. Consultants can be wrong and the community should not have to live with their mistakes.

Thank you for your consideration.

Sincerely,

David & Eliana Schmoldt

## Response to Email Comment 31 – David and Eliana Schmoldt

See standard response 2 related to comment period extensions based on COVID-19.

### Response to Comments 31A-D

Comments noted.

### Response to Comment 31E

The City will continue to monitor and consider recommendations from public health officials related to COVID-19. If at any time, public health recommendations warrant a change in the policy recommendations included in the Heights District Plan, the City can amend the plan through the text and map amendment procedures described in VMC 20.285.

### Response to Comment 31F

Comment noted. See standard response 7 related to building heights.

### Response to Comment 31G

Comment noted.

### Response to Comment 31H

The parking standards proposed in the Heights District Plan are in line with what is required in the rest of the City, where parking for multi-family units range from 1 per unit to 1.5 per unit, depending on the location, and 1 per unit for single family houses. This is just the required minimum, and developers can and often do build more parking depending on the population they are targeting. Parking minimums will be codified in the VMC as part of the new HX zone. The public can continue to comment on the parking recommendations included in the Heights District Plan through the plan adoption process. If the plan is adopted, the next

phase of the project is the development of implementation measures, including the HX zone standards, which will require separate Planning Commission and City Council public hearings with additional opportunities for public input. Those hearings are not yet scheduled, but will be advertised per City public notice requirements.

Furthermore, providing a variety of transportation options, including public transportation, will continue to be a priority for the City. Many residents are unable to afford single-occupancy vehicles and the City's transportation system and policies must be equitable for all users. The City will continue to monitor and consider recommendations from public health officials related to COVID-19. If at any time, public health recommendations warrant a change in the policy recommendations included in the Heights District Plan, the City can amend the plan through the text and map amendment procedures described in VMC 20.285 or implement other methods that would apply citywide.

### Response to Comment 31I

The park facilities included in the Heights District Plan have different classifications based on standards included in the City's Comprehensive Parks, Recreation, and Natural Areas Plan (see Table 39 on page 88 of the EIS). The Civic Park would be classified as a special use facility. The Neighborhood Park would be classified as a neighborhood park. The other open spaces included in the Heights District Plan are small pocket parks to serve residential areas and linear parks and greenways, including the MacArthur Greenbelt. These types of open spaces, as well as the existing green spaces in the District such as the Park Hill Cemetery, do not meet specific park classifications identified in the Parks Plan; however, these spaces provide important open space amenities in the Heights District and would support the overall intent of the public realm and open space element of the Heights District Plan to support a variety of community and neighborhood spaces to enrich the quality of life for all residents and visitors. Park impacts associated with the Project Alternative are described in the Parks section of the EIS, beginning on page 77.

### Response to Comment 31J

As described on page 22 of the EIS, the Innovation Hub sub-district is intended to support a variety of uses, such as health care supportive services, office/employment, and live/work units.

### Response to Comment 31K

Comment noted. The demolition of Tower Mall and other existing structures is evaluated in the EIS in the Aesthetics, Light, and Glare section (beginning on page 42) and the Air section (beginning on page 90). The demolition of Tower Mall is required to meet the vision outlined in the Heights District Plan.

Mitigation measures to evaluate the potential for contamination and address cleanup are identified on page 96 of the EIS. A statement indicating cleanup should occur in accordance with Ecology's current guidelines and regulations was added to the mitigation measures on page 96.

The infrastructure improvements included in the Heights District Plan and identified as mitigation measures in the EIS will be included in the City's Capital Improvement Plan.

### Response to Comment 31L

The EIS does not address housing affordability as this is not an element of the environment requiring analysis under SEPA. The City cannot regulate the type of housing constructed as long as the housing meets the density and development standards of the zoning district. The timing and type of development in the District will be determined in coordination with private developers. It is not yet known what the first phase of development in the District will be. Furthermore, the City is committed to providing a variety of housing that is affordable to community members of all income ranges within the Heights and throughout the City and would support affordable housing during any phase of development in the Heights District.

## Survey Form Comments

*The following comments were submitted through an online survey form.*

### Survey Comment 1

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, January 22, 2020 6:36:54 PM
**Last Modified:** Wednesday, January 22, 2020 7:23:34 PM
**Time Spent:** 00:46:39
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Typo on page 38. The picture captions are transposed. We are very concerned about the impact this plan might have on our beloved neighborhood, Dubois Park. I haven't proofed your whole report but I pray the city does a better job of "planning" this project than it does with their proofing public-facing material. Good grief!

### Response to Survey Comment 1

Comment noted. The figure titles have been corrected in the FEIS.

## Survey Comment 2

**Collector:** Web Link 1 (Web Link)
**Started:** Thursday, January 23, 2020 8:09:58 AM
**Last Modified:** Thursday, January 23, 2020 8:16:46 AM
**Time Spent:** 00:06:47
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I am concerned about the management of traffic flow. I live on a dead end street off of Lieser Rd. between Middle Way and SR-14, and it is currently difficult for me to leave my street because of a steady stream of cars going down Lieser hill at 40 mph (speed limit is 25). Lieser would be one of the roads impacted by more traffic from the development as it would be the primary access to SR-14 eastbound to the I-205 bridge and east Portland. Douglas Myerst is difficult

## Response to Survey Comment 2

The transportation impact analysis for the Heights District Plan (Appendix F to the EIS) did not indicate a significant increase in traffic on Lieser as a result of the Project Alternative. The traffic analysis included study of the Mill Plain/Lieser and MacArthur/Lieser intersections. Increases in traffic volumes in 2038 for the Heights District Plan compared to increases in volumes that would occur without the plan are noted below.

- Mill Plain (eastbound) turning south on Lieser: increase of 12 AM trips and 6 PM trips
- MacArthur (eastbound) turning south on Lieser: increase of 17 AM trips and 13 PM trips

For additional details, see the Transportation section of the EIS, beginning on page 50, and Appendix F to the EIS.

## Survey Comment 3

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, January 29, 2020 10:38:40 PM
**Last Modified:** Wednesday, January 29, 2020 10:44:29 PM
**Time Spent:** 00:05:49
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Reduce N Andresen Road to one travel lane in each direction from just south of the Mill Plain Boulevard intersection to Highland Drive with protected bike facilities. I'm concerned that this suggestion doesn't take into account traffic and parking at St. Joseph Church and School. Would turn lanes (like the right turn lane in front of Marshall Elementary on MacArthur) be added in front of the church? Currently it can get quite congested at school drop off and pick up times and just before and just after mass times, but the traffic flow is minimally affected because of the road being two lanes in each direction. There is also plenty of room for on street parking on both sides of Andresen (and that is frequently used during masses) that it is unclear whether it would remain once the bike lanes are added.

## Response to Survey Comment 3

Design details such as turn lanes, bike lanes, on-street parking, and other elements will be considered during the design phase of the specific improvement to implement this element of the Heights District Plan. Parking, bike lanes, and turn lanes may or may not be included depending on the availability of right-of-way and traffic characteristics. A separate public outreach process from the Heights District Plan will be held before any improvements are made. The City will work with adjacent property owners to understand and address potential impacts during the design phase for this project.

## Survey Comment 4

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, February 03, 2020 8:16:16 PM |
| **Last Modified:** | Monday, February 03, 2020 8:18:03 PM |
| **Time Spent:** | 00:01:46 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I am in support of the whole project. Some of my neighbors are not respecting personal property rights and are trying to take a property owners ability to do what they will with their property.

## Response to Survey Comment 4

Comment noted.

## Survey Comment 5

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, February 05, 2020 9:00:30 AM
**Last Modified:** Wednesday, February 05, 2020 9:00:40 AM
**Time Spent:** 00:00:10
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

The Vancouver Heights United Methodist Church on MacArthur and Devine should only be zoned for residential or church uses. A common sense view of the map shows it is in a residential only neighborhood in a way the rest of the project is not. In a larger view, studies of comparable projects should be done to analyze the crime impact of this project.

## Response to Survey Comment 5

The church properties have been removed from the rezone area included in the Heights District Plan. See standard response 3. Regarding the comment on crime impact, crime is not an element of the environment that requires analysis under SEPA and is therefore not evaluated in the EIS.

## Survey Comment 6

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, February 05, 2020 9:01:22 AM |
| **Last Modified:** | Wednesday, February 05, 2020 9:07:21 AM |
| **Time Spent:** | 00:05:59 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I live in the area and am opposed to this plan. I think the height of the buildings is out of scale for the area. In addition, I'd like to see the Methodist church taken out of the rezoning as it adds a lot to the neighborhood. Finally, I feel that Vanco Golfs is so very important to the city and neighborhood that it saddens me greatly that it will be lost. It is a greenspace, a gathering place and an offline activity all of which are becoming lost in this day and age. Please let it stay and give kids and adults somewhere to go and be active.

## Response to Survey Comment 6

See standard responses 3 and 7 that address church rezoning and building height respectively. Regarding Vanco Golf Range, the City approved an extension to the lease allowing for the driving range to continue for up to five additional years. However, the Heights District Plan, if implemented, does not reflect continuing use of this City-owned property for a driving range. Open space amenities included in the Heights District Plan are outlined in the Parks section of the EIS, beginning on page 77.

## Survey Comment 7

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, February 05, 2020 9:34:01 AM
**Last Modified:** Wednesday, February 05, 2020 9:37:12 AM
**Time Spent:** 00:03:10
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

We are residents of Father Blanchet neighborhood and are very concerned about the spillover effect of traffic coming down Corrigedor/Maple trying to get to Leiser/HWY 14. It's already BAD, people speeding, not paying attention. Someone is going to get hurt or killed. What is the plan to mitigate this? We don't see much about it in the EIS. Also, we support a longterm solution that enables the driving range to remain in business on the city property. Thank you.

## Response to Survey Comment 7

The analysis of traffic conditions completed for the project assumes completion of various improvements that are intended to improve traffic conditions within the district boundary and surrounding areas. These improvements include installing a signal at the intersection of MacArthur Boulevard and Lieser Road, which is an existing bottleneck in the transportation system. Improving the efficiency of this intersection will reduce existing congestion during the busiest times, improve the intersection's overall performance, and reduce the amount of traffic that diverts from this location to other streets due to congestion. Improving traffic efficiency throughout the district boundary and surrounding areas is intended to prevent traffic from diverting onto neighborhood streets.

The Heights District Plan includes a policy for monitoring neighborhood streets, evaluating traffic volumes and speeds on an annual basis, and prioritizing improvements needed to address increased traffic (see Heights District Plan, page 25, C-11). These efforts are also addressed in the Implementation Strategy outlined in the plan document (page 79). This analysis will be completed in coordination with the City's Neighborhood Traffic Calming Program and Pavement Management Program. The implementation strategy specifically calls for evaluating existing traffic speeds and volumes, measuring changes over time, and developing standards for when improvements to reduce and/or calm traffic will be implemented.

Regarding Vanco Golf Range, the City approved an extension to the lease allowing for the driving range to continue for up to five additional years. However, the Heights District Plan, if implemented does not reflect continuing use of this City-owned property for a driving range.

## Survey Comment 8

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, February 11, 2020 3:11:46 PM |
| **Last Modified:** | Tuesday, February 11, 2020 3:13:58 PM |
| **Time Spent:** | 00:02:12 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Build it! We need more density to accomodate population growth. Mixed use limits traffic by putting people near jobs and shops. The only way this could be better is if it included light rail between the development, downtown Vancouver and Portland

## Response to Survey Comment 8

Comment noted.

## Survey Comment 9

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, February 11, 2020 11:20:54 PM |
| **Last Modified:** | Tuesday, February 11, 2020 11:31:35 PM |
| **Time Spent:** | 00:10:40 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

The initial planning stage must have considered the reaction of the church members upon realizing their houses of worship would be taken away. There must be some flexibility in the plan to allow some or all of these churches to remain in place.

## Response to Survey Comment 9

The Heights District Plan does not propose the removal of the houses of worship included in the District boundary. These properties were initially included in the plan area proposed for rezoning; however, the church properties have been removed from the rezone area included in the Heights District Plan. See standard response 3 for additional details.

## Survey Comment 10

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, February 12, 2020 10:58:30 AM |
| **Last Modified:** | Wednesday, February 12, 2020 11:00:14 AM |
| **Time Spent:** | 00:01:43 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I am concerned about 2 items: adequate parking for cars for residential and commercial development that avoids spillover to adjacent areas and the impacts of the planned densification on adjacent properties and quality of life.

## Response to Survey Comment 10

See standard response 6 related to spillover parking. Impacts associated with increased density are addressed throughout Chapter 3 of the EIS.

## Survey Comment 11

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, February 13, 2020 12:19:59 PM |
| **Last Modified:** | Thursday, February 13, 2020 12:20:58 PM |
| **Time Spent:** | 00:00:59 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

32 days is not enough time to review this 504 page document.

## Response to Survey Comment 11

The comment period was extended to May 20, 2020. See standard response 1 related to comment period extensions.

## Survey Comment 12

**Collector:** Web Link 1 (Web Link)
**Started:** Saturday, February 15, 2020 3:05:49 PM
**Last Modified:** Saturday, February 15, 2020 3:07:45 PM
**Time Spent:** 00:01:55
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Close attention needs to be paid to the traffic impact. There are several schools in the Heights District and the traffic load will make their journey to and from school very hazardous.

## Response to Survey Comment 12

Comment noted. Traffic impacts and proposed improvements under the Project Alternative are detailed in the Transportation section in Chapter 3 of the EIS. Transportation improvements in the Project Alternative include new crosswalks, sidewalks, and multimodal infrastructure to improve safety and connectivity throughout the District, including to/from the existing schools.

## Survey Comment 13

**Collector:** Web Link 1 (Web Link)
**Started:** Saturday, February 15, 2020 3:10:22 PM
**Last Modified:** Saturday, February 15, 2020 3:16:30 PM
**Time Spent:** 00:06:07
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

A 1. The "comment period" needs to be extended for at least 60 days.. February 23 is an unreasonably short time for review.

B 2. The "zoning changes" proposed the Planning Commission are premature. Zoning should not be changed until the "plan" is finished.

C 3. The DEIS impacts are significant and adverse in a legal sense and a "finding of no significant impact" is not warranted. I will submit additional comments in writing. But in the interim I agree with the public comments offered at the Planning Commission hearing.

## Response to Survey Comment 13

### Response to Comment 13A

The comment period was extended to May 20, 2020. Additional details are provided in standard response 1.

### Response to Comment 13B

The EIS must consider proposed zone changes included within the plan in order to assess potential impacts that could result from those zone changes. The zone changes evaluated in the EIS have been identified as a measure necessary to implement the Heights District Plan. The City Council, as the ultimate decision maker for the plan, will make a final decision on the plan and any implementation measures.

### Response to Comment 13C

Comment noted. A more specific response cannot be provided as no details were provided in the comment as to how the impacts noted in the EIS for the Project Alternative would meet the definition of "significant and adverse" as defined in the SEPA rules (WAC 197-11-794).

## Survey Comment 14

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, February 19, 2020 4:24:11 PM |
| **Last Modified:** | Wednesday, February 19, 2020 4:29:24 PM |
| **Time Spent:** | 00:05:12 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I am in favor of the plans I've seen. I would like a variety of housing - low to high income, similar to New Columbia in Portland just south of the sewer park. Green space with shade, plaza space WITHOUT vehicle traffic, benches to sit (although I realize there are some impacts with benches), walkable, bikable with some retail and services. A 20 minute neighborhood if at all possible for the space and those living around it. I think the churches would like to stay. I don't go to church, but if they want to stay, it would be good to let them unless there are impacts that really outweigh their history here.

## Response to Survey Comment 14

The City is committed to ensuring a diversity of housing types across the City, including in the Heights District. Several City policies relevant to your comments directly informed the Heights District Plan, including:

- **2016-21 Strategic Plan Goal 1: Develop and maintain a safe, balanced and innovative transportation system that will meet the needs of future generations.**
- **2016-21 Strategic Plan Goal 6: Facilitate the creation of neighborhoods where residents can walk and bike to essential services and amenities.**
- **2016-21 Strategic Plan Goal 8: Strengthen commercial, retail and community districts throughout the City.**
- **2016 Affordable Housing Task Force Recommendations, including addressing the lack of affordable housing as well as long-term housing supply issues.**
- **Complete Streets Policy: directs the City to develop a safe and accessible street system that benefits all users of all ages and abilities, regardless of how they choose to travel.**

Regarding the church properties, see standard response 3.

## Survey Comment 15

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, February 19, 2020 9:54:51 AM
**Last Modified:** Thursday, February 20, 2020 2:40:32 PM
**Time Spent:** Over a day
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

It looks like someone copy and pasted a lot of text into a template without much real work being done here. The fact that the document title is still "STYLE TEMPLATE - " sort of gives that away. That said you're adding a lot of housing and saying there is no impact to the schools where were scoped to only cover growth based on current housing not adding net new. There is no way we don't have an overcrowding problem in the brand new schools after we add new housing. Please actually provide the data rather than copy/paste.

## Response to Survey Comment 15

Impacts to schools, including the anticipated number of students, are detailed on page 73 of the EIS. Current and projected enrollment and school capacity is outlined in Tables 31 and 32 on page 72 of the EIS. Mitigation measures to address impacts to schools are included on page 73 of the EIS. Additional information provided in standard response 10, related to school impacts.

Regarding the comment on "STYLE TEMPLATE", staff could not find reference to this language in the EIS PDF document. Furthermore, this language is related to document properties and is not reflective of the project-specific analysis completed for the EIS.

## Survey Comment 16

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, March 02, 2020 11:06:04 AM |
| **Last Modified:** | Monday, March 02, 2020 11:26:32 AM |
| **Time Spent:** | 00:20:27 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

My home is in a residential neighborhood: [redacted] We face south and currently look at an open grassy park area with fire station in distance. I understand that whole space is to be redeveloped. My demand is that home that are built across from us on Idaho street are also single family residences to continue that neighborhood feel. Not multi family. Idaho Street is is residential neighborhood. It should continue to feel residential as I look out my window and sit on my front porch.

## Response to Survey Comment 16

Comment noted. The area south of Idaho Street within the Heights District is in the District Gateway sub-district. The new HX zone will include development standards for the District Gateway sub-district to address compatibility with existing single-family residential neighborhoods.

## Survey Comment 17

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 03, 2020 8:12:01 AM |
| **Last Modified:** | Tuesday, March 03, 2020 8:20:33 AM |
| **Time Spent:** | 00:08:32 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I love the idea of roundabouts on the two proposed streets. I'm concerned about the added stress to our neighborhood streets, schools, police and firefighters. How will this impact response time for our first responders? Do you have enough police to adequately meet the current needs of our area, let alone add more residents? Traffic on Mill Plain, as you go East can be very busy. What changes are you going to make to not slow down traffic time as it is? I live in the Father Blanchet neighborhood.

## Response to Survey Comment 17

Roundabouts will be designed to ensure emergency services can use them in a safe and efficient manner. There are roundabouts in several locations around the City that provide sufficient space and are designed to ensure emergency services can still access and respond to issues within neighborhoods.

The Heights District Plan includes recommendations for a variety of transportation system improvements that will address increased traffic generated by new development as well as existing congestion issues, including:

- **Roundabouts at MacArthur and Andresen and MacArthur and Devine**
- **A new traffic signal at the MacArthur /Lieser/St. Helens intersection**
- **Improving signal timing along Mill Plain Boulevard and at the intersection of Andresen Road and 18th Street**

In addition to addressing congestion, roadway improvements are proposed for Mill Plain, Andresen, Devine, and MacArthur that will provide safer, more comfortable options for people walking, biking, and rolling. These improvements will also modify the street design to reduce traffic speeds by narrowing travel lanes (Mill Plain and MacArthur) and reducing the number of travel lanes (Andresen). Other safety improvements to existing streets will include new and improved crossings at intersections to increase safety for people walking and rolling. Policy recommendations in the plan (see plan policy C-10 and the Neighborhood Traffic Impacts Implementation Strategy) call for limiting vehicle access from the new development to existing neighborhoods in order to maintain the character and safety of these areas, monitoring neighborhood streets for any changes in traffic volumes and speeds as development occurs, and addressing any traffic safety issues through traffic calming and other design improvements if challenges emerge. The forthcoming Mill Plain Bus Rapid Transit line will also provide frequent transit service connecting the Heights to major employment centers in Downtown Vancouver and Columbia Tech Center (CTC) in east Vancouver, including the Clark College CTC campus.

Impacts to traffic, schools, and public services are addressed in Chapter 3 of the EIS. Regarding police and fire response times, see standard response 4.

## Survey Comment 18

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, March 04, 2020 8:22:17 AM |
| **Last Modified:** | Wednesday, March 04, 2020 8:30:10 AM |
| **Time Spent:** | 00:07:52 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Blandford Canyon is a treasure in this community and will be a major access point to the new complex. I am deeply concerned about the many impacts this plan has on Blandford. I am deeply concerned this impact has not been addressed in the EIS

## Response to Survey Comment 18

Blandford Drive is outside the project boundary and the transportation impact analysis did not identify Blandford Drive as directly impacted by the project. The plan does propose pedestrian and bicycle improvements on Blandford Drive (page 32 of the plan and page 62 of the EIS), which are conceptual and would require additional analysis prior to implementation.

## Survey Comment 19

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Friday, March 06, 2020 11:20:54 AM |
| **Last Modified:** | Friday, March 06, 2020 11:30:35 AM |
| **Time Spent:** | 00:09:40 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I've lived on the Heights for about 50 years. Cramming more homes and a projected 4000 folks in a small space near existing neighborhoods invites more crime, congestion and problems. Consider those neighborhoods with apartments/duplexes near them to observe the impact. We already have issues with people from other areas outside our neighborhood using our park and creating a nuisance by unleashing their dogs, leaving garbage and dog poop behind, as well as two individuals (which I witnessed while walking my dog) urinating on park trees. Traffic, foot and vehicle, in existing neighborhoods will increase. Homes bordering MacArthur will see more problems such as graffiti/vandalism, noise pollution, etc. What makes our neighborhood great (even if there is park issues at times) is the relaxed community feeling that you get in a neighborhood where there is a pride of ownership. An additional four thousand people will whisk away that contentment away fairly quickly.

## Response to Survey Comment 19

Comment noted.

## Survey Comment 20

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|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Saturday, March 07, 2020 11:31:49 AM |
| **Last Modified:** | Saturday, March 07, 2020 11:38:45 AM |
| **Time Spent:** | 00:06:55 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I'm N0T AGREE to build this project. [redacted]

## Response to Survey Comment 20

Comment noted.

## Survey Comment 21

**Collector:** Web Link 1 (Web Link)
**Started:** Sunday, March 08, 2020 11:42:37 AM
**Last Modified:** Sunday, March 08, 2020 11:53:41 AM
**Time Spent:** 00:11:03
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Please know that our short, but soon to be elongated Street, Sleret Avenue is going to be negativity impacted by all the building and infill already happening here! We do not have good response times from the police officers in Vancouver already! We have cars stolen from here AND we often have stolen cars dumped on our street! The drug activity which has happened and we think continues to happen at [redacted] has not been stopped by the Vancouver Police Department. Make sure we have enough officers to respond to this type of activity BEFORE you continue allowing more infill. Thank you for your time!!!!!

## Response to Survey Comment 21

Sleret Avenue is outside the Heights District Plan boundary and no specific changes are proposed to this street as part of the plan. Impacts to police service are addressed in Chapter 3 of the EIS. See standard response 4, related to police response times and service levels.

Additionally, as part of the Neighborhood Police Officers program, the VPD has assigned a police officer to each of the four districts in the City to assist with managing livability issues and chronic criminal activity. Neighborhood Police Officers can assist in developing long-term solutions to neighborhood problems bringing the appropriate police resources to bear. VPD has resolved crime issues associated with particular locations throughout the City.

## Survey Comment 22

COMPLETE

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|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Sunday, March 08, 2020 4:12:29 PM |
| **Last Modified:** | Sunday, March 08, 2020 4:37:13 PM |
| **Time Spent:** | 00:24:43 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

A Pat Freeman 1. I am very concerned about services for all these new residents in the proposed area. Fire and police. We don't have enough support now. Where will funding come from ? The fire station is scheduled to be moved. Where will they be? We are short of police. We will need more services! What's the plan for that?

B 2. Blandford and MacArthur as an entry to the Tower Mall. How will that work? New signal? A two way stop like we have now won't cut it, it doesn't work now. Many people use Blandford as a cut through to Mill Plain.

C 3. Five story buildings are too many people and too high! Our neighborhood is mostly one and two stories, we can't handle that many cars, people, and traffic.

D 4. Changing zoning seems to be disingenuous to all of the residents who have purchased property in this area over the last 50 plus years. They bought anticipating that this would remain a single family community. The biggest rub is to recent residents who bought here because it was single family, one and two level homes, with quiet neighborhoods and traffic that was manageable. Statement to City Council: You as our representatives are asking us to accept a lot of change. Some of it will be helpful to our community, some of it overwhelming. It's Too much change in such a short period of time. People in general have problems with change. When it involves our homes, neighborhoods and ideas of community it's too much. There are so many parts of this town that need help and change you should focus on those areas.

## Response to Survey Comment 22

### Response to Comment 22A

Regarding police and fire response times and service levels, see standard response 4.

Regarding the relocation of Fire Station 3, the VFD recently constructed two new Fire Stations (Fire Station 1 is located at the corner of Main Street and E. Fourth Plain Boulevard.; Fire Station 2 is located on Norris Road just south of Fourth Plain Blvd.). Due to the relocations of these Fire Stations, Fire Station 3 also needs to be relocated in order to ensure optimal spacing between fire stations, which helps ensure equitable response times across the City. The City has not secured a new location for Fire Station 3 at this time, but it will likely be relocated somewhere to the south and east of its current location. Funding to reconstruct Fire Station 3 will be allocated through VFD's capital facilities planning process and come from the City's general fund budget, which supports fire and emergency services. Please note that relocation and reconstruction of Fire Station 3 is not tied to the Heights District Plan; it has been identified as a capital facility need for several years and is required whether or not the Heights District Plan is implemented.

Regarding funding for City services, see standard response 5.

### Response to Comment 22B

The primary motor vehicle entry points to the Redevelopment Area would be Devine Road from Mill Plain Boulevard and MacArthur Boulevard. Based on projected traffic volumes and considering the transportation improvements planned throughout the District, the transportation analysis did not identify new stop control measures as warranted at Blandford Drive and MacArthur Boulevard. Transportation impacts are addressed beginning on page 56 of the EIS.

### Response to Comment 22C

Comment noted.

### Response to Comment 22D

Comment noted. No existing single-family residential neighborhoods are planned for redevelopment in the Heights District Plan.

## Survey Comment 23

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|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 10, 2020 5:35:24 PM |
| **Last Modified:** | Tuesday, March 10, 2020 5:43:48 PM |
| **Time Spent:** | 00:08:23 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Not enough Comercial space in Tower redevelopment. There is really no place to go in the Heights area for restaurants or shopping, let alone walk to. No more than 25% income targeted housing. There is already plenty of low income housing around the area already. Schools start to suffer when you get beyond the 25% mix.

## Response to Survey Comment 23

Comment noted. The amount of commercial space and affordable housing targets planned in the Heights District are based on a market analysis. See Appendix D to the Heights District Plan. The EIS does not set requirements for affordable housing.

## Survey Comment 24

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Tuesday, March 10, 2020 7:30:16 PM |
| **Last Modified:** | Tuesday, March 10, 2020 7:34:49 PM |
| **Time Spent:** | 00:04:32 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

Macurther Blvd. will become a main road with all the influx of people and as a local I want to revive the double lane road as it was before , make a separate single lane for cyclist as the road has width to make it so. Thank you for the consideration

## Response to Survey Comment 24

The Heights District Plan proposes a new street cross section for MacArthur Boulevard that includes one travel lane in each direction, on-street parking on the north side of the street, and a separated greenbelt with multiuse path on the south side of the street. See page 28 of the Heights District Plan.

## Survey Comment 25

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Thursday, March 12, 2020 10:52:13 AM |
| **Last Modified:** | Thursday, March 12, 2020 10:56:35 AM |
| **Time Spent:** | 00:04:22 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

I think the increased traffic in on Mac Arthur Blvd. will be detrimental to the quality of life in the Dubois Park neighborhood.

## Response to Survey Comment 25

Comment noted.

## Survey Comment 26

COMPLETE

| | |
|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Monday, May 11, 2020 11:54:10 AM |
| **Last Modified:** | Monday, May 11, 2020 11:55:07 AM |
| **Time Spent:** | 00:00:57 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

A I am not opposed to the redevelopment of the Tower Mall property. And I do think it has many merits. But I also have grave concerns: • Realizing that the parking standards proposed for the Heights are in line with what is required for the rest of the City - I am suggesting that it will not be sufficient - in terms of managing parking in adjacent neighborhoods. Substantial more parking than what is proposed will be needed – at least in the forceable future.

B • I have concerns that the new schools that have been built – will not accommodate the proposed new population in the Heights development. And those additional costs will be substantial. And need to be addressed sooner rather than later. As well as planning for daycares.

C • In light of the Pandemic – I have concerns about the type of housing proposed. High density housing, is more efficient for land use, but not safe during a pandemic– common entrances to multi-floor apartments with stair rails and elevator buttons, and buildings served by HVAC systems designed to efficiently distribute heat or ventilation (and airborne viruses).

D • The Vine is being touted as the latest and greatest along Fourth Plain Blvd. In terms of efficiency, it appears to be successful, but in terms of ridership – not so much. Because the bus is set up to board and un-board in a traffic lane – rather than space apart from the traffic lane – traffic backs up behind the busses. From the drawings I have viewed – it appears that more of the same is proposed for Mill Plain. • Fourth Plain has turned into an "urban jungle" – too many apartments and not enough services, and too many people packed together in apartment complex, after apartment complex; a parking nightmare and high crime area. It boggles my mind as to why we would want another neighborhood in the city like this one. WE DO NOT.

## Response to Survey Comment 26

### Response to Comment 26A

See standard response 6 related to parking and spillover parking.

### Response to Comment 26B

See standard response 10 related to school impacts.

### Response to Comment 26C

Comment noted.

### Response to Comment 26D

See standard response 6 related to parking. Additionally, development in the Heights District will be subject to urban design standards as outlined in the Urban Design Framework, Appendix D to the EIS. These standards and guidelines are intended to create a walkable, mixed-use urban center with different development standards than currently allowed in other general commercial areas of the city, including along Fourth Plain Boulevard.

## Survey Comment 27

**Collector:** Web Link 1 (Web Link)
**Started:** Wednesday, May 13, 2020 2:27:08 PM
**Last Modified:** Wednesday, May 13, 2020 2:41:57 PM
**Time Spent:** 00:14:49
**IP Address:** [redacted]

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

THE HEIGHTS DISTRICT PLAN SHOULD IMMEDIATELY BE SHELVED!! In the midst of the greatest economic devastation since the Great Depression, if City leaders do not immediately initiate a moratorium on this project, they are being fiscally irresponsible with taxpayer dollars. As the Columbian has already reported other projects being put on hold already due to reduction in tax revenue collected (e.g., the onerous Columbia Street closure to residents with automobiles) and staffing reductions, the Heights District Plan should be put on hold until such time as the economy has recovered.

## Response to Survey Comment 27

Comment noted.

## Survey Comment 28

COMPLETE

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|---|---|
| **Collector:** | Web Link 1 (Web Link) |
| **Started:** | Wednesday, May 20, 2020 9:23:45 PM |
| **Last Modified:** | Wednesday, May 20, 2020 9:24:42 PM |
| **Time Spent:** | 00:00:57 |
| **IP Address:** | [redacted] |

Page 1: Provide your feedback on the Draft EIS for the Heights District Plan

**Q1**

Provide your comments related to the draft EIS in the space provided.

We respectfully offer our commentary on "The Heights District Plan" Draft Environmental Impact Statement. 1. Due to the City's projected $30-60 million dollar deficit, the City should postpone any further work on and investment in The Heights District Plan. a. If postponing further work on The Heights Plan has any tangible, negative impact on the City or its budget, then the FEIS should explain how and why. b. Likewise, if continuing with The Heights Plan and adoption of the "Project Alternative" impacts the City's financial revenue, those numbers and an explanations of how and why should be clearly, transparently articulated in the FEIS. A

2. The Department should recommend City Council reopen the "Comprehensive Plan: 2011-2030." The Department's intention to reopen and amend the "Comprehensive Plan" is already discussed ("Affected Environment, Impacts, Mitigation" p. 34-35). Because the "Comprehensive Plan" can be reopened and amended, the Department should further recommend City Council do away with designating The Heights as an "urban center." the "Comprehensive Plan's" notion to redefine The Heights' character from "a 'hometown feel' within the big city" (Appendix D P. 110) to an "urban center" is unsupported by current Heights residents, and Stanford's 10 year research study shows mixed-income housing developments that are unsupported by their wealthy, higher-income residents ultimately fail (https://www.gsb.stanford.edu/insights/affordable-housing-good-neighborhood). B

3. The Department should request City Council to commit to fully funding infrastructure improvements recommended in the DEIS before approval. C

4. The Department should make safety a key priority by recommending City Council commit to fully funding hiring enough first responders to meet the anticipated population growth before they approve the project. D

5. If the Department pursues The Heights District Plan regardless of citizen's outcries against it, then we respectfully request the following modifications to the "Project Alternative:" a. Further reduce the number of residential units (1340 is not low enough). b. Restrict all new housing developments within The Heights boundaries to exclusive use by Vancouver's fastest growing population – people aged 65 and older ("Visioning and Analysis Summary Report" p. 23). Because "growth in the number of seniors will result in demand for housing types specific to seniors, such as . . . age-restricted developments" (p. 23) The Heights Plan should meet and cater to this need. c. Modify parking requirements to 2 parking spots per residential unit. Thank you for your time and thoughtful consideration. Joe and Kate Fernald [redacted] E

## Response to Survey Comment 28

### Response to Comment 28A

See standard response 9 related to City budgeting and the financial implications of the Heights District Plan.

### Response to Comment 28B

Through the adoption process, the City Council will evaluate the appropriateness of the development proposed in the Heights District Plan. If the Heights District Plan is adopted, the City's Comprehensive Plan will be amended to reflect the proposed Comprehensive Plan map amendments included in the District Plan and to reference the Heights District Plan as an adopted subarea plan for the Heights District.

### Response to Comment 28C

The infrastructure improvements included in the Heights District Plan and identified as mitigation measures in the EIS will be included in the City's Capital Improvement Plan. Improvements identified to support future development are typically installed by developers at their expense. Additionally, new service connections require payment of connection fees and system development charges to mitigate for development impacts to the broader city system. Infrastructure improvements identified as necessary to support existing City deficiencies (such as a water transmission line in Blandford Drive) would be required regardless of development in the Heights District. These improvements are funded through existing utility funds which is an enterprise fund. Enterprise funds are funds that are supported in general by users of the service. Therefore, the majority of costs are supported by utility rate payers.

In addition, the Implementation Plan section of the Heights District Plan includes a policy about phasing improvements to existing arterial streets to enhance neighborhood livability. The language included in the plan is as follows:

Improvements to existing arterial streets should be phased to reduce congestion impacts and impacts to adjacent neighborhoods. The MacArthur-Lieser-St. Helen's intersection, while not in the District, has a significant impact on the Level of Service (LOS) in the District and diversion into neighborhoods, and should be a top priority that is implemented prior to the Andresen roadway retrofit or the installation of a roundabout at the intersection of MacArthur and Andresen. Similarly, the MacArthur/Andresen roundabout and Andresen roadway retrofit should happen concurrently; travel lanes on Andresen should not be reduced until or as part of implementation of the intersection improvements.

Improvements to existing streets and intersections are included in the City's 6-Year Transportation Improvement Program (TIP), which prioritizes them for funding and implementation.

### Response to Comment 28D

See standard response 4 related to maintaining response times and service levels for the Vancouver Police and Fire Departments.

### Response to Comment 28E

The City Council will make the final decision on the residential units and mix of development types recommended in the Heights District Plan. Parking requirements for future development will be codified in the VMC as part of the new HX zone. The development and adoption of the HX zone standards will occur after adoption of the Heights District Plan as part of the implementation process. This process will involve additional public outreach, including public hearings before the Planning Commission and City Council.

## Public Hearing Comments

*The following comments were provided as oral testimony at the City of Vancouver Planning Commission meeting held on February 11, 2020. The public comments responded to below are limited to those that related to the DEIS. Comments that pertained only to the underlying Heights District Plan, and not the EIS analysis, were recorded and considered separately by the City.*

*The oral testimony was transcribed from the audio recording of the Planning Commission public hearing and names and testimony may have inaccuracies. A recording of the meeting is available on the Planning Commission website: https://www.cityofvancouver.us/pc/page/planning-commission-meeting-46*

### Public Hearing Comment 1 – Kathy Ault

I live in the Harney Heights neighborhood [address redacted]. The plans I've seen show [what] looks like 5 story buildings lining Mill Plain to the south. And I have a couple of concerns about those. One is the noise, when you get a wall there it is going to bounce the noise north, so there goes our quiet neighborhood, right? And I've not seen that acknowledged or addressed. The other [concern] is for the people that live just across Mill Plain there, they're going to be in the shadow in the winter of these large apartment buildings, and I think that's really inappropriate. We need to look at the heights that are in the plan for this development, and we need to make sure that we don't cast shadows on the existing neighborhood. If people want to convert to solar sometime, or add panels to their house, they're not going to be able to do that and they're going to be in the dark. As we come out of the doldrums of winter now, to put those people in the dark in winter I don't think is an appropriate thing to do.

I certainly have concerns about traffic and parking because I have been to Seattle and Portland and I know what has happened there as they have added density. Areas end up with neighborhood parking permits and I shudder to think that we will have to end up there. I am concerned, again as people have said. We don't have sidewalks in our neighborhoods for the most part. I walk, I bike, I drive in all these neighborhoods around the development and I don't want to have parking create a difficult problem for those kinds of activities. Particularly on Idaho as you go to the east, from the school towards Devine, there's an S curve in the road that is particularly dangerous. People need to slow down a bit more there. It is near the fire station and I'm concerned that people are going to park on both sides of the road there and narrow down the walking area, and that is going to be a hazard for people coming through that area on foot or on bike. A lot of bikers come down Idaho.

### Response to Public Hearing Comment 1

Regarding the comment on noise, reflected noise can increase the experienced noise levels when a site is currently shielded from direct noise exposure. However, in the case of the existing neighborhoods to the north of Mill Plain Boulevard, the properties are not currently shielded from the traffic noise on Mill Plain. Any noise reflecting off new buildings to the south of Mill Plain would have further to travel to reach the existing neighborhoods than the noise source itself (traffic on Mill Plain). Therefore, an increase in traffic noise is not anticipated as a result of the proposed plan. Furthermore, the proposed urban design and landscaping standards (outlined in the Urban Design Framework, Appendix D to the EIS) would require variation in the building facades and would preclude the construction of a continuous wall adjacent to Mill Plain Boulevard.

Regarding shadows and building height, see standard response 7 that outlines required building height transitions adjacent to residential areas.

See standard response 6 related to spillover parking. Traffic and parking impacts are addressed in the Transportation section of the EIS (beginning on page 58).

### Public Hearing Comment 2 – Jack McClary

My main concern has to do with the environmental impact statement that was just put out, where they specify that they have to prepare for 1,800 cars/parking spaces. We live about halfway between St Joseph's church and the Tower Mall project. During Easter time, when church is on, we quite often have cars park right in front of my house. So I am wondering if the 1,800 cars from the Tower Mall project are going to be placed on the property or they are going to be in the neighborhood. Because they talk in the environmental impact statement about parking meters being installed - so our concern is the traffic issue with the cars parked, and where are they going to be - more specifically speaking than generally. The other thing that I wanted to mention is that in the environmental impact statement, the zoning change to HX for Tower Mall allows for 80-foot high buildings. That's a six story building according to my numbers. So if we're talking six stories and apartment houses, we're talking about a mass population in a very small area. And again, it's traffic issues that are our main concern.

### Response to Public Hearing Comment 2

See standard response 6 related to parking and spillover parking. Additionally, traffic impacts are evaluated in the Transportation section of the EIS, beginning on page 50.

## Public Hearing Comment 3 – Sandi McClary (reading letter from Rick Gales)

The City plan to "create a new vibrant mixed-use urban neighborhood destination that is strategically located in the heart of Vancouver" is located adjacent to my Heights neighborhood. I chose to live here because it was a safe neighborhood with large yards, established for decades away from a commercial district. Living in the Heights gave us the desired low-density we desired, and access to the community churches we attended among many other fine attributes.

In the 18 years we have lived here, we've seen the neighborhood impacted by positive change and some not so desirable changes. More recently we have had people camping in the bushes near Blandford and at Park Hill Cemetery, a thwarted robbery next door, and just this week a stabbing at another neighbor's front door. Crime is showing no signs of slowing down. It is increasing and becoming more violent and regular.

The Heights Plan will double the population of the five area neighborhoods bordering the Old Town Mall. Higher density will add to existing traffic issues and demand for emergency services already stretched. Traffic calming measures include stop signs and speed limits that have proven unsuccessful in mitigating the problems to date. Increasing density only adds to the problems despite the opinion in the EIS report that states "no significant unavoidable adverse impacts" related to traffic, emergency services, police, environment are envisioned. I take issue with that opinion on nearly all the mitigation strategies.

Re-zoning the church properties opens the door for our neighborhoods to include commercial enterprises and multi-story housing inconsistent with the neighborhood character, further adding to crime and traffic. Many of us moved here because it was low-density single-family housing with a stable population away from commercial activities and close to schools.

While it may generate tax revenue and solve your "under-utilized" property designation, it will not be welcomed by neighbors or improve livability of the neighborhoods. It will only add to the problems we face, reduce property values, and encourage my family and I to relocate where density is at a level that enticed us to this area, along with the area churches.

Our local churches are the glue that brings neighbors together, making the Heights such a great place to live and raise kids in a safe environment. These same churches contribute to the social fabric and economics of the community by their quiet efforts to give back. Compassion Vancouver Heights is offers free basic health care and social service networking to under insured members of the community. Our churches participate in this effort and much more. Their members are the first to volunteer and support neighborhood clean ups, emergency services during a disaster, host neighborhood picnics, provide a place to worship, food pantries, day-care, classes for new parents and so much more.

The City tells us in their Plan summary, the development will provide easy access to "places of worship, parks and open spaces" among other services and benefits. If the City truly wishes to allow for "easy access to churches," why would they need to re-zone church properties to allow commercial and multi-family housing in their place? Re-zoning paves the way for the churches to disappear from the landscape, pushed out by economic and social engineering over meaningful action to make our neighborhood and the community at large more livable.

I urge the Planning Commission and City Council to remove ALL the churches from the Heights Plan boundary and allow the churches to serve the community as they have done for decades without the need for meeting new (and undefined) design standards, including new zoning requirements that could radically change the flavor and livability of our neighborhoods.

Below I've listed two questions I hope can be answered to help gain clarity into your decision making and prioritization strategies beyond "listening" to what neighbors have to say. I certainly appreciate the effort to listen, but I have yet to hear how our feedback will amount to meaningful compromises, and how those decisions will be made.

Transparency in what drives priorities and decision making should be a required element in any municipal project so the citizens clearly understand how the information gathered informs decisions that impact how we live. I believe this is a significant contributor to the angst and mistrust that eats away at our faith in government.

### Comment 3A

I would like to know how the City can be the property owner, permit grantor, zoning regulator for their own development, and produce their own Environmental Impact Study without a conflict of interest?

### Comment 3B

2. Is the City Council and Planning Commission willing to define how they will make decisions on this, and other projects, so the process of decision making is open and transparent with defined guidelines, thresholds and priorities informed by the listening? If so, how can citizens gain access to these documents?

It is clear the City is interested in meeting housing needs for the future, generating tax revenue, and making improvements to our community. How you go about accomplishing these goals is more important than the goal itself. When our government officials

understand this, and open the process to transparency in how decisions are made, you will find champions to your cause and a more unified community. Listening is not enough. We need to know how the data informs solutions so we can be confident you not only listened, but you heard the concerns and made meaningful compromises as a result. We are all in this together.

### Response to Public Hearing Comment 3

The impacts outlined in the EIS are based on qualitative and quantitative analysis. From a SEPA perspective, the threshold that is used to evaluate impacts is whether or not the impact is "significant" and if so, whether or not it can be mitigated. The SEPA Rules (WAC 197-11) state that significant means "a reasonable likelihood of more than a moderate adverse impact on environmental quality." Based on the analysis included in the EIS, the guidance provided by the SEPA rules, and the implementation of the proposed mitigation measures, no significant unavoidable adverse impacts were identified.

Regarding the church properties, see standard response 3.

#### Response to Comment 3A

See response to email comment 3A from Rick Gales.

#### Response to Comment 3B

See response to email comment 3B from Rick Gales.

CHAPTER 5

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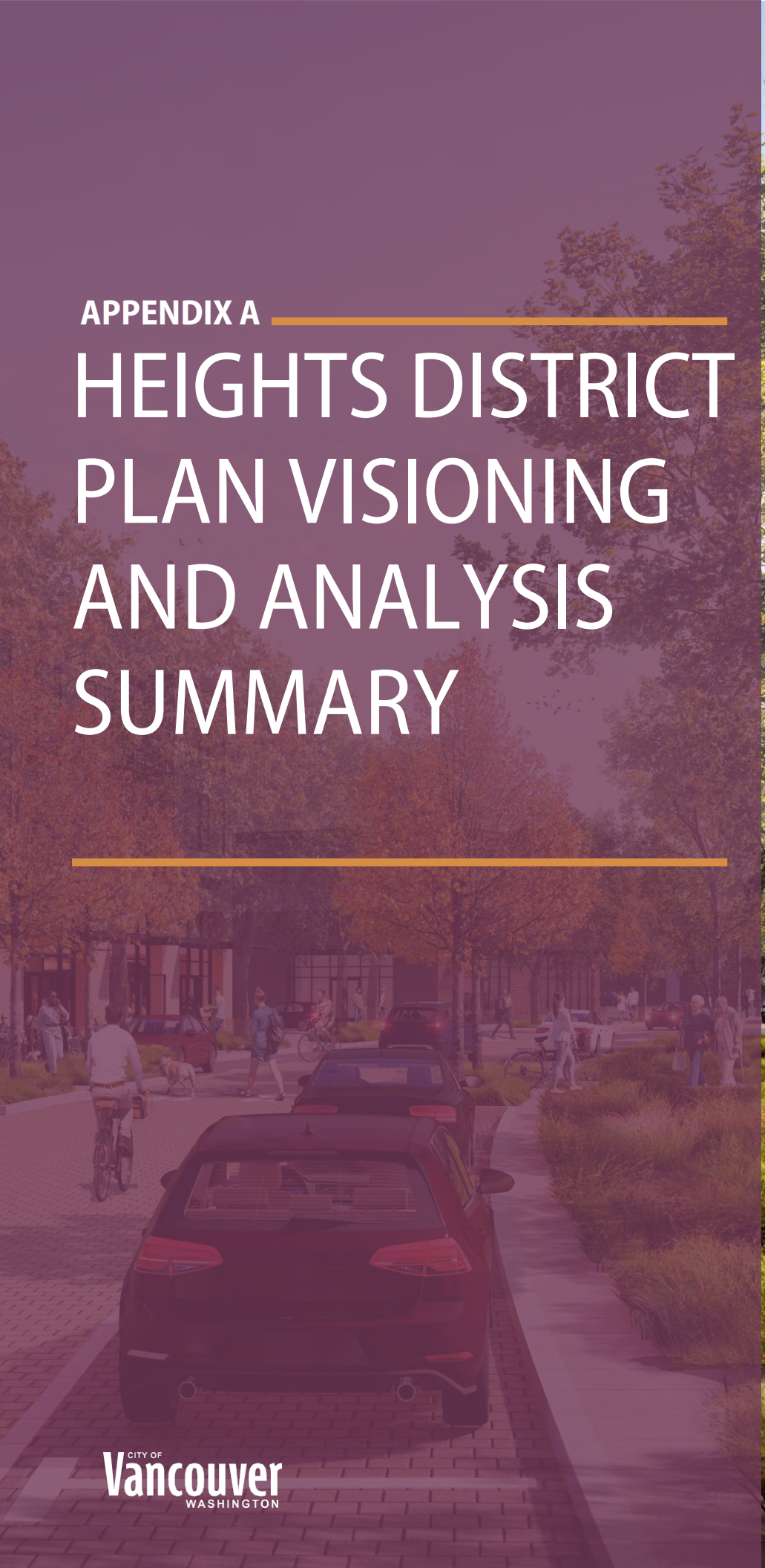
APPENDIX A

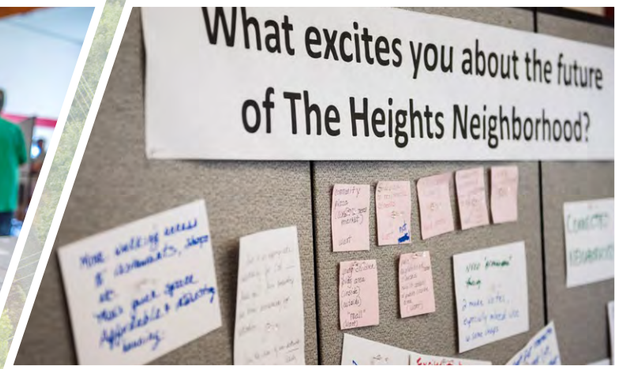
# HEIGHTS DISTRICT PLAN VISIONING AND ANALYSIS SUMMARY



CITY OF Vancouver WASHINGTON

# The Heights District Plan

## VISIONING & ANALYSIS SUMMARY


CITY OF Vancouver WASHINGTON

MARCH 20, 2019

# ACKNOWLEDGMENTS

## City Council

Mayor Anne McEnerny-Ogle
Councilmember Bart Hansen
Councilmember Bill Turlay
Councilmember Ty Stober
Councilmember Linda Glover
Councilmember Laurie Lebowsky
Councilmember Erik Paulsen

## City Leadership and Project Staff

| | |
|---|---|
| Eric Holmes | City Manager |
| Brian Carlson | Public Works Director |
| Lenda Crawford | Deputy City Manager |
| Chad Eiken | Community & Economic Development Director |
| Julie Hannon | Parks & Recreation Director |
| Bronson Potter | City Attorney |
| Natasha Ramras | Financial & Management Services |
| Rebecca Kennedy | Planning Manager, CED; Heights Project Manager |
| Andrea Pastor | Associate Planner, CED |
| John Todoroff | Associate Planner, CED |

## Consultant Team

GGLO, Inc.
VIA Architecture
BergerABAM
EnviroIssues
ECONorthwest
GRI
HDR, Inc.
Rick Williams Consulting

## Community Advisory Committee

| | |
|---|---|
| Rahim Abbasi | Abassi Design Works & Lift Development |
| Jordan Boldt | Vancouver Farmers Market |
| Amy Elkington | Resident, Esther Short Commons |
| Jeanne Farber | Dubois Park Neighborhood Association |
| Saeed Hajarizadeh | Vancouver Housing Authority |
| Jennifer Halleck | Vancouver Public Schools |
| David Hudson | Clark County Public Health |
| Frank L'Amie | Vancouver Heights Neighborhood Association |
| Amey Laud | Hiperware Technology |
| Melissa Martin | Clark County Public Health |
| Sandi McClary | Evergreen Heights Neighborhood Association |
| Doug Messner | Northcrest Community Church |
| Hope Murray | Sea Mar |
| Scott Patterson | C-TRAN |
| Chris Prothero | Harney Heights Neighborhood Association |
| Colleen Pyle | Gravitate Design |
| Harshiem Ross | Sea Mar Clinics |
| Kurt Snyder | Garside Florist |
| Elson Strahan | Southcliff Neighborhood Association |
| Jeremiah Thompson | Northcrest Neighborhood Association |
| Tim Trachtenberg | Father Blanchet Park Neighborhood Association |
| Jan Wichert | Bridgeview |
| Holly Williams | Bike & Pedestrian Stakeholder Group; Parks & Rec. Advisory Committee (PRAC) |

## Technical Advisory Committee

| | |
|---|---|
| Sammy Abdala | Vancouver Police Department |
| Judi Bailey | Office of Neighborhoods Manager, CMO |
| Teresa Brum | Economic Development Division Manager, CED |
| Carol Bua | Communications Manager, CMO |
| Jennifer Campos | Principal Transportation Planner, CED |
| Linda Carlson | Real Property Specialist, PW Asset Management |
| Tyler Chavers | Vancouver Police Department |
| Chris Christofferson | Traffic Engineer, PW |
| Tyler Clary | Water Engineering Program Manager, PW |
| Chad Eiken | Community & Economic Development Director |
| Annette Griffy | Surface Water Engineering Program Manager, PW |
| Steve Kaspan | Parking Manager, CED |
| Rebecca Kennedy | Planning Manager, CED; Heights Project Manager |
| Ryan Lopossa | Streets & Transportation Division Manager, PW |
| Lt. Doug Luse | Vancouver Police Department |
| Chris Malone | Finance & Asset Management Manager, PW |
| Andrea Pastor | Associate Planner, CED |
| Brian Potter | Operations Superintendent, PW |
| Charles Ray | Urban Forester, PW |
| Peggy Sheehan | Housing/CDBG Programs Manager |
| Bryan Snodgrass | Principal Land Use Planner, CED |
| Monica Tubberville | Parks Planner, Parks & Recreation |
| Greg Turner | Current Planning Manager, CED |

# COMMUNITY ASSETS REFERENCE MAP

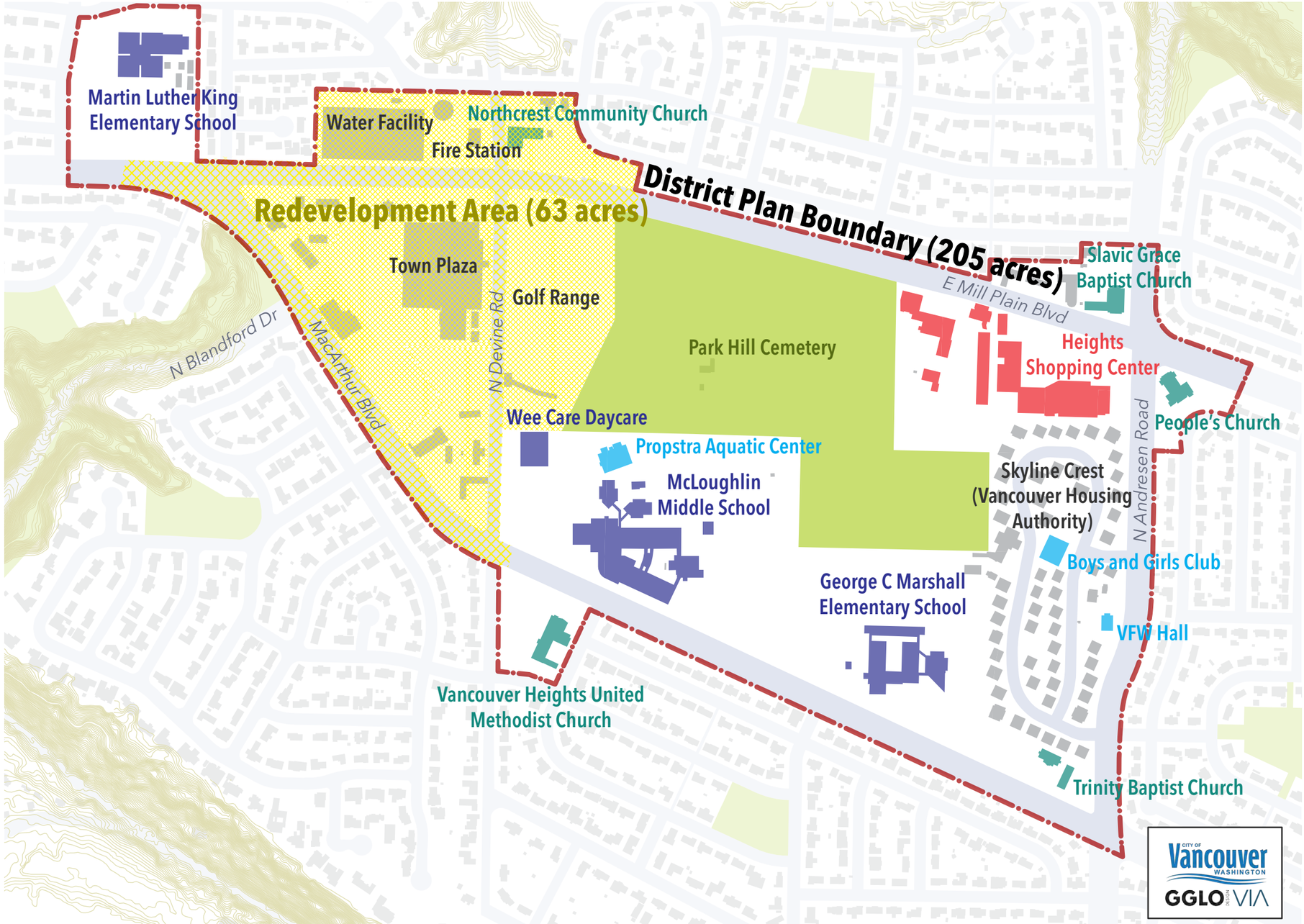



*Figure 1. Community Assets Reference Map*

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# 1.0 INTRODUCTION

## OVERVIEW

The key objectives of The Heights District Plan are to:

- Identify a long-range land use and transportation vision and plan for The Heights District;
- Develop a preferred Conceptual Development Site Plan for the 63-acre Tower Mall Redevelopment Site* to support the City's use of its community renewal authority and eliminate blight within that area;
- Prepare the required Environmental Impact Statement (EIS) and Planned Action Ordinance (PAO) in response to applicable State Environmental Policy Act (SEPA) requirements and other applicable local requirements;
- And provide support for City Council approval of the District Plan and Redevelopment Site Plan and completion of the Final EIS and PAO.

The Draft Interim Vision and Analysis Summary focuses on a District level assessment of existing land use, real estate, transportation and environmental systems for The Heights District. The assessment also includes a summary of the public engagement visioning process.

The existing conditions summary addresses the following:

- Demographic / Economic Studies
- Land Use and Zoning Regulations
- Transportation and Transit Data
- City Development Standards
- City Capital Improvement Plans
- Neighborhood Plans
- School District Plans and Capital Improvement Program
- Infrastructure Assessment Studies
- Current City-Owned Assets within the Subarea

**The Tower Mall Redevelopment Site is the 63-acre study area that includes the City owned Town Plaza (formerly "Tower Mall") site, Northcrest church and adjacent properties, water utility, fire station, golf driving range, and portion of the cemetery site, as well as the adjoining privately-held parcels adjacent to the Tower Mall site. Refer to map on page 41.*

## THE OPPORTUNITY

The Heights District represents an opportunity to create a new, vibrant, mixed-use urban neighborhood destination that is strategically located in the heart of Vancouver. With easy access to major commercial uses, social services, schools, places of worship, parks and open spaces, and downtown, The Heights District is well-positioned for a reevaluation of its market position and purpose as an important up-and-coming future neighborhood center. Recognized by many local residents as an area that is surrounded by stable, yet growing neighborhoods, the hallmark of The Heights may be its quiet character, where people have lived for many generations and are exceptionally friendly.

The Town Plaza mall is the central structure in the district. It was built in 1970 as the "Tower Mall" and was initially successful, but the opening of I-205 in 1975 and Vancouver Mall in 1977 siphoned business away and set it on a slow path of decline. After the 2009 recession, the mall struggled to find market tenants and the last decade has been characterized by vacancy and non-market tenants as the property's value has continued to drop. This Town Plaza site is characterized by structures and areas that have been inadequately maintained and are in a substantially dilapidated and deteriorated condition with inadequate street layout such that it substantially impairs the sound growth of the area and constitutes a menace to public health and safety and is a blighted area in need of renewal. This site could be the centerpiece of where the main opportunities lie within The District and will benefit from the use of the City's community renewal authority.

At the onset of the visioning process, stakeholders and community members engaged in a series of discussions to help define the important guiding principles for the study area. The stakeholders shared thoughts on what excites them about the planning study, what concerns they have, and important measures of success to help guide the plan as it moves forward through implementation.

A series of interviews were conducted with City and agency staff concurrently to review existing data on the long-range plan vision and goals and objectives for The Heights District and the Redevelopment Site. Information related to existing plans, future planned capital improvements, and regulatory policies that may affect future development in The Heights were discussed.

As a result of the initial visioning and outreach process, the planning team was able to develop a long-range vision and set of design principles that reflect the aspirations and values of a diverse range of interests in the community. The initial visioning process also served as a tool to evaluate and refine the vision statement, help craft project goals and objectives, and help craft key design strategies intended to ensure a unique outcome and the success of the plan implementation over time.


*Figure 2: Regional Context Diagram*

## PURPOSE & METHODOLGY

The Heights District Plan was conceived by the City as a means to meet a number of important City objectives, in particular to establish a long-range vision for The Heights District and the renewal of the Tower Mall Redevelopment Site. The process for developing The Heights District Plan and Redevelopment Site began with the proactive City leadership and decision to acquire the aging 12-acre Tower Mall property. This investment served as the catalyst to engage in a community-driven planning process and strategic plan for The Heights District.

To date, the planning process has included a series of public outreach efforts intended to solicit input on community values and aspirations. Concurrently, the team engaged in a series of staff and agency interviews to gain a shared understanding of existing conditions, market realities, and opportunities and challenges which informed a set of guiding principles and a refined vision statement. The design principles and vision represent the shared values around which concepts were developed for the design, development, and programming of The Heights District and Redevelopment Site. Applying the project Guiding Principles, preliminary development concepts for the Tower Mall Redevelopment Site will be produced (ongoing at the time of this interim report), with a goal of illustrating a wide range of physical and programmatic possibilities for the site. Stakeholder and community feedback will be incorporated to determine consensus on different elements of each concept.

Three refined concepts with variations in neighborhood design and program have been developed and evaluated for financial feasibility, mobility, access performance, and estimated order of magnitude cost as well as metrics guided by community and stakeholder feedback. From the evaluation, a further refined Preferred Tower Mall Site Redevelopment Concept will emerge.

Finally, a strategic district-wide vision and development of a feasible concept for the Tower Mall Redevelopment Site requires an action-oriented implementation strategy and a phased development approach of associated improvements in the Redevelopment Site. As the plan process evolves, measures of success will be established to provide quantitative and qualitative targets that outline community expectations for development of the Redevelopment Site. The preferred redevelopment concept and measures of success will be presented to the community as part of the ongoing stakeholder engagement process.


*Figure 3: Vicinity Map*

# 2.0 PUBLIC PROCESS

## DRAFT PROJECT GOALS AND OBJECTIVES

At the onset of the project planning process, a series of draft goals and objectives were established as follows:

**GOAL**

***"Establish a vision for a vibrant urban center that is economically feasible and context sensitive."***

**OBJECTIVES**

- *Establish a vision for a vibrant urban center*
- *Catalyze additional private development in the District*
- *Eliminate dilapidated and deteriorated structures and large areas of impermeable surfaces*
- *Involve the public in the planning and design process*
- *Consider affordable, workforce and/or mixed-income housing*
- *Include accessible public open space*
- *Utilize innovative urban design and sustainable development practices*
- *Plan for the creative and functional integration of transit*
- *Increase multi-modal connectivity in the District uses*

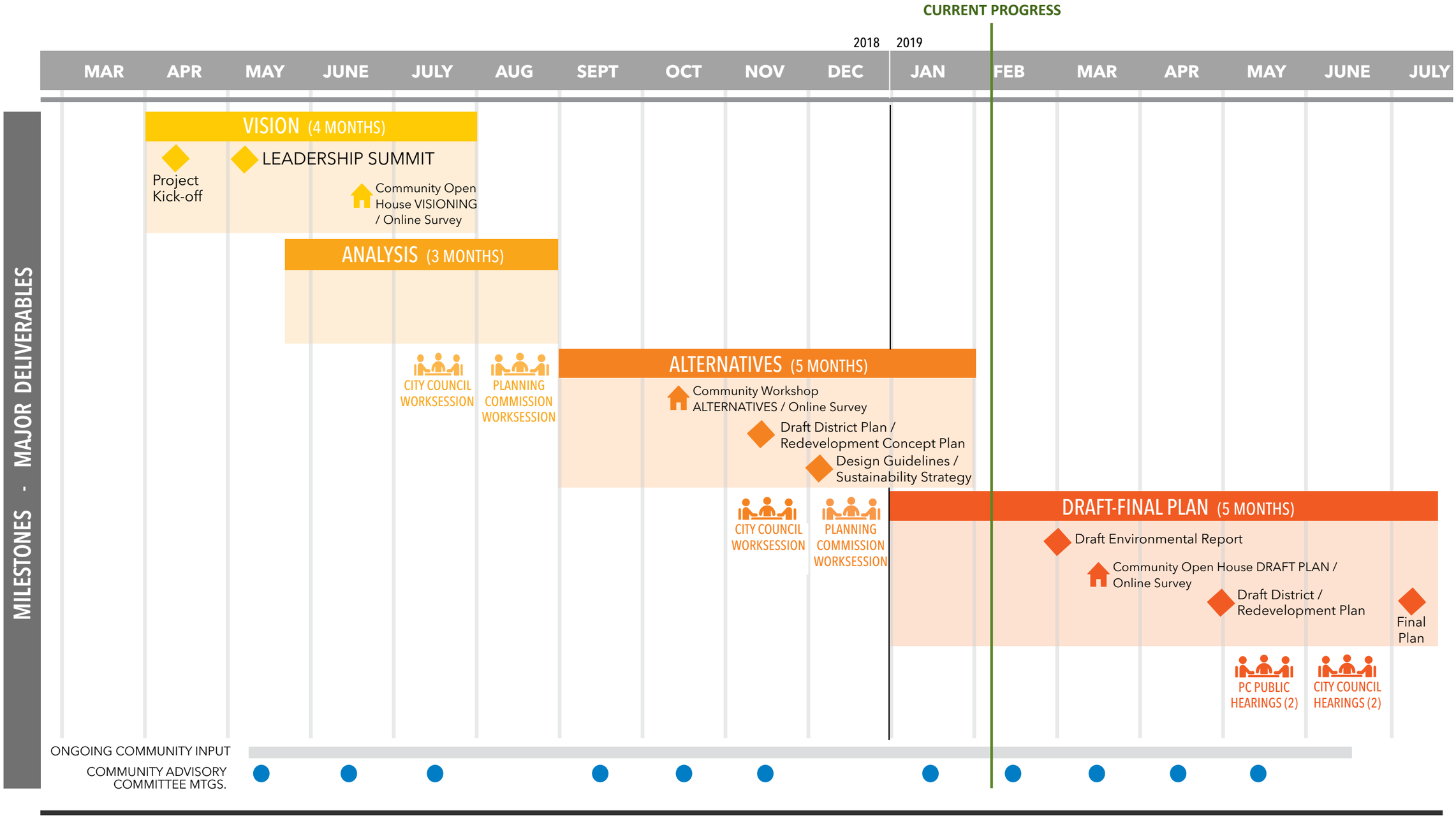
As the planning process advances and stakeholder and community feedback is taken into account, a final vision statement will be created along with a set of finalized goals and objectives. These goals will set a benchmark for outcomes based on design principles that came out of the community engagement process. The draft design principles can be found on page 18.

## PROJECT TIMELINE

There are numerous scheduled stakeholder events that will occur throughout the project timeline. These primarily take the form of regular meetings with the Community Advisory Committee as well as community events such as workshops, open houses, and online surveys as well as other outreach and engagement events facilitated by the City as the plan process evolves.

There have been and will be many one-on-one meetings with stakeholders that are not depicted in the project timeline.

The next several pages contain further details on stakeholder events that have already occurred.




*Actual project schedule and plan elements to be finalized

*Figure 4: Project Timeline*

## STAKEHOLDER ENGAGEMENT

The Heights District Plan Vision and Project Goals are preliminary and will be reviewed by the project stakeholders and City leadership in more detail. The draft Vision will be evaluated and refined with significant stakeholder engagement. Input was sought through a series of public engagement efforts, including public open houses, an online survey, one-on-one interviews, and focus group discussions conducted in and around The Heights District study area. The outreach and interview sessions aimed to capture a broader range of input and feedback on the community values, neighborhood identity and the potential for the growth in the neighborhood over time. Attention has been focused on communities which historically have been underrepresented in traditional public participation forums.

A Community Advisory Committee (CAC) composed of public and non-profit agencies, neighborhood representatives, and local businesses provide community-based insights to ensure that future investments and development serve both the adjacent neighborhoods and the broader Heights District and community interest. A Technical Advisory Committee (TAC) composed of City department representatives provides technical information and perspective based on multiple City interests in the study area.

One-on-one interviews and focus groups with key stakeholders added additional perspective on community values and desires, concerns and opportunities. Local business, property owners, tenants, places of worship, social service agencies, and developers were consulted in the initial phase to help define priorities and a baseline of information used to inform the plan visioning process.

Early engagement ensured that the values and priorities of all parties were heard before any important decisions were made. An initial Kick-off Leadership Summit was held to formally initiate the plan process and open the flow of ideas and preferences. The initial dialogue validated the City's project goals and set the tone for a positive exchange of ideas. As part of the Phase I visioning process, a community open house and community online survey helped to define community values and perceptions as well as opportunities for The Heights District and Redevelopment Site.

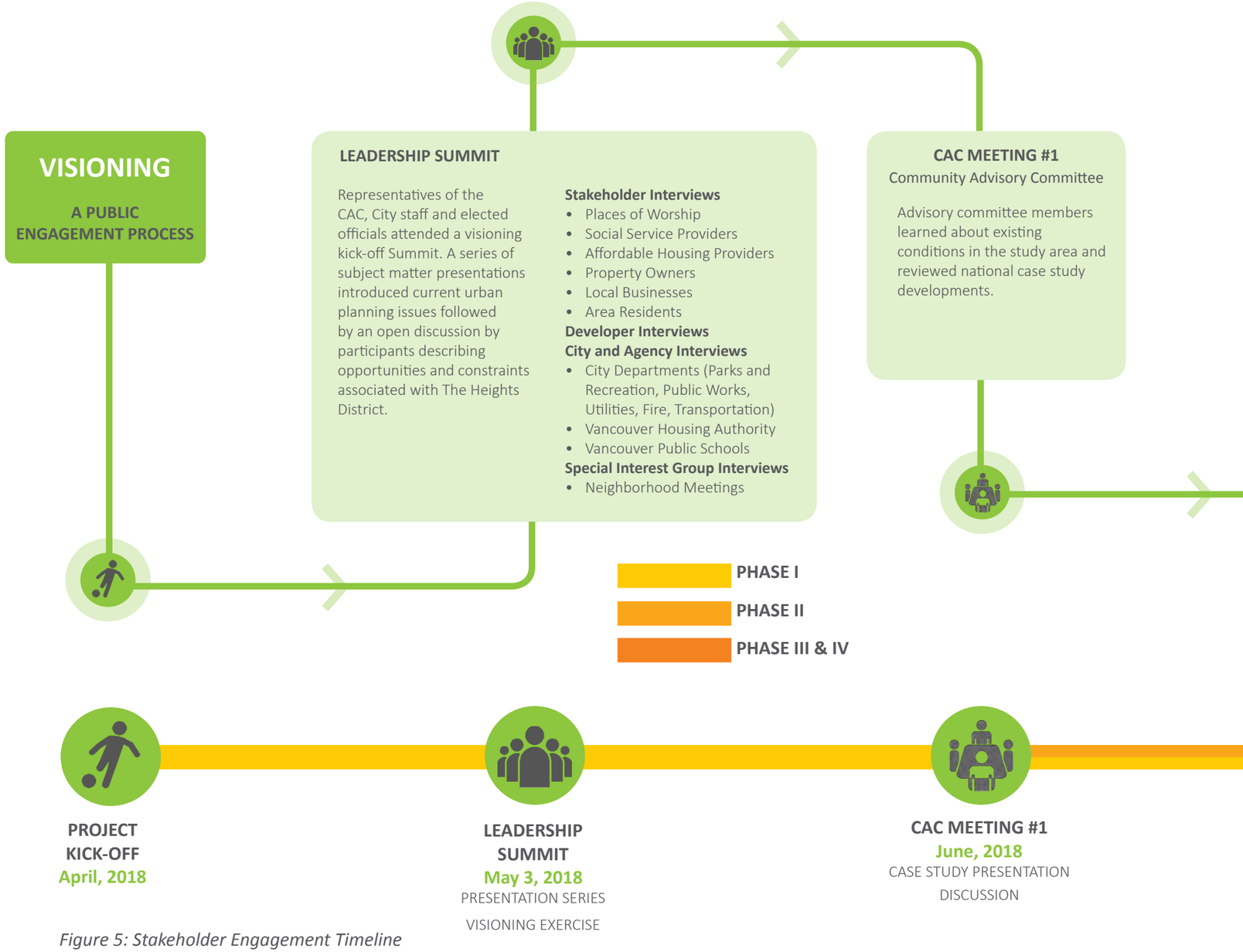



*Figure 5: Stakeholder Engagement Timeline*

# PUBLIC PROCESS | OVERVIEW

**COMMUNITY OPEN HOUSE**

Over 230 community members participated in an informal Community Open House event to provide input on community values, desires, concerns and opportunities for The Heights District and the potential Redevelopment Site.

**COMMUNITY ONLINE SURVEY**

Concurrent with the Community Open House event, a Community Online Survey was developed and made available to the community to provide a broader level of input on the development of the project Vision, Goals, and Objectives.

**CAC MEETING #2**
Community Advisory Committee

Participants provided input on key redevelopment attributes for the study area. The discussion helped to inform and refine the development of the project Vision, Design Principles, Goals and Objectives.

*Data gathering and analysis continues throughout the initial planning process*

**REFINED DESIGN PRINCIPLES**

- Economic Development
- Mixed Income Housing
- Urban Character / Form
- Community Health, Wellness and Equity
- Connectivity
- Sustainability
- Public Realm
- Arts/ Culture

**CAC MEETING #3**
Community Advisory Committee

**NEXT STEPS ?**

Phase III: Exploration of Alternatives
- Community Workshop
- Online Survey
- Property Owners Input, Neighborhood Meetings
- Focus Groups

Phase IV: Draft Final Plan
- Community Open House
- Online Survey
- Property Owners Input, Neighborhood Meetings

**COMMUNITY OPEN HOUSE**
**JUNE 23, 2018**
COMMUNITY MAPPING
VISIONING EXERCISE

**COMMUNITY ONLINE SURVEY**
**June 20 - July 11, 2018**
WEB BASED ONLINE OPEN HOUSE

**CAC MEETING #2**
**July 12, 2018**
PRESENTATION ON URBAN DESIGN CONCEPTS
WORK SESSION TO DETERMINE DESIGN PRINCIPLES
REVIEW CITY'S VISION STATEMENT

**CAC MEETING #3**
**September, 2018**
AFFORDABLE HOUSING
20 YEAR BUILD OUT PROJECTIONS
PRELIMINARY CONCEPTS

**PHASE III**
**August 2018 - January 2019**
**PHASE IV**
**January 2019 - July 2019**

## PHASE I AND II


## PHASE I VISIONING MEASURES

| | |
|---|---|
| Leadership Summit | Representatives of the CAC, City staff and elected officials attended a visioning kick-off Summit. A series of subject matter presentations introduced current urban planning issues followed by an open discussion by participants describing opportunities and constraints associated with The Heights District. |
| Focus Group Interviews | • Neighborhood Associations<br>• Places of Worship<br>• Developers<br>• Affordable Housing<br>• Health and Social Service Providers |
| City and Agency Interviews | • City Departments (Parks and Recreation, Public Works, Utilities, Fire, Transportation)<br>• Vancouver Housing Authority<br>• Vancouver Public Schools |
| Special Interest Interviews | Interviews with communities who are underrepresented in traditional public participation forums. |
| CAC Meeting #1 | Advisory committee members learned about existing conditions in the study area and reviewed national case study developments. |
| Community Open House #1 | Over 230 community members participated in an informal Community Open House event to provide input on community values, desires, concerns, and opportunities for The Heights District and the potential Redevelopment Site. |
| CAC Meeting #2 | Participants provided input on key redevelopment attributes for the study area. The discussion helped to inform and refine the development of the project vision, design principles, goals, and objectives. |
| Community Online Survey #1 | Concurrent with the community open house event, a community online survey was developed and made available to the community to provide a broader level of input on the development of the project vision, goals, and objectives. |
| CAC Meeting #3 | Participants engaged in a  discussion on the role of mixed-income / affordable housing, the 20 year projected development program, and preliminary site concepts. |

## Leadership Summit

May 3, 2018

**29 attendees**

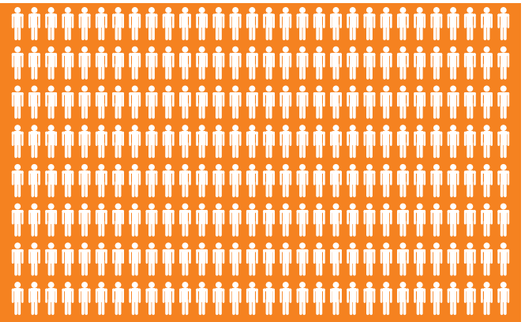
## SUMMARY

The purpose of the Leadership Summit was to introduce the project to key stakeholders, provide information related to timeline and process, and develop a shared understanding of key concepts related to urban mixed use redevelopment. This was communicated primarily through a series of short presentations on issues and trends relevant to the planning process, including historical context, health, jobs/housing balance, mobility, placemaking, and urban design.



**Community Open House**

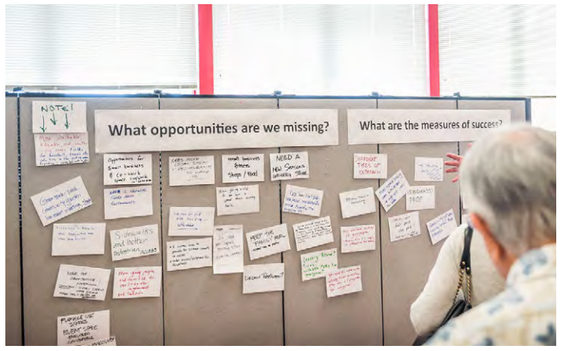
June 23, 2018



**220-250 attendees**

## SUMMARY

The initial Community Open House provided a public forum for the community to share their concerns and desires for the future of The Heights District, including new businesses, transportation improvements, parking, and housing. Participants were presented with a series of existing conditions analyses on local socioeconomics and housing, land use and zoning, and mobility and access. Participants were also introduced to different urban design concepts that could be implemented within the Redevelopment Site.


**Community Online Survey**

June 20 - July 11, 2018

**169 responses**

## SUMMARY

The first online open house for The Heights District Plan was publicly available June 20 through July 11, 2018. It was one way in which project stakeholders were able to learn about and provide input to the project, and complemented a community open house that was held June 23, 2018. Two additional online engagement opportunities are planned for future project phases. Goals of the online open house included:

- Introduce the project, inform and connect with the community
- Broaden engagement
- Gain actionable input on the big picture and key opportunities

More information on this open house and results can be found in Appendix H.

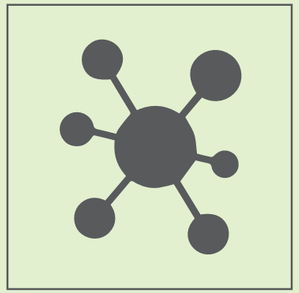
*What would make The Heights District a more desirable place to spend time?*

# 2.1 DESIGN PRINCIPLES

## KEY DESIGN DRIVERS

The planning and design team documented input received from the public throughout the initial visioning process to determine opportunities and desires. The team organized the information into major themes and presented to the CAC for further discussion. The CAC advanced these themes into Key Design Drivers and prioritized the drivers into 'primary' and 'secondary' categories.

## PRIMARY DRIVERS



### 1. Connectivity

- Creation of a walkable and bikeable street network with connections to nearby trails
- Maintain local and regional connections to services and amenities in Downtown Vancouver, Portland, etc.
- Improved traffic safety at intersections, through improved lighting, signals, and visibility

### 2. Community Health, Wellness & Equity

- Walkable, healthy food options, such as grocery stores and farmers markets
- Uses that promote "healthy" living, including playgrounds and exercise/ athletic facilities
- Maintain social and support services for underserved families in the area
- Elimination of dilapidated structures and impermeable surfaces within Town Plaza

### 3. Sustainability

- Increase urban greenspace and trees while preserving existing significant trees
- Break up existing pattern of pavement and gravel
- Address drainage and flooding issues along major corridors

## SECONDARY DRIVERS

### 4. Public Realm

- Creation of flexible gathering spaces that can accommodate community activities and events
- Provide a variety of active open spaces, including dog parks, playfields, and community gardens
- Well-maintained public spaces and sidewalks

### 5. Economic Development

- Restaurants and other food options that are affordable and easy to walk to
- Specialty, health-focused grocery store
- Maintain "small business" culture by saving existing locally owned businesses and attracting new local businesses

### 6. Mixed Income Housing

- Increased housing variety that includes mixed types (i.e. senior housing) and mixed incomes
- Mindful placement and integration of low-income housing
- Keeping housing options affordable for a diverse demographic, from seniors to young families

### 7. Urban Character/Form

- Creation of a distinct identity through urban form
- Attractive, appealing architecture that complements existing neighborhood character
- Appropriate scale (number of stories) of buildings

### 8. Arts/Culture

- Installation of art pieces, such as murals, that can be participatory and reflect local history
- Dedicated, flexible venues for arts and cultural events
- Neighborhood library as a cultural amenity

# 3.1 REAL ESTATE AND DEMOGRAPHICS

## REAL ESTATE AND DEMOGRAPHICS KEY FINDINGS AND IMPLICATIONS

The Heights District presents an unprecedented opportunity for new development in Vancouver. Given its location and size, redevelopment in the District has the potential to create a new urban community within the growing city. This market analysis explores the socioeconomic and real estate market drivers in the Vancouver market that will influence future land uses in The Heights. Using data from several sources, including local stakeholders and developers, we have synthesized this information to help inform The Heights District Plan. Sources are stated in the original presentation of the data in each section. This report, and other project related information, will be used by the District Plan project team, the City of Vancouver, and community members to chart a path for future land uses in The Heights. Here we summarize the key findings from our research.

## KEY FINDINGS

Demographic trends show how communities have grown and how they will shape future growth. The following summarizes some of the key findings from our demographic analysis:

- The demographic profile of the population of Vancouver is one of a growing and aging community. In the last two decades, Vancouver grew by 23 percent. The city's population is expected to continue growing; by 2030, the population is forecast to be 202,300, a 15% increase from 2017. In addition to population growth, Vancouver's households are changing. Increasingly Vancouver's households are becoming older, smaller, and contain fewer children, following similar trends across the country as the baby-boomer generation ages. The population of Vancouver also has a lower median income and a larger share of low-income residents than surrounding communities in Clark County.
- Vancouver's housing market is also unique and is changing. Currently, about half of Vancouver residents are renters, and of the multifamily housing stock only five percent are owner-occupied, i.e., condominiums. This is a distinct difference from other cities of a similar size, many of which have a higher number of home owners and a higher percentage of owner-occupied multifamily units.
- Vancouver has a low home vacancy rate, matching the county's, at five percent. Washington's home vacancy rate is nine percent, indicating that housing supply is more constrained in Vancouver than other areas throughout the state.
- Since the recession, permits issued for new multifamily housing have increased significantly, and well beyond increases in single family homes and other types of housing units. On average, about 500 multifamily units have been delivered to the market annually since the year 2000; delivery of these units has not been consistent from year to year.
- Since the recession, average asking rents in Vancouver have edged upwards. This effect is partially due to increasing rents of existing buildings, but also as the result of new buildings being delivered to market with rent levels well above average.
- Vancouver currently has demand for all types of housing units: multifamily, single-family, and single-family attached. In the next two decades, Vancouver is projected to need almost 11,000 new dwelling units, at an annual average development trajectory of 540 units per year.

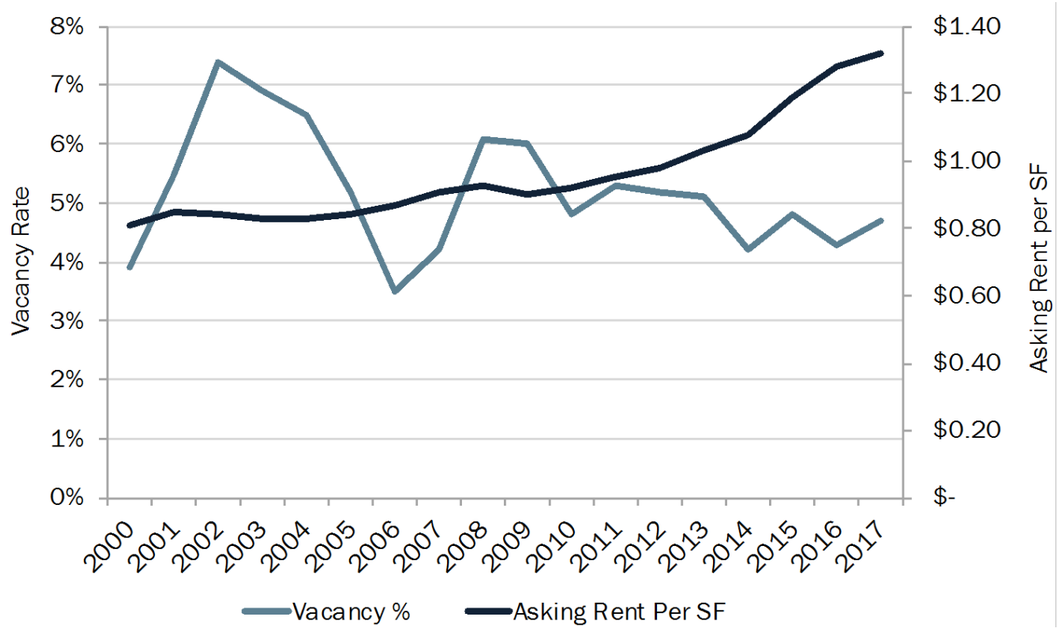



*Figure 6: Multifamily Unit Rents and Vacancy Trend*

## IMPLICATIONS FOR THE HEIGHTS DISTRICT

- The Heights District is well-suited for residential development. Its proximity to downtown Vancouver, easy access to highways, and nestled location in established residential neighborhoods create the conditions to foster multifamily development. Further, demographic trends indicate a demand for more multifamily housing within the city; smaller and older households are ideal households types for denser housing types. There is also demand for low-income housing in Vancouver. The Heights District's ease of access to retail centers and services makes it an appropriate location for affordable housing.
- Residential development in The Heights could take several forms. Using data gathered through our research, we recommend consideration of the five housing types shown below.
- Other types of commercial real estate—retail and office—have been focused in other areas of the city. Data and information from stakeholders indicate that there is a limited ability for the Heights District to capture future retail and office uses. However, these could play a supportive role to residential uses in the Heights District. This is not to diminish their importance. Retail uses, especially those that create neighborhood vibrancy such as cafes and restaurants, add real value and a sense of place to local communities. Consideration should be given to strategically supporting and fostering appropriately sized retail and office uses that enliven and add value to the future Heights District.
- Discussions with stakeholders also indicate a strong interest in retaining many of the current businesses and services that already exist in The Heights District. Currently there are several churches, commercial businesses, and non-profits in the area. Redevelopment plans for the district should consider how to retain or enhance the presence of many of these uses.

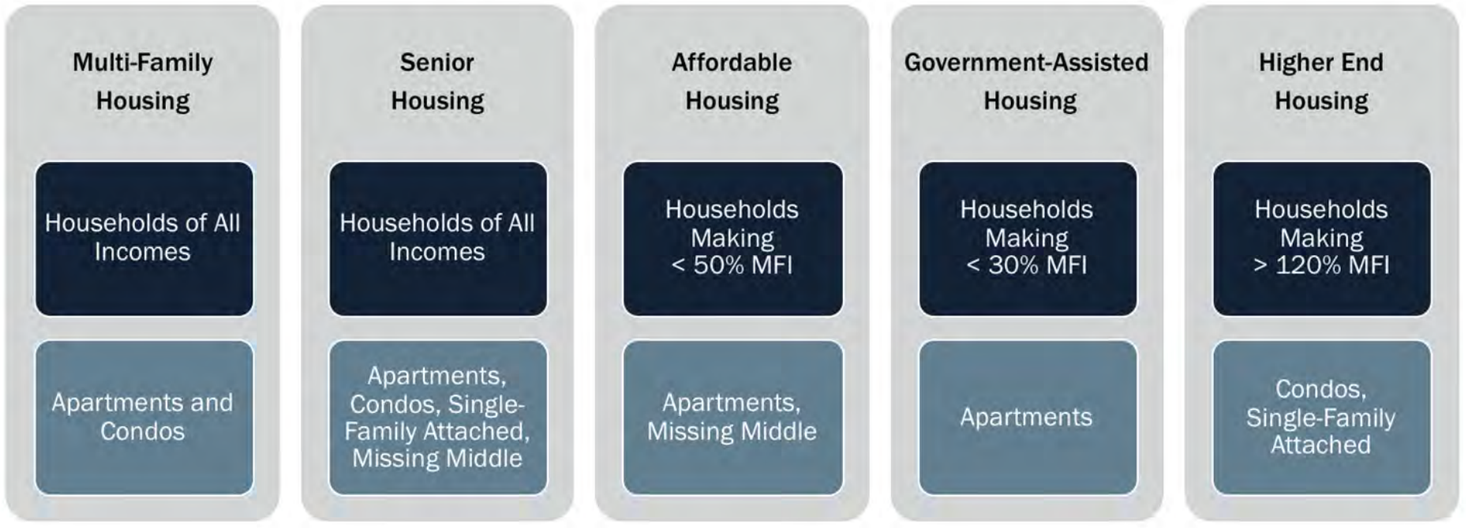



*Figure 7: Housing Needs and Products that Meet those Needs*

## REAL ESTATE AND DEMOGRAPHICS OVERVIEW

In this section, we examine the demographic, economic, and real estate market trends that will influence future land uses in The Heights District. Additional market data and trends are located in appendix F.

## DEMOGRAPHIC TRENDS

Demographic trends show how communities have grown and how they will shape future growth. The following summarizes some of the key findings from our demographic analysis:

- **Population Growth.** In the last two decades, Vancouver's population has grown by about 33,000 people. By 2030, the population is forecast to grow by another 26,000 people.
- **Aging Population.** From 2000 to 2016, the 50 to 64 cohort grew by 56% (10,913 people) and the 65 and older cohort increased by 58% (8,865 people). In Clark County by 2040, the 60 and older cohort is forecast to grow from 14% of the population to 22% of the population.
- **Fewer Households with Children.** Since 2010, Vancouver households with children decreased by 10%. This coincides with findings that Vancouver has smaller households on average and more non-family households than those at county and state levels.
- **Lower Incomes.** As of 2016, Vancouver's median household income was about $52,000, which is lower than the county, Portland Metropolitan Statistical Area (MSA), and state by roughly $10,000. From 2000 to 2016, adjusted for inflation, the share of Vancouver residents making higher incomes did increase; however, the share of lower income residents in Vancouver is higher than the larger comparative regions.

## POPULATION CHARACTERISTICS

Growth in Vancouver's population will impact demand for housing. Vancouver's population has grown at an average annual rate of 1.22% from 2000 to 2017, adding close to 33,000 people to the community. By 2030, Vancouver's population is expected to grow by 15%, adding another 25,900 people to the population. City staff attributes a sizeable portion of population growth in recent decades to City land annexations and net migration.

The Internal Revenue Service (IRS) tracks migration rates across the United States at the county level. IRS tax records show that due to net migration, Clark County has gained almost 25,000 people in the last five years. The portion of these migrants moving into the Vancouver is unknown, but likely to be significant given Vancouver is the largest city in Clark County. The records show similar net migration trends to Clark County going back many more years. With a clear history of collecting new migrants, Clark County and Vancouver are likely to continue to see these trends in the future.

**From 2000 to 2017, Vancouver grew by 32,840 people (23%). By 2030, Vancouver is forecast to grow by another 25,900 people (22%).**

In the same time, Clark County grew by 125,762 people (36%). The county is expected to grow by 105,880 people (22%).

In 2017, Vancouver accounted for 37% of Clark County's population. The 2030 forecast indicates that Vancouver will account for 35% of Clark County's population.

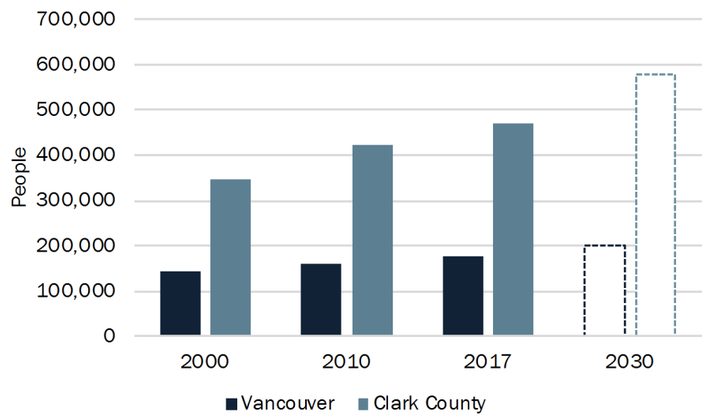



*Figure 8: Population growth and forecast for Vancouver and Clark County*

**Since 2011, net migration has steadily increased in Clark County.**

From 2011-2012 to 2015-2016, net migration increased by 128%.


*Figure 9: Net migration trends for Clark County*

**The share of Hispanic and Latino residents is greater in Vancouver than Clark County.**

From 2000 to 2016, the share of Hispanic and Latino residents grew by about 12,000 people (133%) in Vancouver and about 23,000 people (140%) in Clark County.

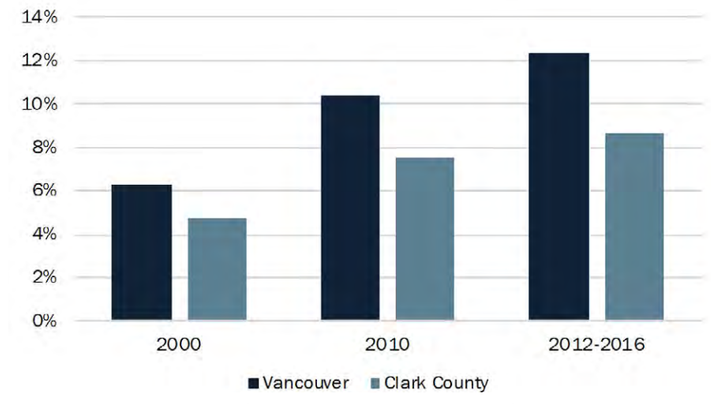



*Figure 10: Hispanic and Latino Percentage Growth*

## AGE DISTRIBUTION

This section expands on Vancouver's population trends, providing implications for future housing demand in the city:

- **Vancouver and Clark County have a growing share of elderly residents.** As Vancouver's elderly population grows, it will have increasing demand for housing that is suitable for elderly residents. Vancouver's population aged 50 to 64 and 65 and older grew the most from 2000 to 2012-2016, at 56% and 58%. Growth in the number of seniors will result in demand for housing types specific to seniors, such as small and easy-to-maintain dwellings (single-family attached/detached and multi-family), assisted living facilities, or age-restricted developments.
- **Vancouver has a large proportion of younger people under the age of 20.** About 25% of Vancouver's population is under the age of 20 years, decreasing some from the year 2000 when those under the age of 20 accounted for about 29% of the population. Those in this cohort, who decide to stay in Vancouver, will be moving out on their own over the next couple decades. This demographic group will require smaller, affordable housing units and may have similar housing preferences to today's Millennials.
- **Millennials may increase demand for rental units.** Those aged 20 to 34 make up about 23% of the total population as of 2016. The long-term housing preference of Millennials is less certain. Research suggests that Millennials' housing preferences may be for smaller, less costly units. A recent survey of people living in the Portland region shows that Millennials prefer single-family detached housing, but housing price is the most important factor in choosing housing for younger residents. The survey results suggest Millennials are more likely than other groups to prefer housing in an urban neighborhood or town center.

**Vancouver, Clark County, and Washington's median age are similar, roughly 37 years old as of 2016.** From 2000 to 2016, Vancouver's median age increased by 3.4 years. Comparatively, Clark County's median age increased by 3.6 years and Washington's increased by 2.3 years.

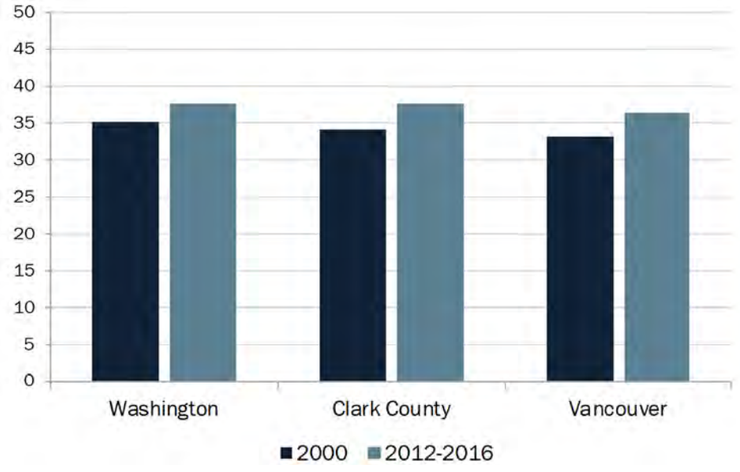



*Figure 11: Median age, Years, 2000 to 2012-2016*

**While the population aged 20 and younger continue to make up a larger share of the total population, older demographic groups are growing at the fastest rate.** From 2000 to 2012-16, those aged 50 to 64 grew by 56% (10,913 people) and those aged 65 and older increased by 58% (8,865 people).

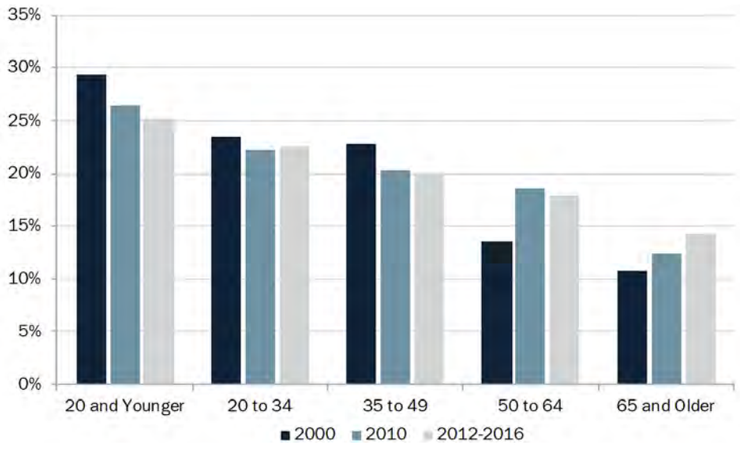



*Figure 12: Population distribution by age over time*

## HOUSEHOLD CHARACTERISTICS

Vancouver's households are smaller than the region's and the city has a larger percentage of non-family households. Data shows that family households without children are on the rise and households with children are declining.

**Vancouver's average household size is smaller than the county and state.**

**2.49 Persons**
Vancouver

**2.72 Persons**
Clark County

**2.57 Persons**
Washington

**Average household sizes remain static from 2000 to 2016.**
Vancouver's average household size in 2000 and 2016 was about 2.5 people per household.

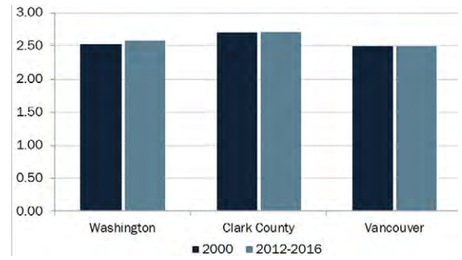



*Figure 13: Change in average household size*

**Average household size for the population that is Hispanic/Latino has remained static from 2000 to 2010.** Vancouver's average household size for this population in 2000 and 2016 was 3.4 people per household.

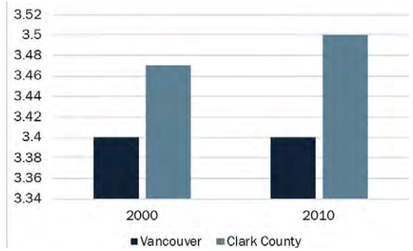



*Figure 14: Change in average household size for hispanic and latino population*

**Vancouver has a larger share of nonfamily households as compared to its larger regions as well as a smaller share of family households without children.**

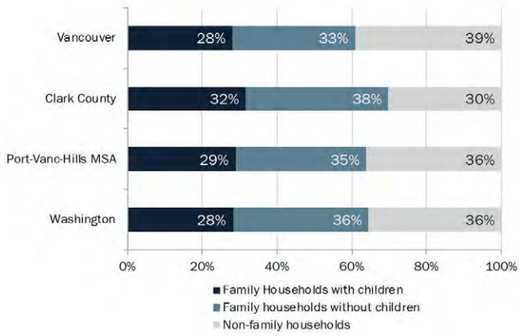



*Figure 15: Household Child Status, Geography Comparison*

**Since 2010, households with children have decreased by 2,025 households.** In this same time, family households without children increased by 2,405 households and non-family households increased by 1,271 households.

| Households with Children | Family Households without Children | Nonfamily Households |
|---|---|---|
| -10% (-2,025 households) | 12% (2,405 households) | 5% (1,271 households) |

## INCOME CHARACTERISTICS

Income is one of the key determinants in housing choice and households' ability to afford housing. While income for Vancouver residents has increased since 2000, households have comparatively lower incomes than the county, state, and MSA.

**Vancouver's median household income in 2012-16 was about $52,000. Median household incomes for comparative regions was about $63,000.** From 2000 to 2012-2016, household median income in Vancouver, adjusted for inflation, decreased by 13% from $59,766 to $52,004.

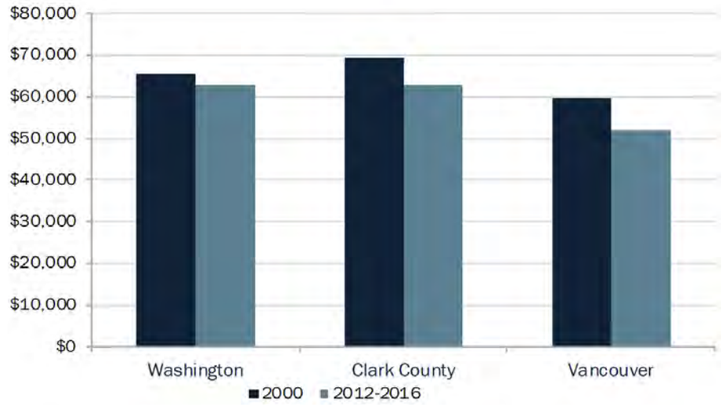



*Figure 16: Median Household Income, Washington, Clark County, and Vancouver, 2000 (inflation-adjusted) and 2012-2016*

**Despite Vancouver's median family income declining from 2000 to 2016, there is growth in households making higher incomes.**

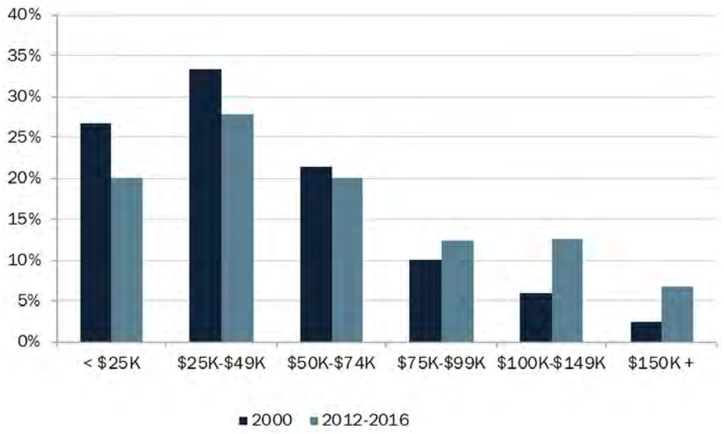



*Figure 17: Change in Household Income Distribution, Vancouver, 2000 to 2012-2016, 2016 Inflation-adjusted Dollars*

## ECONOMIC TRENDS

Vancouver has a robust, diversified economy that continues to expand. The following are a few of our key economic findings:

- **More Employed Workers.** The unemployment rate dropped from almost 11% in 2011 down to 8% by 2016.
- **More Jobs.** Service providing jobs in Clark County increased by 16% from 2010 to 2016. In SW Washington, industries including Professional & Business Services, Construction, and Education and Health are projected to grow the most by 2025. From 2015 to 2025, Retail Trade will grow by 11%.
- **Similar Commute Tendencies.** As of 2015, about 58% of employed Vancouver residents work in either Vancouver or Portland, 35% and 23% respectively. This has stayed static since 2011.

**As of 2015, most residents of Vancouver, live and work in Clark County (49%) and Multnomah County (26%).** Mostly, these residents are working in Vancouver and Portland.

## EMPLOYMENT CHARACTERISTICS

**From 2011 to 2016, Vancouver's unemployment rate decreased by 2.8%.**

**2011** 10.90% **2016** 8.10%

**From 2006 to 2016, the service, education, and finance sector grew.** The service industry is Vancouver's largest industry, employing over 26,000 people in 2016.

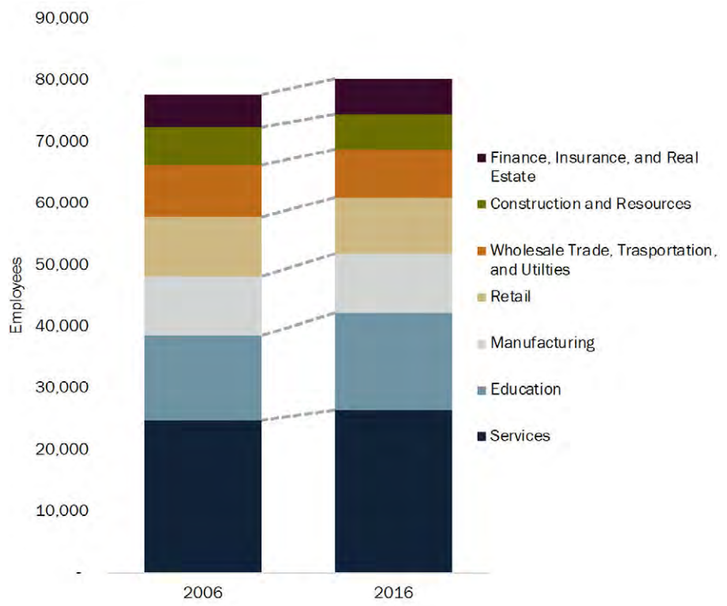



*Figure 18: Industry Growth*

## JOB CENTERS AND COMMUTING PATTERNS

Residents of Vancouver work across Oregon and Washington, indicative of Vancouver's influential position in the larger Pacific Northwest Region.

**As of 2015, most residents of Vancouver, live and work in Clark County (49%) and Multnomah County (26%).** Mostly, these residents are working in Vancouver and Portland.

| Location | 2011 | | 2015 | |
|---|---|---|---|---|
| | Number | Percent | Number | Percent |
| Counties | 64,753 | 100% | 72,536 | 100% |
| Clark, WA | 30,897 | 48% | 35,766 | 49% |
| Multnomah, OR | 16,992 | 26% | 18,774 | 26% |
| Washington, WA | 3,654 | 6% | 3,764 | 5% |
| King, WA | 3,669 | 6% | 3,754 | 5% |
| Clackamas, OR | 2,380 | 4% | 2,534 | 3% |
| Cowlitz, WA | 1,043 | 2% | 1,206 | 2% |
| Pierce, WA | 920 | 1% | 984 | 1% |
| Thurston, WA | 601 | 1% | 802 | 1% |
| Marion, OR | 526 | 1% | 564 | 1% |
| Snohomish, WA | 512 | 1% | 479 | 1% |
| All other Counties | 3,559 | 5% | 3,909 | 5% |
| Cities | 64,753 | 100% | 72,536 | 100% |
| Vancouver, WA | 21,717 | 34% | 25,189 | 35% |
| Portland, OR | 15,340 | 24% | 16,911 | 23% |
| Camas, WA | 1,597 | 2% | 1,635 | 2% |
| Seattle, WA | 1,447 | 2% | 1,424 | 2% |
| Hazel Dell, WA | 1,426 | 2% | 1,529 | 2% |
| Gresham, OR | 1,194 | 2% | 1,359 | 2% |
| Beaverton, OR | 1,104 | 2% | 1,079 | 1% |
| Salmon Creek, WA | 875 | 1% | 994 | 1% |
| Tigard, OR | 796 | 1% | 870 | 1% |
| All other Cities | 19,257 | 30% | 21,546 | 30% |
| Total | 64,753 | 100% | 72,536 | 100% |

*Figure 19: Chart Depicting Where Vancouver Residents Work*

## REAL ESTATE TRENDS

This section, divided into residential and commercial uses, provides an overview of real estate trends for Vancouver and comparative regions.

## RESIDENTIAL USES

This assessment of residential real estate trends addresses housing mix, housing tenure, vacancy, new housing development (particularly for multifamily uses), residential sales, and rental costs.

The Heights District is located just to the east of Vancouver's city center and is mostly surrounded by residential uses. For these reasons, the District presents an opportunity for residential development, and in particular multifamily or attached residential development. Further, our findings indicate that there is demand for housing at all income levels. To briefly summarize, our key findings for residential real estate trends include:

- **The number of dwelling units in Vancouver increased by 18% from 2000 to 2016.** In that same time, the share of multifamily housing increased marginally from 37 to 39% and single family detached housing decreased from 58% to 55%.
- **About half of Vancouver residents are renters.** About 26% of all renters are between the age 25 and 34, 48% are between the ages of 35 and 64, and about 17% are 65 years of age and older.
- **Multifamily housing is dominated by renters.** As of 2016, 71%of renters live in multifamily housing, compared to the 5% of homeowners (e.g. condominiums, etc.).
- **Vancouver's vacancy rate matches the rate of the county.** Both Vancouver and Clark County have a home vacancy rate of 5%. Washington's home vacancy rate is much higher, at 9%, indicating that housing supply is more constrained in Vancouver than many other cities in the state.
- **Since 2011, permits issued for new multifamily housing has picked up.** Permits issued for other housing types, such as single-family dwellings, mobile homes, and duplexes have been issued at lower rates than multifamily housing.
- **Multifamily units have been delivered at an annual average of about 500 per year, from 2000 to 2017.** Multifamily rents have been steadily increasing since 2000, while vacancy rates have been decreasing.

## HOUSING MIX

Vancouver has added thousands of housing units over the past two decades which has increased the city's housing stock by about 18%. The majority of housing units in the city and greater regions are single-family detached housing. That said, Vancouver has a larger share of multifamily housing than Clark County, the MSA, and Washington.

**The total number of dwelling units in Vancouver increased by about 18% from 2000 to 2012-16.** This amounted to a 10,611 unit increase over the analysis period.

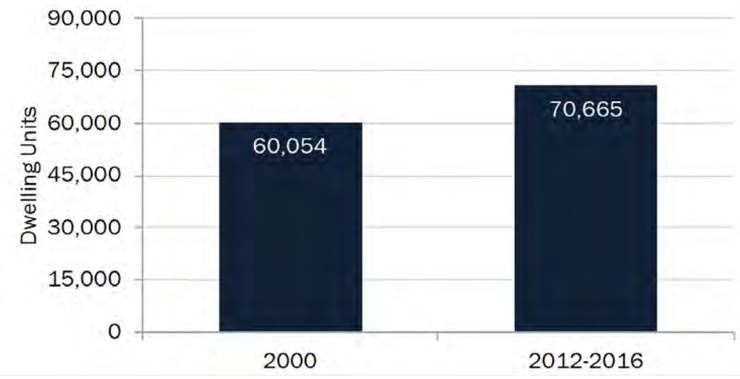



*Figure 20: Total Dwelling Units Over Time*

**Vancouver's housing mix in Vancouver shifted slightly toward multifamily housing from 2000 and 2012-2016.**

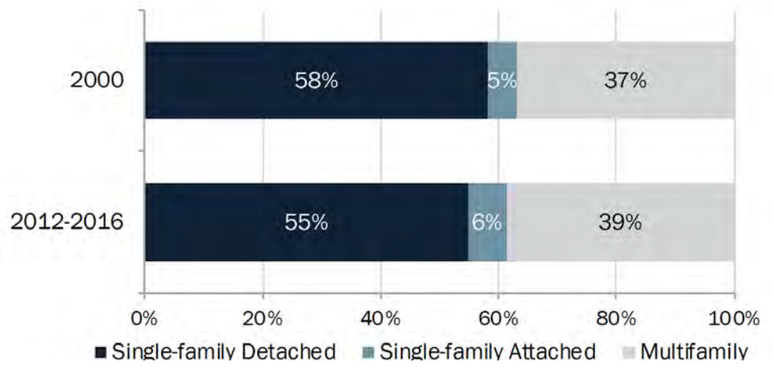



*Figure 21: Change in Housing Mix Over Time*

## HOUSING TENURE

Housing tenure describes whether a dwelling unit is owner- or renter-occupied. This section shows:

- **Less than half of Vancouver's households own their own home.** The Vancouver's homeownership rate is below other comparative regions.
- **Homeownership in Vancouver stayed relatively stable between 2000 and 2012-2016, only decreasing slightly.** In 2000, 53% of Vancouver's households were homeowners. This dropped to 51% in 2010 and then again in 2012-2016 to 49%.
- **Most Vancouver homeowners (89%) live in single-family detached housing, while most renters (71%) live in multifamily housing, while a sizable portion of renters live in single-family detached housing as well (22%).**

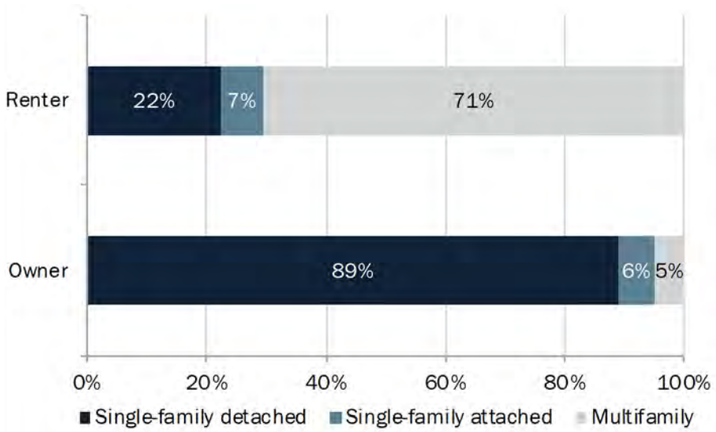



*Figure 22: Housing Units by Type and Tenure*

## VACANCY

In 2016, Vancouver had an overall 5% residential vacancy rate, suggesting that housing supply in Vancouver was more constrained than the state but similar to the rate at the county level.

The city's multifamily residential vacancy rate is similar to the overall residential rate and has been decreasing over the past decade. On average, and across all bedroom sizes, the multifamily vacancy rate was at 4.9% in 2018 Q1, from 5.1% in 2013 and 6.1% in 2008.

**From 2000 to 2012-2016, the vacancy rate in Vancouver has decreased slightly, while it did rise by 1% from 2000 to 2010 before dropping.**

For the 2012-2016 period, the vacancy rate in Vancouver is similar to the county's, but lower than that of the state.

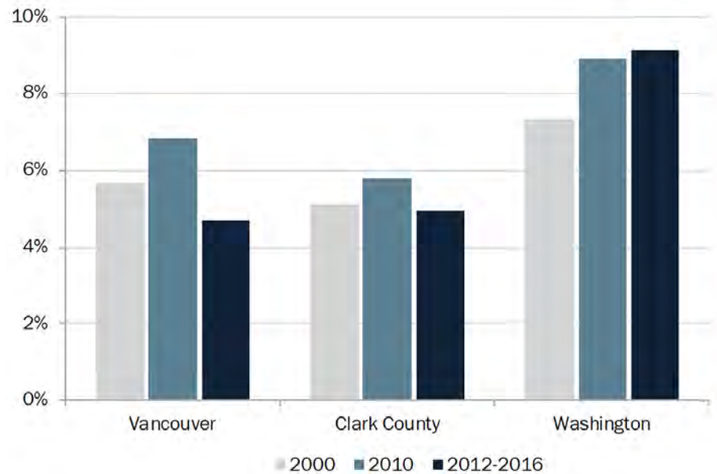



*Figure 23: Vacancy Rate Over Time*

## HOUSING SUPPLY TRENDS

Since the recession, residential permits for multifamily units have increasingly been issued. Data for Q1 2018 shows that Vancouver issued 184 permits, of which 67% were for single-family residences, 3% were for mobile home placements, 4% were for duplexes, and 26% were for multifamily units. The diagram below shows the dramatic upwards swing for multifamily permits that started in 2012-2013 and passed pre-recession permit levels in 2017.

**From 2001 to 2017, Vancouver issued over 14,000 permits for new dwelling units.** In this period, Vancouver issued 323 permits for single-family residences, 14 permits for mobile home placements, and 7 permits for duplexes per year and on average. The average for multi-family units was 517 per year.




*Figure 24: Building Permits by Unit Type*

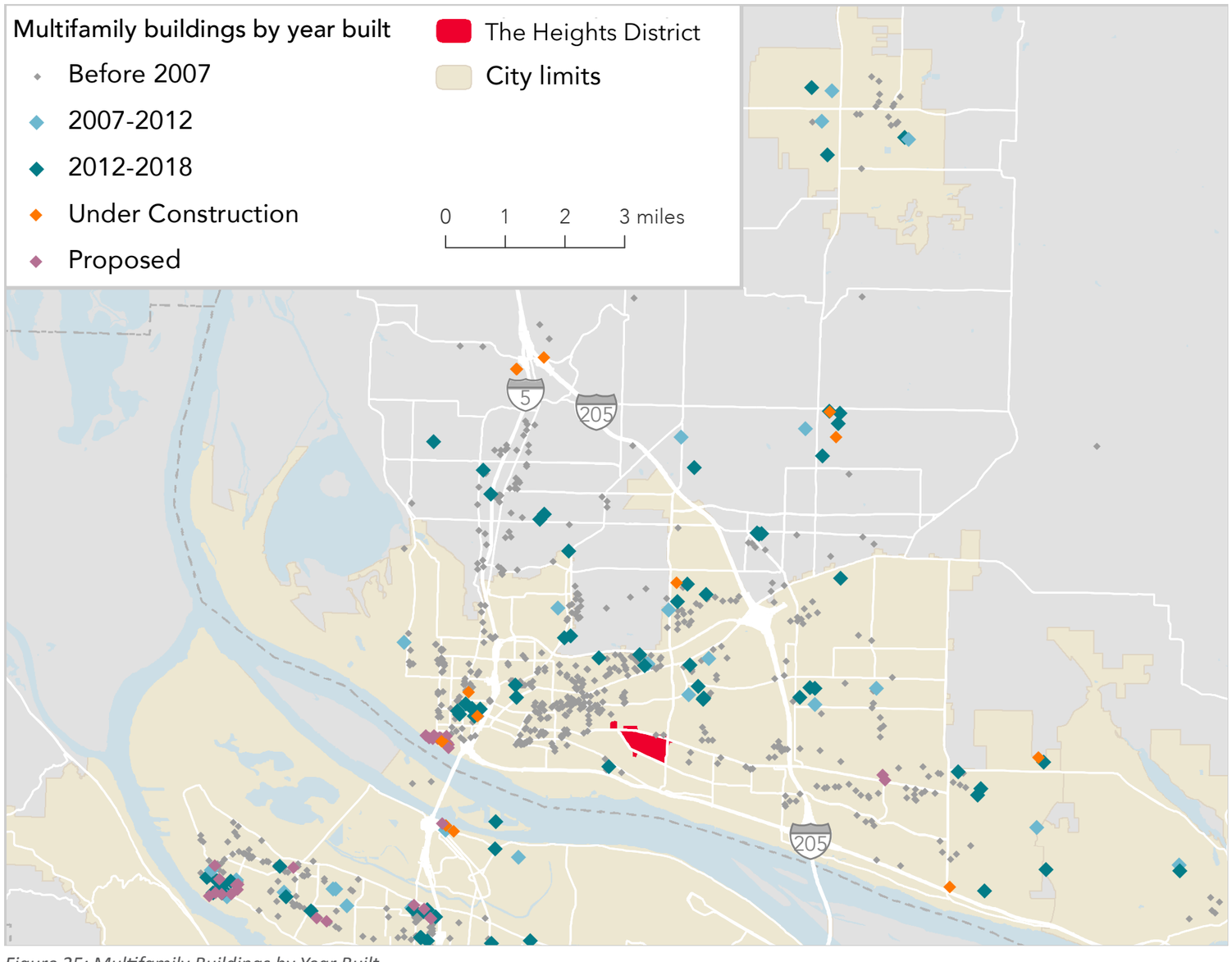



*Figure 25: Multifamily Buildings by Year Built*

An inventory of multifamily housing in Vancouver shows that there are currently 559 multifamily properties with approximately 32,408 units. On average for all bedroom sizes, units are about 880 to 900 sq. ft. As of Q1 2018, nine multifamily buildings were under construction accounting for 684 units. Of these 684 units, about 73% were studios, 10% were 1-bedroom units, 11% were 2-bedroom units, 6% were 3-bedroom units, and 1% were 4-bedroom units.

The diagram on the previous page shows the distribution of multifamily housing units around the city. There are concentrations of newly constructed multifamily units and those under construction or proposed in the downtown and waterfront areas.

**Historical data indicates that on average of 500 multifamily units per year have been supplied to Vancouver.**

| 4 | 528 | 455 |
|---|---|---|
| Building Deliveries | Unit Deliveries | Unit Absorption |

**Since 2013, multifamily unit deliveries increased above recent historical average of about 500 units per year.** From 2015 to 2017, Vancouver has added approximately 2,350 multifamily units.

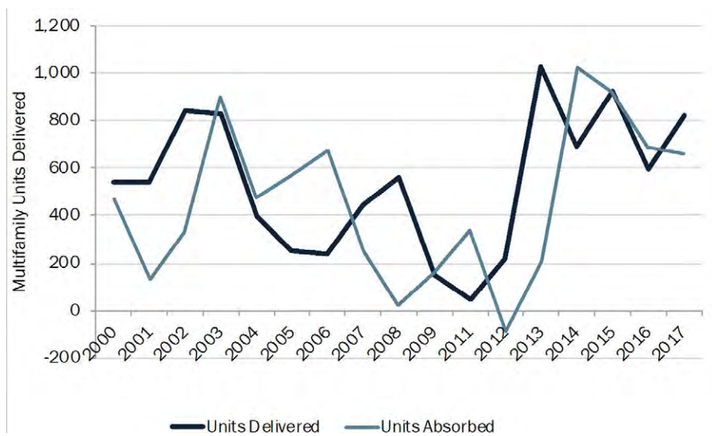



*Figure 26: Multifamily Unit Delivery Over Time*

In Clark County, there are 13 multifamily development projects currently under construction. All 13 buildings are market rate projects. These projects will deliver 905 units. Three of the 13 projects are within three miles of The Heights District. These projects will deliver 98 units.

Information on the three multifamily projects:

- Villas at Walnut Park, 5806 NE 72nd Avenue (19 units)
- Hamilton, 2000 Broadway Street (30 units)
- Our Heroes Place, 412 E 13th Street (49 units)

**Of the 98 units under construction within three miles of the District, a majority are studio units.**

| 43% | 12% | 33% | 12% | 0% |
|---|---|---|---|---|
| Studio | 1-Bedroom | 2-Bedroom | 3-Bedroom | 4-Bedroom + |

## MULTIFAMILY RENTAL RATES

Multifamily rental rates in Vancouver have steadily increased in the past decade. The average multifamily rental rate in Vancouver surpassed $1 per square foot in 2014 and has continued to climb in recent years. The vacancy rate has fluctuated between 4 to 5%, while at the same time the rental rate has grown at an increasing rate.

These trends can also be illustrated in nominal levels. The percentage of Vancouver renters who were paying over $1000 in rent per month grew from 32% in 2007-2011 to over 48% in 2012-2016. Multifamily rents do tend to be slightly less costly in Vancouver than in Clark County generally. As of 2016, 47% of renters were paying more than $1,000 in gross rent, compared to 50% in Clark County and 52% in Washington.

**From 2011 to 2016, gross rents for Vancouver residents have increased.**

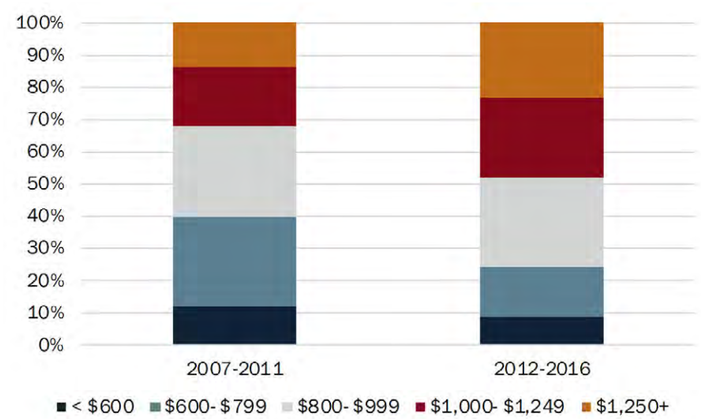



*Figure 27: Rents Increase Over Time*

**In Vancouver, about 47% of renters pay more than $1,000 per month for housing.** About 23% of Vancouver renters pay $1,250 or more in gross rent per month, less than Clark County or Washington.

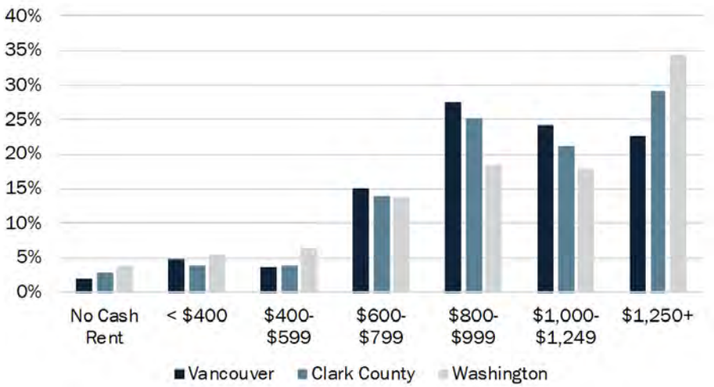



*Figure 28: Rents Comparison Across Geographies*

## RESIDENTIAL SALES

With a median sales price of about $279,000 in 2017, Vancouver's housing sales were generally lower than all comparative areas in this analysis. Vancouver's housing prices decreased after the recession, but since 2012, have steadily began to climb alongside regional trends.

**Vancouver's median home sales price was below that of Portland, Clark County, the MSA, and state.** Vancouver's median home sales price was 11% less than Clark County's.

| $279K | $392K | $310K | $348K | $322K |
|---|---|---|---|---|
| Vancouver | Portland (City) | Clark County | Portland MSA | Washington |

**Between March 2008 to March 2018, home sales prices in Vancouver followed similar trends to comparative areas but tended to remain lower overall.** Vancouver's median home sales price is increasingly alongside regional trends.

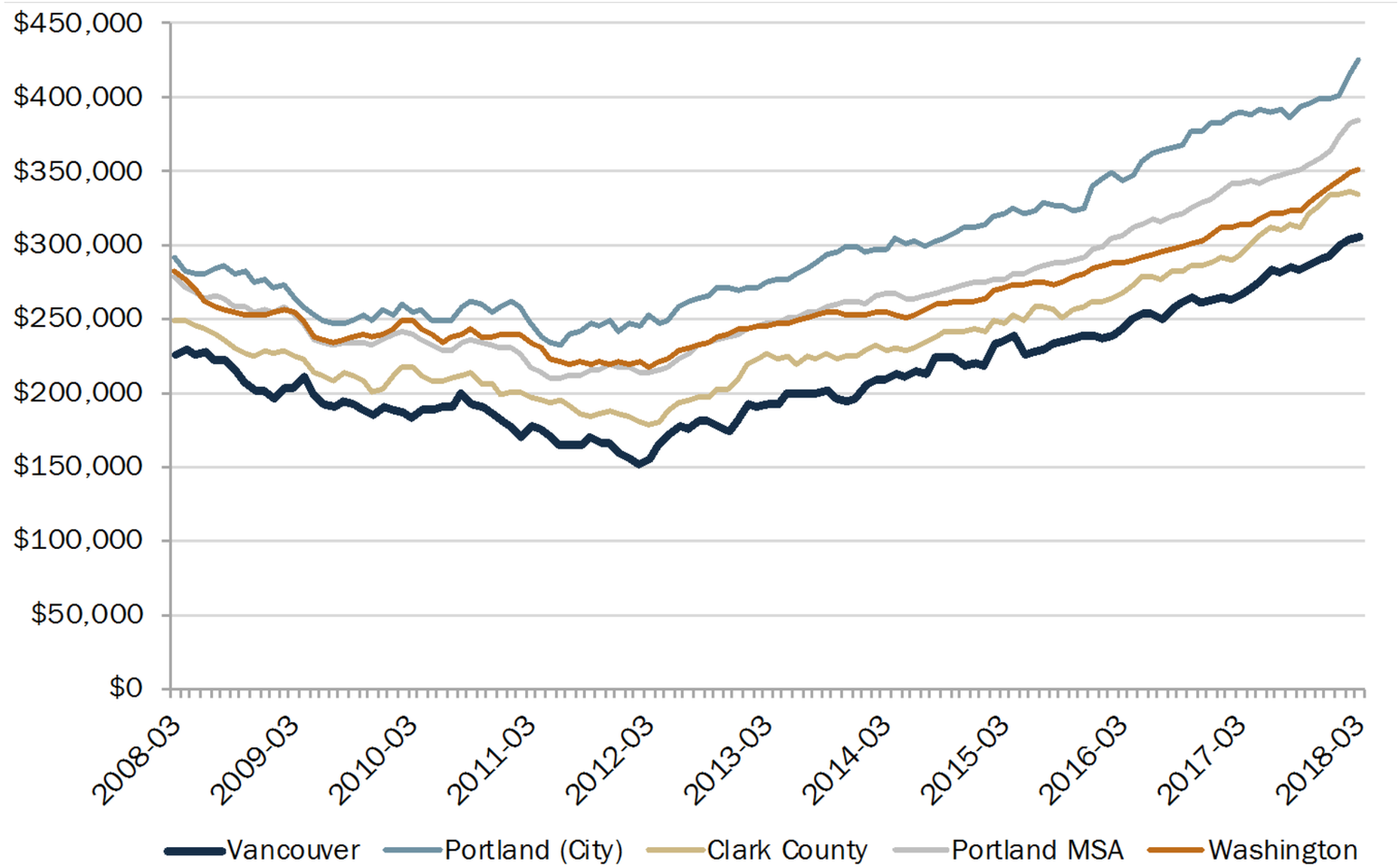



*Figure 29: Median Home Sales Price Over Time*

## COMMERCIAL USES

This second sub-section is an assessment of Vancouver's commercial real estate trends (office and retail).* In this assessment, we look at Vancouver's commercial real estate conditions and trends that will influence the market appeal and viability of commercial uses in The Heights District. Key market findings are:

- **Market Deliveries.** The Vancouver commercial real estate market has been active during this market cycle. From 2010 to the first quarter of 2018, an average of 5 office buildings and 14 retail buildings were delivered per year.
- **Retail Lease Characteristics.** Retail rent per square foot dropped during the recession but is almost back up to pre-recession levels. In the last two years, retail rent per square foot has increased from $19.21 to $22.30, a 16% increase.
- **Office Market Characteristics** Office rents have increased slowly since 2011. Office vacancy rates have plummeted from a recession high of 14% to less than 8% today.

**As of Q1 2018, the average office building was about 24,000 sq. ft. while the average retail building was about 17,000 sq. ft.**

| | Building Inventory | Total Square Feet | Vacant Square Feet (of Total) |
|---|---|---|---|
| Office Uses | 128 | 3.1 million | 7% |
| Retail Uses | 323 | 5.5 million | 5% |

*Figure 30: Nonresidential Building Inventory*

**From 2010 to Q1 2018, an average of 4 office buildings and 14 retail**

| | Average Deliveries per Year | |
|---|---|---|
| | Building Deliveries | Square Feet Deliveries |
| Office Uses | 4 | 105,355 |
| Retail Uses | 14 | 220,308 |
| Total | 19 | 325,663 |

*Figure 31: Nonresidential Building Delivery*

**Industrial properties are typically included in the grouping of commercial real estate. Because it is unlikely the industrial properties will play a role in The Heights District, we have focused exclusively on office and retail properties in this section.*

**Retail deliveries by square footage have declined from historical deliveries. Since 2015, about 466,700 square feet of retail space has been provided to the Vancouver market.**

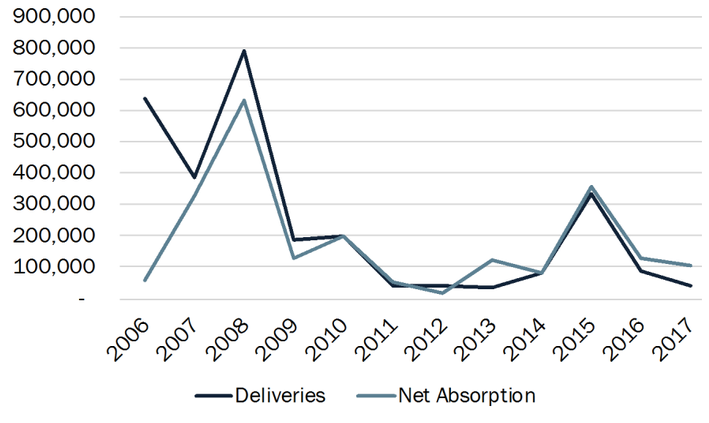



*Figure 32: Retail Deliveries By Square Footage Over Time*

**Retail rent per square foot has declined since 2010. However, from 2016 to Q1 2018, retail rent per square foot has increased from $19.21 to $22.30 ($3.09 or 16%).** Meanwhile, with the exception of the small uptick in vacancy in Q1 2018, retail vacancy has steadily decreased, from 8.9% in 2010 to 4.2% in 2017.

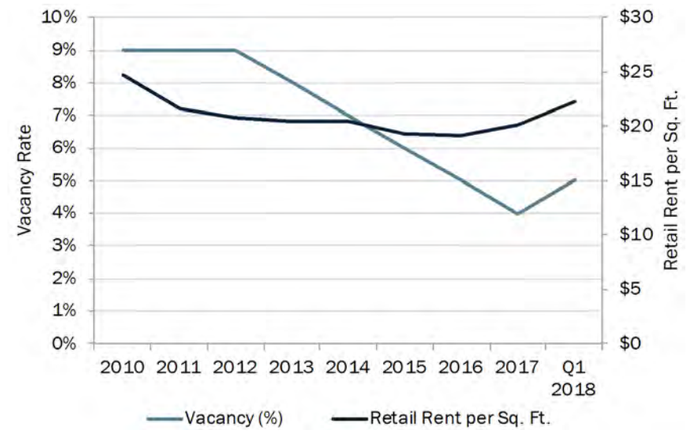



*Figure 34: Retail Rent and Vacancy Over Time*

**Since 2015, about 302,000 square feet of office space have been delivered to Vancouver. This accounts for about 22% of all office space deliveries (sq. ft.) since 2006.**

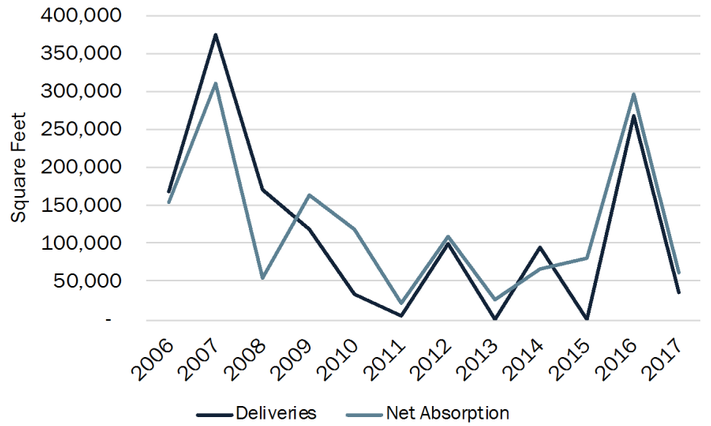



*Figure 33: Office Deliveries By Square Footage Over Time*

**Office rents have increased slowly since 2011 as office vacancy rates have decreased.** From 2010 to Q1 2018, office rents have increased by $1.68/sq. ft. (7% change). In this same time, vacancy rates went from 14% in 2010 to 7% in Q1 2018.

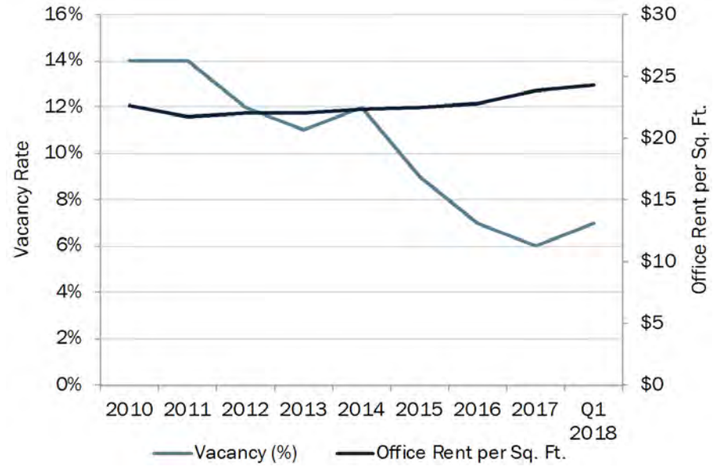



*Figure 35: Office Rent and Vacancy Rate Over Time*

## FACTORS AFFECTING OFFICE AS A SUPPORTIVE USE

A supportive land use is one that helps to sustain a primary land use. Although the mix of future land uses at The Heights District has yet to be defined in the planning process, there are indications—from the community, project participants, and from the market—that multifamily uses will play a primary role, and retail and office uses are likely to play a supportive role.

For office uses, there are several factors that make The Heights District not the most desirable area as a primary office location. The District has some physical constraints (topography) and its geographic location, within the context of the city of Vancouver and the larger metropolitan region, is not a historic center of office uses. To accomplish a viable office sector in the District, it is more likely that the entire area would have to be redeveloped into an office park—an idea that is generally out of alignment with current District visioning, and interest from market participants (i.e., developers and office tenants).

For these reasons, office uses are likely to play a supportive role in The Heights District. A supportive role could take the form of smaller commercial office spaces on first floor of residential buildings or services to support the needs of local and District residents.

## FACTORS AFFECTING RETAIL AS A SUPPORTIVE USE

New residents will demand a number of products and services in close proximity. For this reason, supportive uses—likely restaurants, cafes, and other retail uses—will be needed to fulfill these demands. Mixed-use development is one option to fulfill this demand. Single story stand-alone retail buildings or adaptive reuse of current buildings in the area could also play a role in providing retail and service locations while maintaining area character and providing affordable commercial rents to existing or emerging businesses.

One of the most important decisions retail store owners make is where to locate their business. Location determines the accessibility of the store, customers' interest in entering the store, and, for many types of retail, the sales potential of the establishment. In addition to geographical accessibility, a retail owner must ensure that the location is one that is saturated with potential customers. There are a number of factors that act as strong predictors of preferences within a community. By identifying the preferences and tendencies of consumers, a retail owner will be able to predict the success of their store.

| Retail Types | Population Factors | Locational Factors |
|---|---|---|
| Mid-Small Grocery Store (10,000 to 40,000 sq. ft.) | 6,000 to 8,000 people per store | Clustered near other retail uses; High Visibility and Access |
| Supermarket (50,000 to 100,000 sq. ft) | 10,000 people within 8 to 10-minute drive | Formulated for suburban shopping centers |
| Coffee Shop | 15,000 to 20,000 people per store | Convenient access for pedestrians and drivers |
| Movie Theater | 8,000 to 9,000 people per screen | Located at least 4 to 5 miles from another theater (film zone) |

*Figure 36: Factors Influencing the Location of Retail Uses*

Technological advances have changed consumer behavior and retail success dramatically. The growth of e-commerce makes it even more challenging for traditional brick-and-mortar stores to survive. This can create skepticism for local, "mom and pop" type shops to open their doors in certain communities. Understanding how community members tend to use technology (willingness to order items online or find better prices elsewhere) and their access to technology (smartphones, internet) is crucial to measuring the potential success of a given store. Accordingly, geographic location and the households that comprise the community impact the survival of a retail store. If a store's product is not aligned with the preferences of its potential customers, the store will fail. A significant amount of data collection and analysis must be performed before deciding to open a store in a new location. A summary of criteria considered when evaluating a potential establishment's viability in a given area includes:

- **Population Size and Characteristics.** Total size and density, age distribution, average educational level, total disposable income, per capita disposable income, occupation distribution, percentage of residents owning a home
- **Availability of Labor.** Management, management trainees, clerical
- **Closeness to Sources of Supply.** Delivery costs, timeliness, number of manufactures, number of wholesalers, availability and reliability of product lines
- **Economic Base.** Dominant industry, extent of diversification, growth projections, freedom from economic and seasonal fluctuations, availability of credit and financial facilities
- **Competitive Situation.** Number and size of existing competition, evaluation of competitor strength/weaknesses, short-run and long-run outlook, level of saturation
- **Availability of Store Locations.** Number and type of store locations, access to transportation, owning versus leasing opportunities, zoning restrictions, costs
- **Regulations.** Taxes, licensing, operations, minimum wages, zoning

## THE HEIGHTS FUTURE DEMAND ASSESSMENT

This section outlines demand for development at The Heights District over the next 20 years. This demand projection will inform the master planning process of the District—allowing for right-sizing of prospective development, amenity areas, and supportive infrastructure.

Demand projections allow us to answer the question: how much development can Vancouver expect over the next 20 years, and how much development can reasonably be captured in The Heights District?

As a first step in this process, this section outlines our projections for housing demand in the City of Vancouver. A latter step in The Heights District Plan will further detail demand for The Heights District and the capacity of the District to absorb that demand.

## CITY OF VANCOUVER HOUSING DEMAND PROJECTIONS

Housing demand projections, like any type of forecast, rely on rational assumptions and methods and detailed data in order to be meaningful and a reliable indicator of future outcomes. Here we rely on the best available data that we were able to identify—future population projections provided in the 2011-2030 Vancouver Comprehensive Plan. Should better data become available, these projections may need to be adjusted.

To forecast housing growth and demand, we call on the socio-economic and real estate trends uncovered in the first part of the Market Assessment. As a refresher, we note the following findings:

- Population growth in Vancouver is expected to continue to follow historical precedents.
- Vancouver households are smaller on average and have lower incomes, compared to comparative regions.
- Vancouver and Clark County exhibit low residential vacancy rates which indicate supply constraints.
- Since 2000, an average of 500 multifamily units have been delivered per year.
- Asking rents for multifamily housing has steadily increased alongside decreasing vacancy rates.

These findings inform ECONorthwest's assumptions to complete Vancouver's housing forecast. These assumptions are:

- **Population.** A 20-year population forecast (in this instance, 2018 to 2038) is the foundation for estimating needed new dwelling units. The following exhibit shows that Vancouver will grow by 25,900 people.
- **Household Size.** Vancouver's average household size is 2.49 persons per household. Thus, for the 2018 to 2038 period, we assume an average household size of 2.49 persons per household.
- **Vancacy Rate.** Vacancy rates are cyclical and represent the lag between demand and the market's response to demand for additional dwelling units. Vacancy rates for rental and multifamily units are typically higher than those for owner-occupied and single-family dwelling units. We assume a 4.7% vacancy rate.

| Variable | New Dwelling Units (2018-2038) |
|---|---|
| Change in persons | 25,900 |
| *minus* Change in persons in group quarters | 370 |
| *equals* Persons in households | 25,500 |
| Average household size | 2.49 |
| New occupied DU | 10,240 |
| *times* Aggregate vacancy rate | 4.7% |
| *equals* Vacant dwelling units | 480 |
| **Total new dwelling units (2018-2038)** | **10,720** |
| **Annual average of new dwelling units** | **540** |

*Figure 37: Forecast of Demand for New Dwelling Units*

This analysis shows that there will be increased demand for housing in Vancouver in the near to long term. Over the next twenty years, Vancouver will need close to 11,000 new dwelling units, developed an annual average of 540 units. Housing supply data and recent demographic trends suggest that many of these new housing units are likely to be multifamily units. As described in an early section of this report, the proportion of new multifamily housing units developed in Vancouver has been increasing in recent years. For example, from 2015 to 2017 approximately 2,350 multifamily housing units were developed within the city. Demographic trends, such as a decrease in households with children and shrinking household size, also point to future increased demand for multifamily housing.

## DEMAND FOR AFFORDABLE HOUSING

A typical standard used to determine housing affordability is that a household should pay no more than a certain percentage of household income for housing, including payments and interest or rent, utilities, and insurance. HUD guidelines indicate that households paying more than 30% of their income on housing experience "cost burden," and households paying more than 50% of their income on housing experience "severe cost burden."

About 37% of Vancouver's households are cost burdened. About 50% of renter households are cost burdened, compared with 24% of homeowners. To use an example, 20% of Vancouver households have income of less than $25,000 per year. These households can afford rent of less than $625 per month, or a home with a value of less than $62,500. Most, but not all, of these households are cost burdened.

**Renters are much more likely to be cost burdened than homeowners.** In the 2012-2016 period, about 50% of renters were cost burdened, compared to 24% of homeowners.

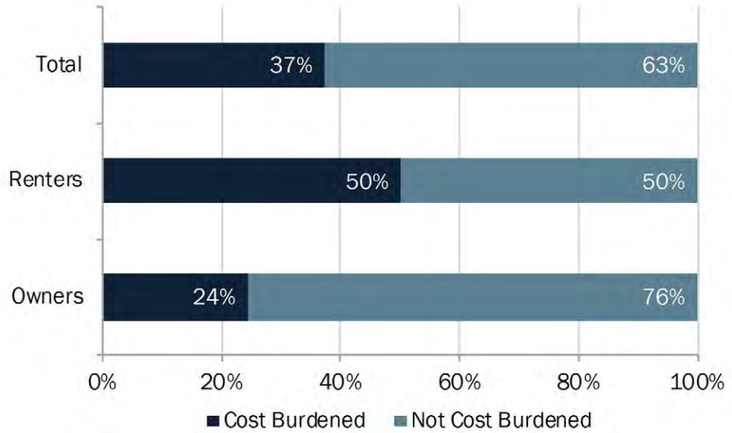



*Figure 39: Cost Burden*

While cost burden is a common measure of housing affordability, it does have some limitations. Two important limitations are:

- A household is defined as cost burdened if the housing costs exceed 30% of their income, regardless of actual income. The remaining 70% of income is expected to be spent on non-discretionary expenses, such as food or medical care, and on discretionary expenses. Households with higher incomes may be able to pay more than 30% of their income on housing without impacting the household's ability to pay for necessary non-discretionary expenses.
- Cost burden compares income to housing costs and does not account for accumulated wealth. As a result, the estimate of how much a household can afford to pay for housing does not include the impact of a household's accumulated wealth. For example, a household of retired people may have relatively low income but may have accumulated assets (such as profits from selling another house) that allow them to purchase a house that would be considered unaffordable to them based on the cost burden indicator.

Cost burden is only one indicator of housing affordability. Another way of exploring the issue of financial need is to review housing affordability at varying levels of household income.

Forty-three percent of Vancouver households have incomes of less than $44,820 and cannot afford a two-bedroom apartment at Clark County's 2017 identified Fair Market Rent* (FMR) of $1,242.

**Fair Market Rent is a benchmark rent calculated by HUD to determine Section 8 Voucher rates. Other agencies and organizations also use FMR for various purposes. Generally, FMR represents a locally sensitive rent for a lower income housing unit.*

| MFI % Categories | < 30% | 30% to 60% | 60% to 80% | 80% to 120% | > 120% |
|---|---|---|---|---|---|
| Annual Income by % of MFI | < $24,410 | $24,410 to $44,820 | $44,820 to $59,760 | $59,760 to $89,640 | > $89,640 |
| Monthly Affordable Housing Cost | < $560 | $560 to $1,121 | $1,121 to $1,494 | $1,494 to $2,241 | > $2,241 |
| % of Vancouver Households | 17% | 26% | 14% | 18% | 24% |
| Attainable Owner-Occupied Housing Types | None | Mfg. in parks | Single-family attached; condos; duplexes; mfg. on lots | All housing types of lower values | All housing types of higher values |
| Attainable Renter Housing Types | Apts.; new and used govt assisted housing | Apts.; mfg. in parks; duplexes | Single-family attached; detached; mfg. on lots; apts. | All housing types of lower values | All housing types of higher values |
| | Primarily Existing Homes | | | Primarily New Homes | |

*Figure 40: Financially attainable housing for households at various percentages of median family income*

**Fair Market Rent for a 2-bedroom apartment in Clark County is $1,242/month**

| $946 | $1,053 | $1,242 | $1,808 | $2,188 |
|---|---|---|---|---|
| Studio | 1-Bedroom | 2-Bedroom | 3-Bedroom | 4-Bedroom |

**A household must earn at least $23.88 per hour to afford a two-bedroom unit at FMR in Clark County.**

To explain housing affordability another way, we compare the number of households by income with the number of units affordable to those households in Vancouver. Vancouver currently has a deficit of housing affordable to households earning less than $25,000. The deficit of housing for households earning less than $25,000 results in these households living in housing that is more expensive than what they can afford. Households in these income ranges are generally unable to afford market rate rents. When lower cost housing (such as government subsidized housing) is not available, these households pay more than they can afford in rent. This is consistent with the data about renter cost burden in Vancouver.

Accordingly, we note in the diagram below that Vancouver has a deficit of housing types that are affordable such as apartments, duplexes, tri- and quad-plexes, manufactured housing, townhomes, and smaller single-family housing. Vancouver also has a deficit for executive housing.

Developing housing types at the lower end of this spectrum is a challenge because rents are lowered and generating economies of scale are sometimes limited. Appendix E provides a supplemental read on affordable housing.

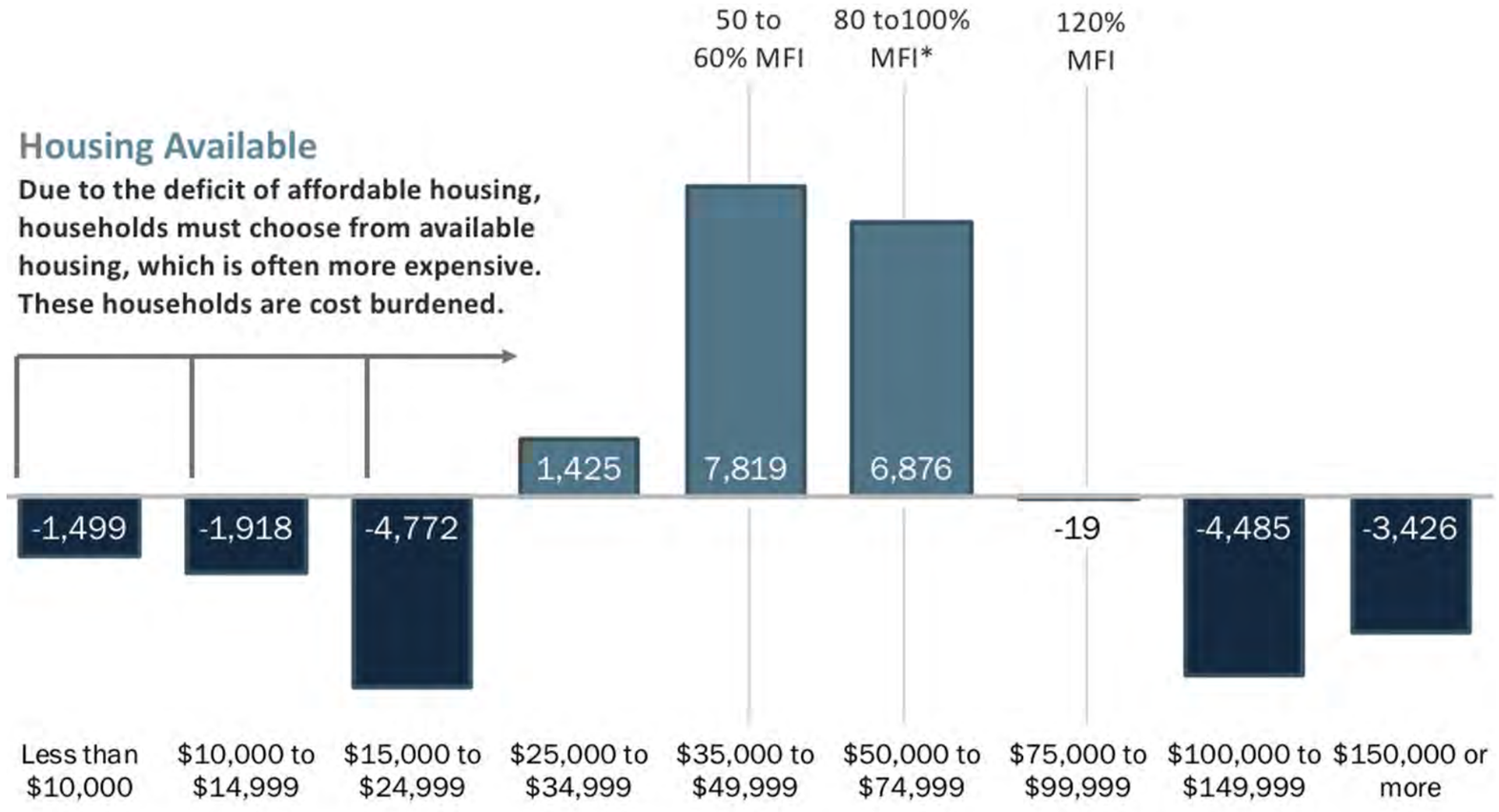



*Figure 41: Housing Availability by Income Type*

## RESIDENTIAL HOUSING TYPE CUTSHEETS

This section presents several recently constructed developments in Vancouver as examples of housing types that may be possible in the District. These are provided to support discussions on appropriate housing types for The Heights. These examples have not been financially modeled however, and therefore financial feasibility, at this point, is unknown. The mix of precedents shown is also not intended to imply a balance of housing types expected or feasible within The District.

### 13 West Apartments

Location: Vancouver, WA
Year Built: 2017

Housing Units: 92
Unit Mix:

- Studio – 22%
- 1-Bed – 54%
- 2-Bed – 24%

Overall average asking rent: $1.16 per sq. ft.
1-Bed average asking rent: $1.11 per sq. ft.

Amenities: Breakfast/Coffee Concierge, Clubhouse, Dishwasher, Elevator, Fitness Center, Hardwood Floors, Microwave, Oven, Playground, Range, Refrigerator, Stainless Steel Appliances, Tub/Shower, Washer/Dryer

### Vintage at Vancouver (Affordable, Senior)

Location: Vancouver, WA
Year Built: 2002

Housing Units: 154
Unit Mix:

- 1-Bed – 50%
- 2-Bed – 50%

Parking Ratio: 1.21 (160 stalls)

Overall average asking rent: $1.15 per sq. ft.
1-Bed average asking rent: $1.25 per sq. ft.

Amenities: Air Conditioning, Balcony, Business Center, Cable Ready, Ceiling Fans, Dishwasher, Disposal, Fitness Center, Gameroom, Grill, High Speed Internet Access, Laundry Facilities, Laundry Service, Microwave, Playground, Pool, Property Manager on Site ...

### Midtown


Location: Vancouver, WA
Year Built: 2017

Housing Units: 48
Unit Mix:

- 1-Bed – 65%
- 2-Bed – 35%

Parking Ratio: .59 (18 stalls)

Overall average asking rent: $3.00 per sq. ft.
1-Bed average asking rent: $3.84 per sq. ft.

Amenities: Ceiling Fans, Fireplace, Granite Countertops, Hardwood Floors

### The MEWS at Cascadia Village (Affordable)

Location: Vancouver, WA
Year Built: 2005

Housing Units: 24
Unit Mix:

- 1-Bed – 33%
- 2-Bed – 25%
- 3-Bed – 29%
- 4-bed – 13%

Overall average asking rent: $0.44 per sq. ft.
1-Bed average asking rent: $0.50 per sq. ft.

Amenities: Air Conditioning, Balcony, Courtyard, Trash Pickup - Door to Door, Washer/Dryer, Wheelchair Accessible Rooms

# 3.2 LAND USE AND ZONING

## HISTORICAL CONTEXT

The known history of The Heights District starts with the Native population. Chinook people had villages along the Columbia River and used the lowlands around present-day Vancouver. Cowlitz people occupied the more inland area around Vancouver. Prairies often were maintained by burning to encourage specific plants and attract animals for subsistence. Introduced diseases swept through the area in the nineteenth century, decimating Native populations. Today, Native people with roots in the area are members of several different Tribes.

After Fort Vancouver was established, agricultural endeavors grew up around several prairies, and roads from the Fort passed through prairies, including nearby Mill Plain and Fifth Plain. During WWII, as people flocked to Vancouver for jobs in the shipyard and aluminum plant, housing was in short supply. The Heights was the second largest wartime housing project in the nation. Recreation centers provided after school activities for children while their parents worked. Land was set aside for people to plant “victory gardens” to help feed their families. Bus service was available to take residents to their jobs. After the war, the temporary homes were removed and the property redeveloped.

The building stock in and around The Heights reflects prevailing design trends during the postwar period, with wide single story homes and winding, unconnected streets with few sidewalks. This reflects an underlying assumption of automobiles being the primary mode of transportation anywhere outside the home. This is even reflected in home design, as the garage protrudes to take precedence over the front door as the primary entrance.

In contrast, the historic city center is based on a regular grid, which more evenly prioritizes pedestrian and bicycle movement, with smaller lots and larger houses reflecting pre-automobile design sensibilities. Newer subdivisions, despite still being primarily auto-oriented, partially recapture these historic characteristics. Although they have winding streets and large lots and blocks, they have sidewalks and cut-through paths to increase pedestrian access and home designs have largely restored the prominence of the front door over the garage.

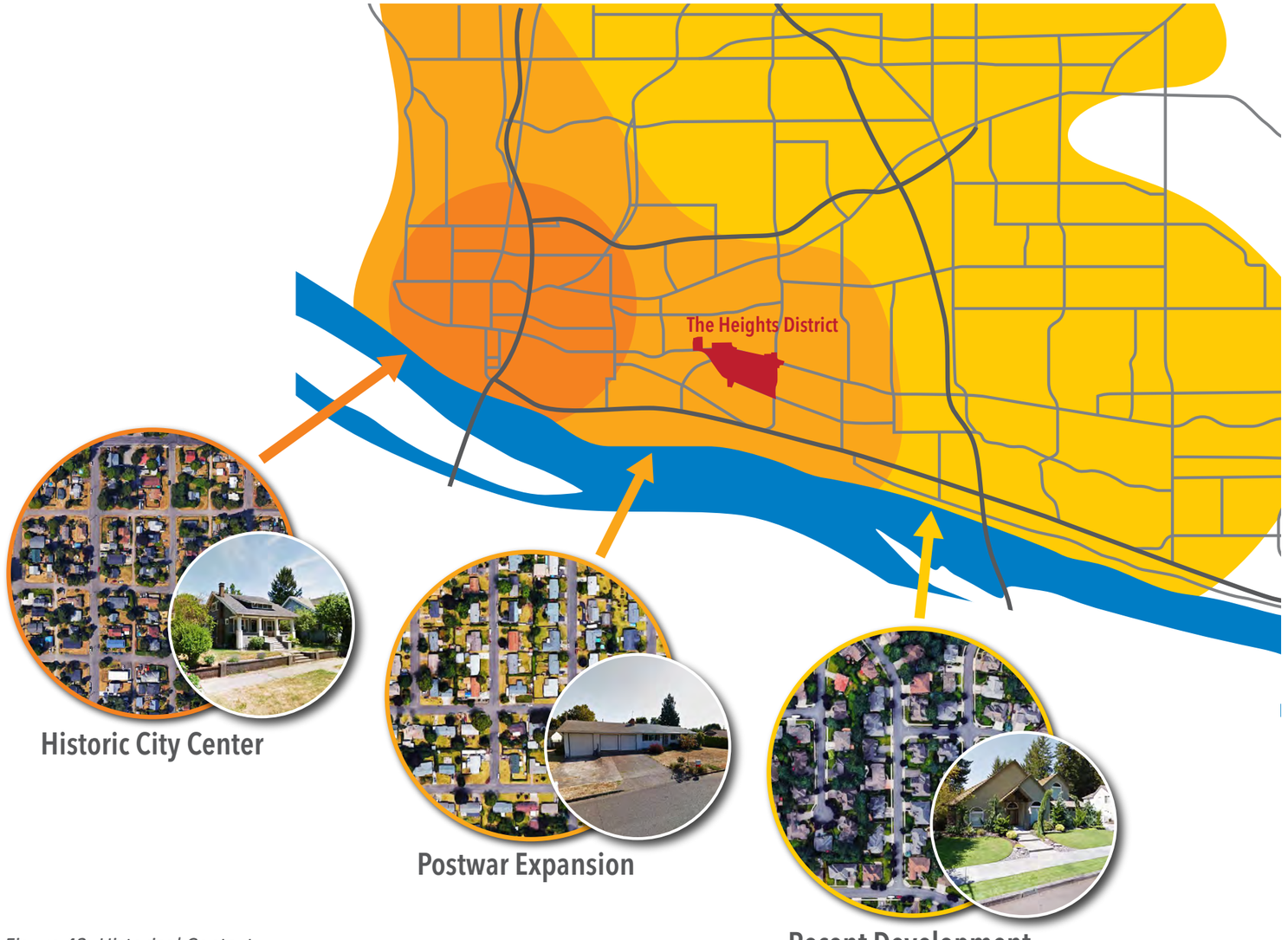
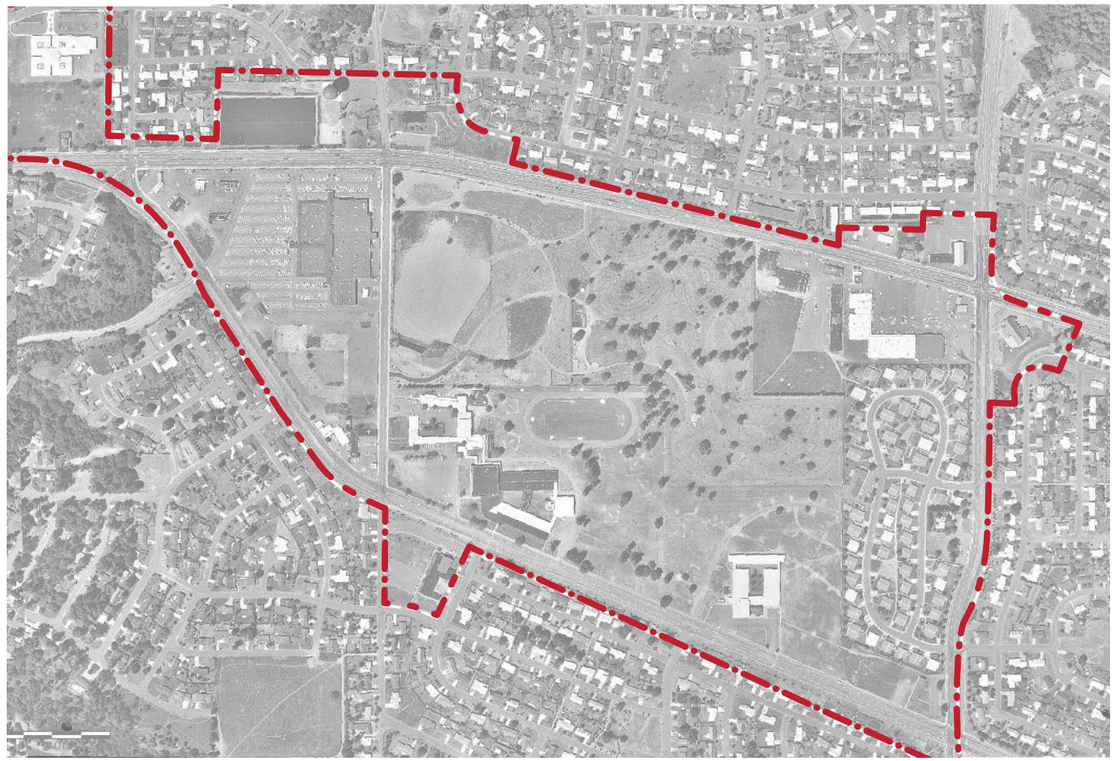



*Figure 42: Historical Context*

*Research credit: Archaeological Investigations Northwest, Inc*

## 1955

This historic photo shows the postwar condition of the Heights. There are few recognizable features from this time that persist today. Notable features are a shopping center that predated the Tower Mall near the corner of Devine Road and MacArthur Boulevard, the water utility site, and Park Hill Cemetery.



*Source: Clark County Historical Museum*

## 1974

In the twenty years preceding this photo, the neighborhoods were demolished and rebuilt into the form that persists today. Tower Mall, Skyline Crest, and the three schools were also built during this time. The shopping center at the corner of Andresen Road and Mill Plain Boulevard also began to take shape. By the time this photo was taken, most major features of the Heights were in place.

## NATURAL FEATURES CONTEXT

The Heights District is positioned in the center of a wedge-shaped plateau, which is the highest area of the city. Drainage goes either down to the green belt to the north or south through Blandford Canyon to the Columbia River. Views from the District are restricted since there are several blocks of trees and houses seperating it from the edge of the plateau. The only properties having a view across the river towards Portland are the residential properties on the ridge south of the district. There are some views from the north side of the plateau towards Burnt Bridge Creek but they are mostly blocked by trees.

Most of the tree canopy is along the ridges, ravines, and larger parks, driven in part by the drainage patterns. Older neighborhoods to the west have more tree coverage than the newer ones to the east.

A more detailed site analysis, including tree canopy, soils conditions and drainage of the Redevelopment Site, will be developed as the planning process evolves.

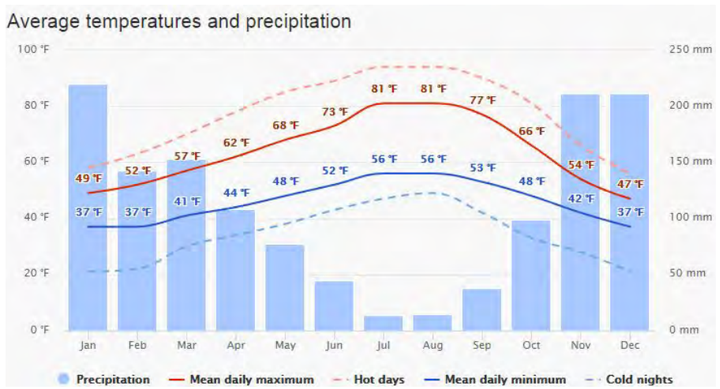



*Figure 43: Average Temperatures and Precipitation*

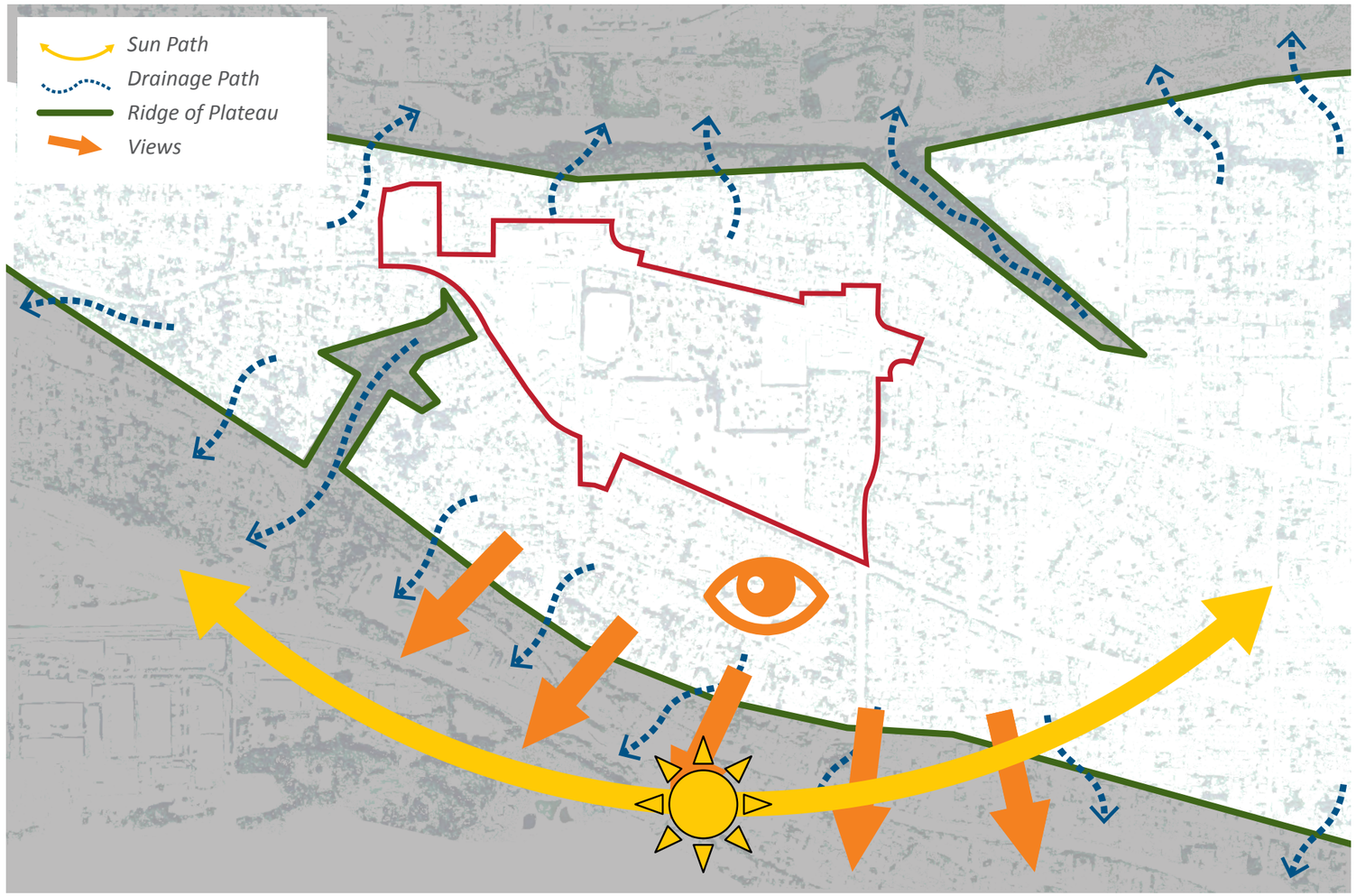



*Figure 44: Natural Features Context*

## PLAN BOUNDARIES

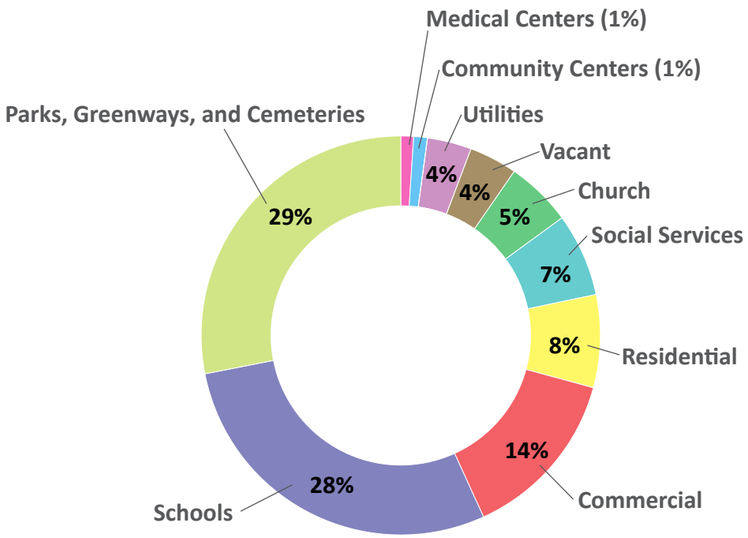
Although “The Heights” colloquially refers to the whole plateau, “The Heights District” refers to the central, non-residential area that is the focus of this study. The Heights District is 205 acres and bounded generally by MacArthur Blvd, Mill Plain Blvd, and Andresen Rd, although it contains some parcels on the other side of the street in several locations.

Within The District, the “Tower Mall Redevelopment Area” will be the subject of a redevelopment plan for this 63 acre area, consisting of four clusters of parcels depicted in orange in the map to the right.


*Figure 45: Plan Boundaries*

## LAND USE MAP

When examining land use by parcel, It becomes clear that schools and the cemetery form major components of the heights. Beyond this, there is a large variety of uses with notable concentrations of commercial uses encompassing restaurants and retail at the intersections of major roads.



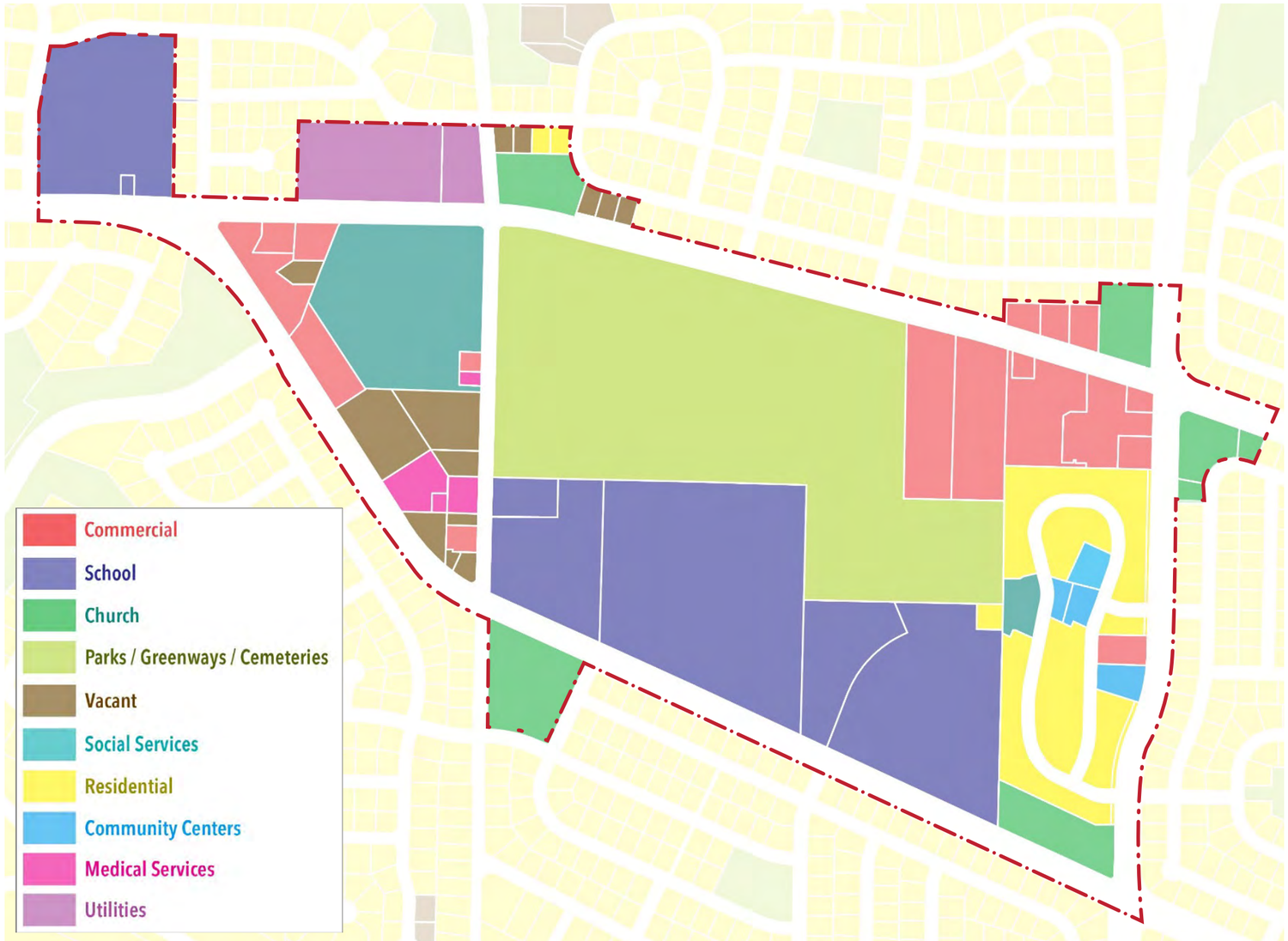




*Figure 46: Land Use Map and Chart*

## BUILDINGS VS. OPEN AREA

The Heights District parcels are currently 85% open, which is typical of a suburban area where buildings are surrounded by green space and surface parking, rather than being located up against streets. The cemetery is also a major factor driving up this figure. The open space contained in Park Hill Cemetery and the schools combined comprise over 50% of the open area.

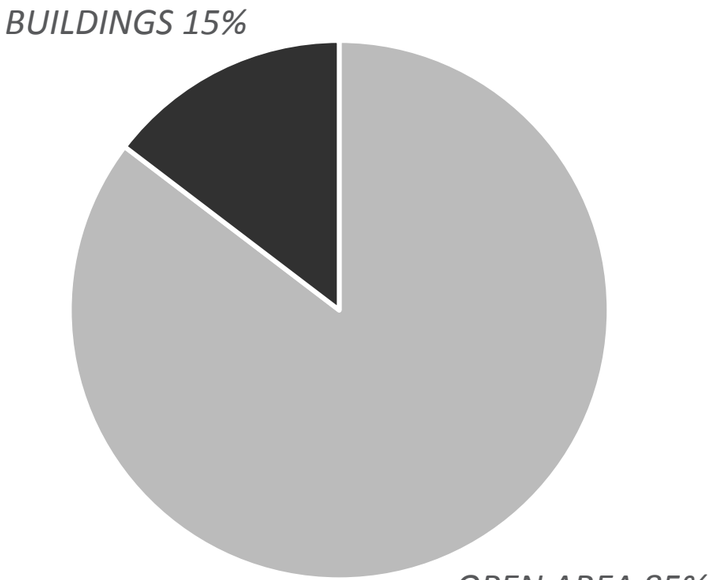



*Figure 47: Buildings vs. Open Area Map and Chart*

## EXISTING OPEN AREA

As shown in a previous diagram, 85% of The Heights District is open space. As is typical of a suburban context, it is predominantly used for either parking or green open space. The commercial and office spaces are surrounded by surface parking, whereas the schools and cemetery are surrounded by green space.

To create this diagram, each parcel was categorized based on its open space. If it was more than 50% parking, it was considered to be a parking parcel wheras if it was more than 50% green space, it was considered to be a green space parcel. The percentages are based on the data aggregated by parcel.

As is typical of suburban areas, the commercial and office areas are surrounded mostly by surface parking, while schools and residences are surrounded mostly by open green area.

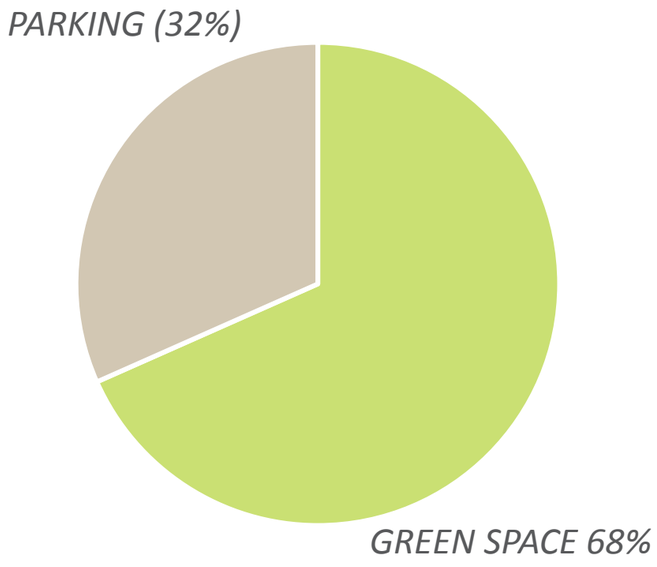



*Figure 48: Existing Open Area Map and Chart*

## EXISTING BUILDING USE

As shown in a previous diagram, 15% of The Heights District is comprised of building footprints. This contains around 1.2 million square feet of enclosed space. This diagram reveals the diverse range of uses that take place within a single parcel and even within a single building. Town Plaza, for example, contians a church, a dance studio, and various social service organizations. The presence of churches is notably high. there is at least one church located at every major intersection. Additional churches are located inside structures such as Town Plaza and the commercial district in the northeast area of the Heights.

Other notable clusters of uses include the fire and water city services North of Town Plaza, a cluster of medical offices south of Town Plaza, VHA's Skyline Crest neighborhood on the eastern border of The Heights, and the strip mall anchored by a Safeway at the corner north of Skyline Crest.

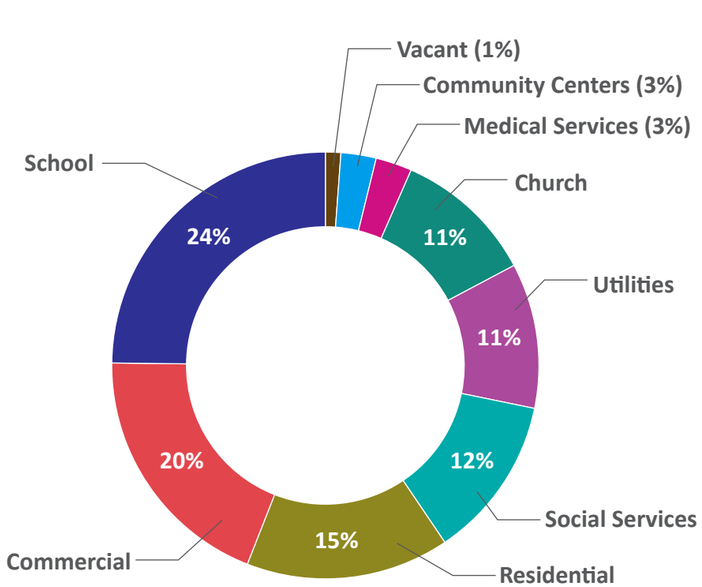




*Figure 49: Existing Building Use Map and Chart*

## VANCOUVER COMPREHENSIVE PLAN PLANNED FUTURE LAND USE

The City of Vancouver Comprehensive Plan's future land use areas do not prescribe major modifications to the existing land uses. The major elements such as the schools, water utility, Park Hill Cemetery, and Skyline Crest are anticipated to remain. This was confirmed by stakeholder interviews with parties representing these areas. However, it was also discovered through these interviews that the borders of these areas are malleable in specific circumstances.

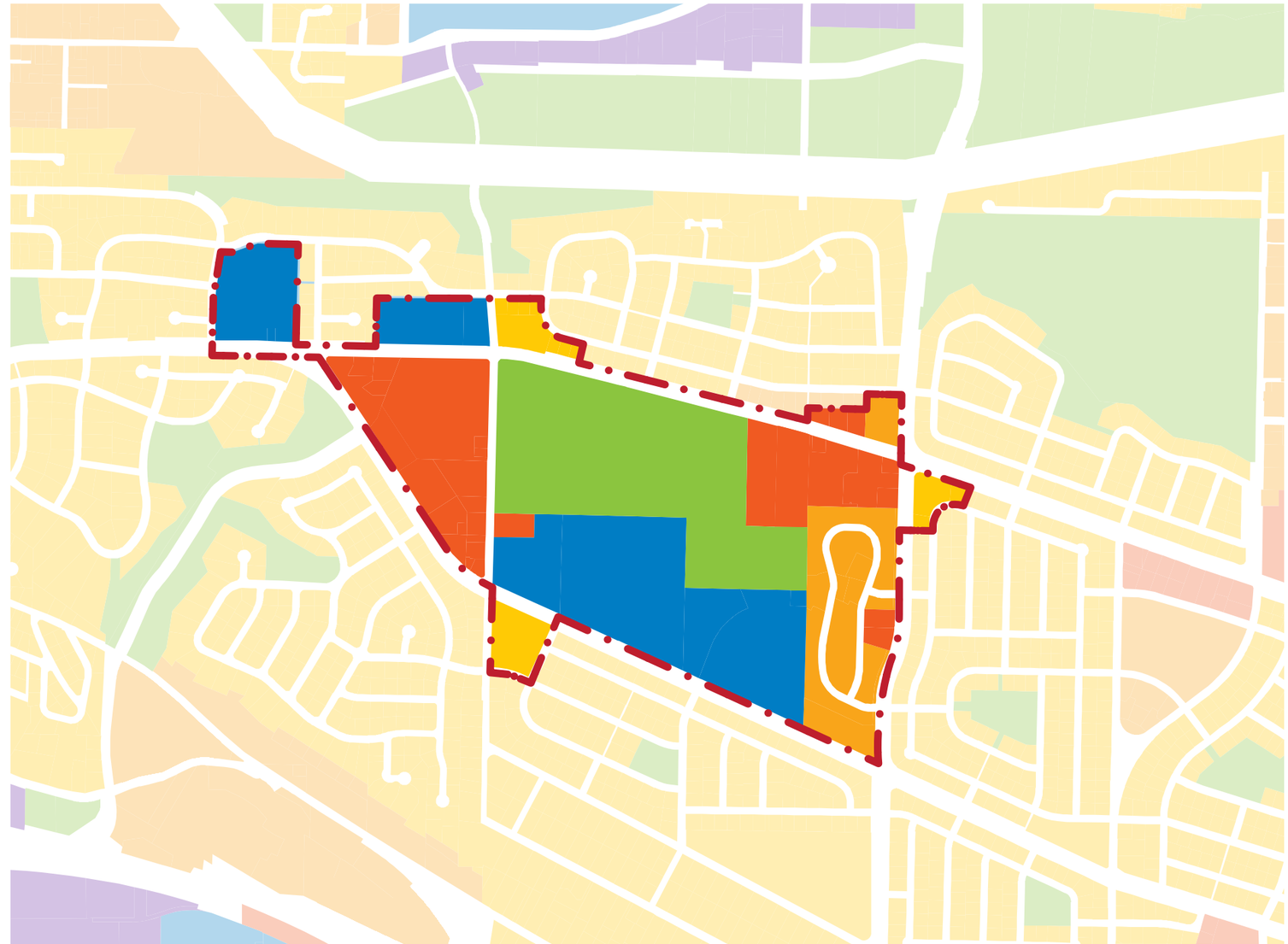



*Figure 50: Vancouver Comprehensive Plan Planned Future Land Use*

## ZONING

The Heights District contains 4 residential zones, 2 mixed-use zones, and 1 open space zone. These zones regulate both uses as well as placement and dimensions of physical structures within their parcels.

The largest mixed use zone, Community Commercial (CC), allows a maximum density of 5 stories on 85% of the lot area (effectively allowing a floor area ratio of 4.25). This is somewhere in the middle of Vancouver's spectrum of allowed densities.

Community Commercial and Neighborhood Commercial zones allow apartments, ground floor commercial space, and some office uses. Major office campuses and industrial facilities are not allowed in these zones. The remaining zones allow only residential use, with the exception of R18 which allows small commercial spaces.

| Zone | Meaning | Min lot area | Setbacks | | | Height | Lot Coverage |
|---|---|---|---|---|---|---|---|
| | | | Front | Rear | Side | | |
| R4 | 4 Houses Per Acre | 10,000 SF | 10' | 5' | 7' | 35' | 50% |
| R6 | 6 Houses per Acre | 7,500 SF | 10' | 5' | 5' | 35' | 50% |
| R9 | 9 Houses Per Acre | 5,000 SF | 10' | 5' | 5' | 35' | 50% |
| R18 | 18 Apartment Units Per Acre** | 2,500 SF | 10' | 5' | 5' | 50' | 50% |
| CN | Neighborhood Commercial*** | N/A | 10'* | 10'* | 10'* | 35' | 85% |
| CC | Community Commercial*** | N/A | 10'* | 10'* | 10'* | 50' | 85% |

**0' if adjacent to CC*
***some commercial / mixed use allowed*
****also allows residential above ground floor*

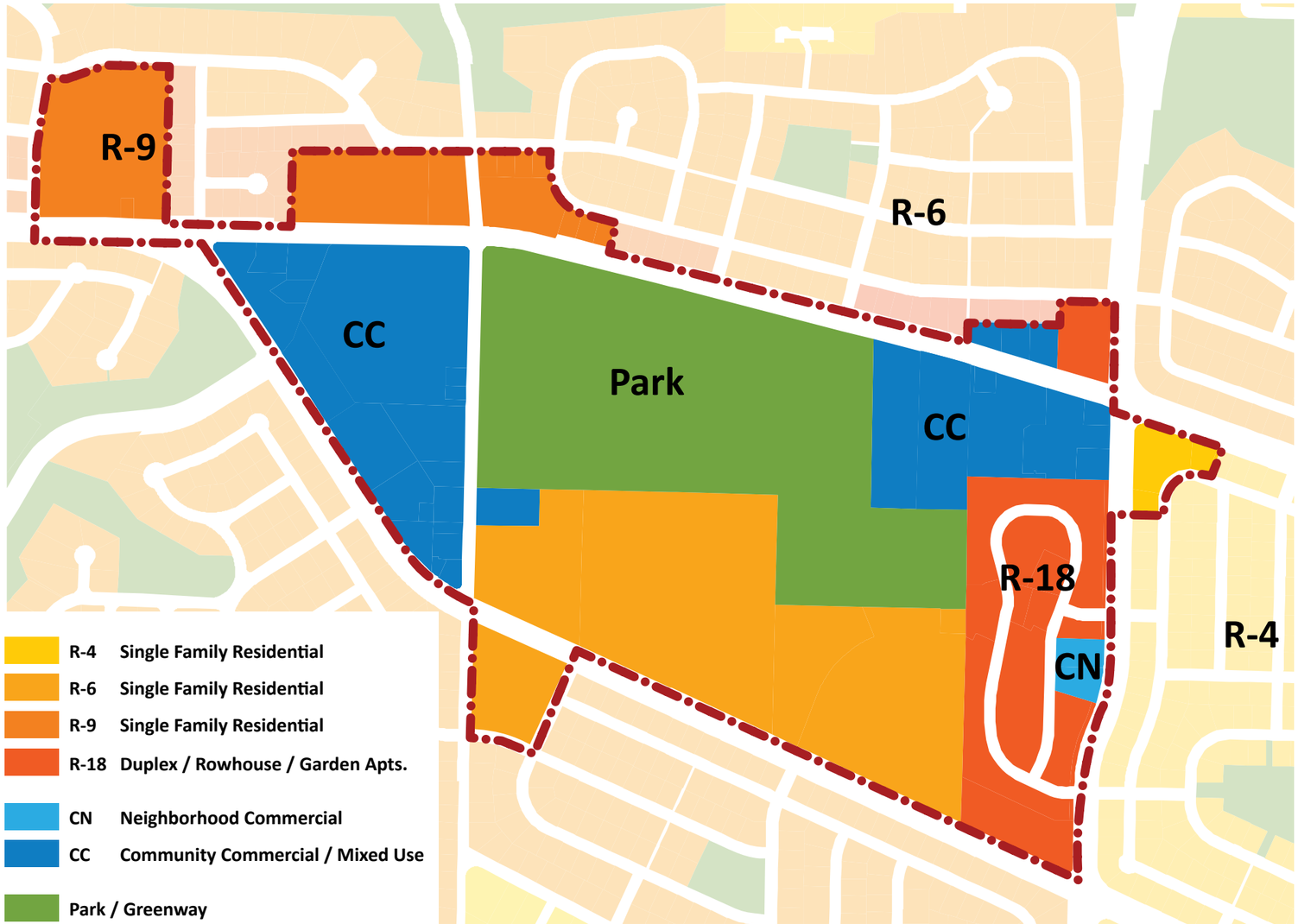



*Figure 51: Zoning Diagram and Table*

## PARKING

Although prescribed citywide instead of by zone, parking regulations are an integral part of the land use code that drives urban form. Parking regulations for residential uses range from 1 parking space per unit for houses and duplexes to 1.5 parking spaces per unit for apartments and condominiums. Commercial and office uses require between 1 parking space per 400 SF and 1 space per 200 SF.

The COV parking standards generally reflect a suburban form of development. If a more compact, walkable urban form is desired, one strategy may be to modify current parking requirements so that they may help promote walking and transit ridership as well as increasing the feasibility and efficiency of desired development.

| Use | The Heights District | Portland | Vancouver, WA City Center |
|---|---|---|---|
| Duplex | 1 per DU | 1 per DU | 1 per DU |
| Hotel | 1 per DU | 1 per DU | 1 per DU |
| Multifamily | 1.5 per DU | 1 per DU | 1 per 1000 SF |
| Cultural Institution | 1 per 400 SF | None | 1 per 1000 SF |
| Religious | 1 per 6 seats | 1 per 100SF Assembly | 1 per 1000 SF |
| Theater/Stadium | 1 per 6 seats | 1 per 4 seats | 1 per 1000 SF |
| Restaurant | 1 per 250 SF | 1 per 250 SF | 1 per 1000 SF |
| Office | 1 per 400 SF | 1 per 500 SF | 1 per 1000 SF |
| Retail | 1 per 300 SF | 1 per 500 SF | 1 per 1000 SF |
| Medical | 1 per 200 SF | 1 per 500 SF | 1 per 1000 SF |
| R&D | 1 per 600 SF | 1 per 750 SF | 1 per 1000 SF |

*Figure 52: Parking Space Requirements Comparison*

## PROPERTY OWNERSHIP AND ACREAGE


OWNED BY THE CITY OF VANCOUVER

PRIVATE OWNERSHIP

1. Leigh Investments LLC
2. Northwest Space Solutions LLC
3. MacArthur Building LLC
4. Devine Property LLC
5. Gregg, Gary T
6. Gregg, Robert M Jr.
7. Northcrest Community Church
8. Private Homeowner
9. Tower Mall Properties LLC
10. ABC Homes
11. Dawk Enterprises LLC
12. MacArthur Building LLC

| AREA | |
|---|---|
| SQ.FT | ACRE |
| **City of Vancouver, WA** | |
| A. 531,281 | 12 |
| B. 515,314 | 12 |
| C. 230,868 | 5.3 |
| D. 65,064 | 1.49 |
| Total = 1,342,527 SQ.FT | 31 AC. |
| **Private Owners** | |
| 1. 58,805 | 1.3 |
| 2. 22,995 | 0.5 |
| 3. 20,908 | 0.47 |
| 4. 82,328 | 2 |
| 5. 6,098 | 0.13 |
| 6. 8,712 | 0.2 |
| 7. 157,065 | 3.6 |
| 8. 10,241 | 0.23 |
| 9. 150,281 | 3.44 |
| 10. 67,082 | 1. 53 |
| 11. 97,574 | 2.23 |
| 12. 56,192 | 1.28 |
| Total = 738,281 SQ.FT | 17 AC. |
| Total = 2,080,808 SQ.FT | 48 AC. |

| | |
|---|---|
| Right of way between redevelopment site parcels | 15 AC. |
| Tower Mall Redevelopment Site total area | 63 AC. |

*Figure 53: Parcel Ownership Diagram and Table*

For more detailed information including property values, please refer to Appendix J: Property Ownership and Value

# 3.3 MOBILITY AND ACCESS

## MOBILITY AND ACCESS OVERVIEW

The purpose of this section is to provide an overview of the existing mobility conditions for people traveling through or accessing destinations within The Heights District. This section provides a qualitative assessment of the existing transportation network and identifies conditions, such as access, facility conditions, and safety concerns that act as barriers to walking, bicycling and transit use.

## REGIONAL CONNECTIONS

Regionally, The Heights District is well connected to the State and Interstate Highway system. Mill Plain Boulevard provides direct connections to I-5, about two miles to the west, and I-205, about two miles to the east. Andresen Road provides access to SR 500 about a mile and a half to the north, and MacArthur Boulevard connects to SR 14 via Lieser Road, about a mile to the southeast. Andresen Road and Blandford Road also both provide access to SR 14. These roads carry a fair amount of traffic, especially Mill Plain Boulevard and Andresen Road. Existing traffic data within and near The District is discussed in the relevant appendix.

## REGULATORY / POLICY BACKGROUND

Two City of Vancouver policies that are important for The Heights District planning effort include the 20-minute neighborhood concept and the Complete Streets Ordinance.

The 20-minute neighborhood is a stated goal in the City's Strategic Plan to "facilitate the creation of neighborhoods where residents can walk or bike to essential amenities and services" and "to improve amenities and services that allow residents to age in place". Generally, the 20-minute neighborhood includes a mix of land uses that are accessed through a well-connected multi-modal transportation network.

The City also adopted a Complete Streets Ordinance in 2017, which calls for "a safe, accessible street system that benefits all users, ages, and abilities, regardless of how they choose to travel; a convenient and interconnected transportation network that improves accessibility to adjacent land uses and fits the dynamics and character of each neighborhood throughout the City". Several projects based on this policy are currently underway, including bike and pedestrian improvements along Mill Plain Boulevard between Brandt Road and MacArthur Boulevard. The analysis of existing conditions presented in this section took these policies into consideration.


*Figure 55: Regional Connections*

## NEIGHBORHOOD CONTEXT

The Heights District is surrounded by established, predominantly single-family neighborhoods that are oriented to and accessed from the major roadways around The Heights District. Due to its proximity to established residential areas, the Heights District is well situated to grow into a 20-minute neighborhood, provided that development within the District is of a type, scale and character that fosters walking, and the existing roadway network is improved to allow for safe, convenient and comfortable travel by bike and on foot as well access by transit. The following photos show representative views of streets in the neighborhoods around the Heights District. Typically, local streets in the adjacent neighborhoods are wide and lack sidewalks. The Skyline Crest Apartments are the exception and sidewalks are on both sides of Andresen Road.

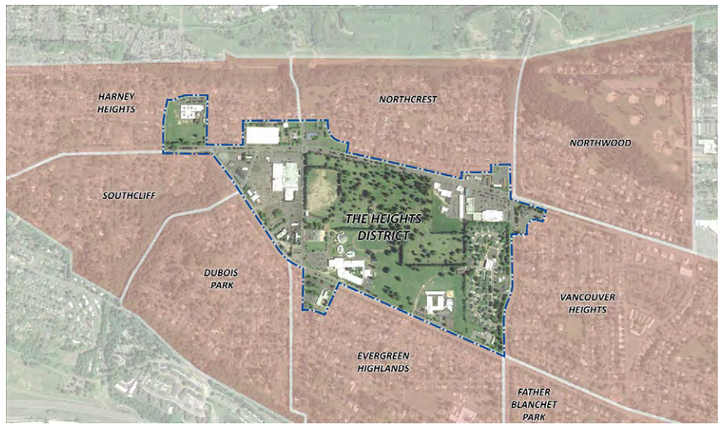



*Figure 56: Surrounding Neighborhoods*

*Northcrest*

*Northwood*

*Dubois Park*

*Skyline Crest*

## THE HEIGHTS DESTINATIONS

The Heights District is home to a variety of destinations, including schools, churches, medical and recreational facilities, and social services. Many of these destinations are frequented by people who rely on walking or transit, so assessing their connectivity is critical for these users. Destinations beyond the Heights District boundary frequented by local residents include regional recreational amenities: David Douglas Park, an 88-acre community park with athletic fields, picnic areas, a playground, and walking paths, and the Burnt Bridge Creek Trail, an eight mile long paved shared-use trail.

While there are a multitude of destinations, access to them is often challenging, particularly for people on foot. In order to gauge the walkability of a place, Walk Score® is a helpful tool that measures walkability on a scale from 0 to 100 based on walking routes to destinations. Walk Score® identifies both locations as car-dependent. Residences in the immediate vicinity of the Heights District have similar Walk Scores. For instance, a residence on Phoenix Way in the Dubois Park neighborhood has a Walk Score of 37, a residence on Kansas Street in the Northcrest neighborhood has a Walk Score of 47, and a residence on Willamette Drive in the Southcliff neighborhood has a Walk Score of 41, all falling within the car-dependent Walk Score range of 25-49. Representative residences on St. Louis Way in the Vancouver Heights neighborhood and on Indiana Street in the Northwood neighborhood fared a little better with Walk Scores of 57 and 60, respectively, which are rated somewhat walkable (Walk Score range of 50-69).

Two types of destinations in The Heights District stand out for their specific access needs or traffic implications. Fire Station #3 at Mill Plain Boulevard and Devine Road requires emergency vehicle access. The Heights District schools – Martin Luther King Elementary School, McLoughlin Middle School, and George C Marshall Elementary School – generate traffic peaks for dropping off and picking up of students.

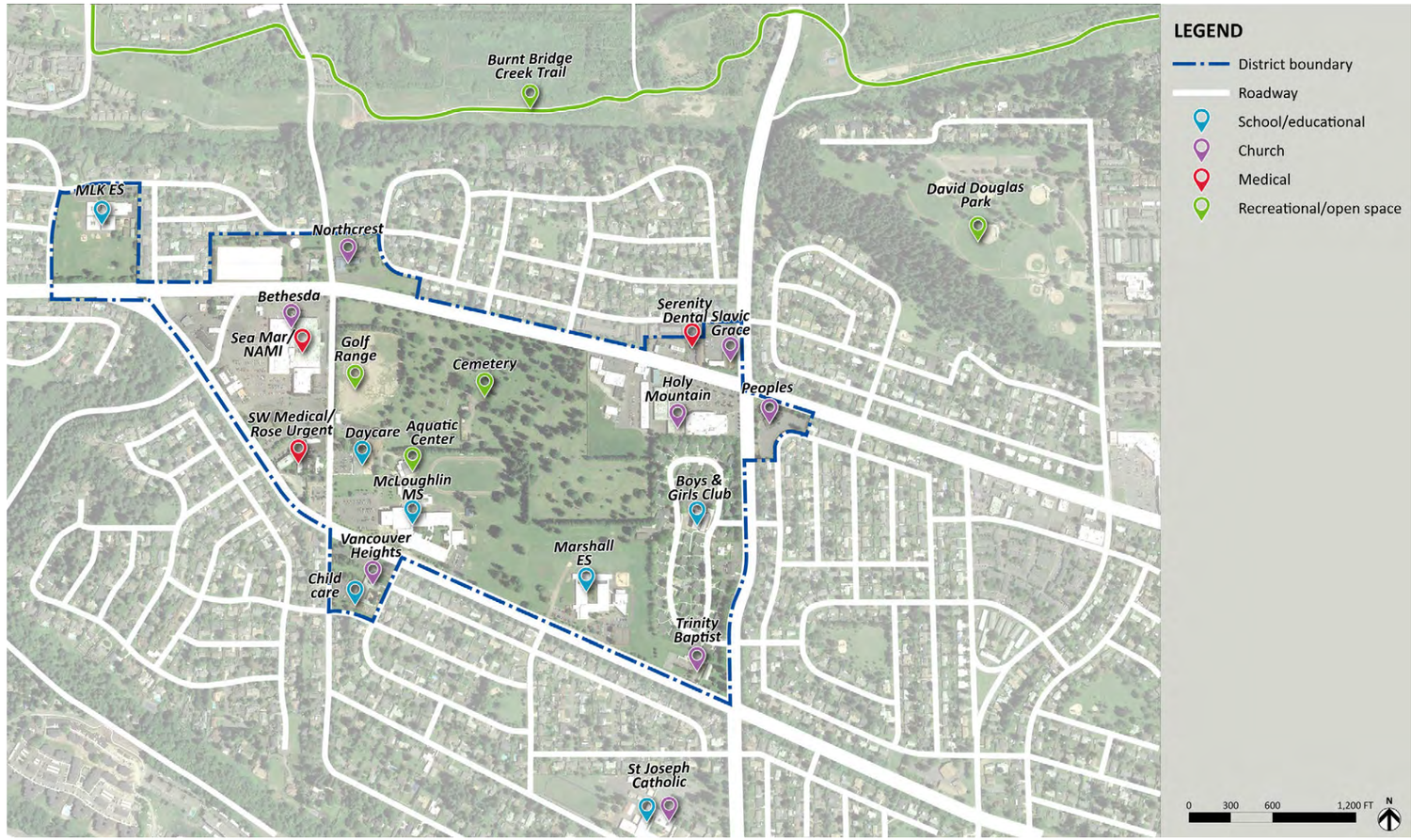



*Figure 57: The Heights Destinations*

## STREET NETWORK AND ACCESS

Given the proximity of residential areas to a variety of existing services, why is The Heights District so car dependent? A closer look at the roadway network and access to and from The District provides an answer.

The abutting neighborhoods have relatively few access points to The District (Figure 58). As a result, relatively few streets have to carry all traffic to and from the adjacent neighborhoods, whether in a car, on a bike, or on foot. In addition, the small number of access points causes out-of-direction travel, which is particularly challenging and inconvenient for people walking or biking. This reflects the typical street network of postwar developments. The figure also highlights the lack of internal connectivity within The District. Devine Road is the only internal connection in the “superblock” created by Mill Plain Boulevard, MacArthur Boulevard, and Andresen Road, with no east west connectivity at all. The block east of Devine is more than 140 acres in size with a perimeter of about two miles.

In summary, the street network in The District presents connectivity challenges. The lack of internal connectivity results in reliance on few major roadways for all modes of travel – Mill Plain Boulevard, Andresen Road, and MacArthur Boulevard – which carry a fair amount of vehicular traffic, often at high speeds.


*Street Hierarchy*


*Figure 58: Street Access Points*

## PEDESTRIAN NETWORK

The pedestrian network mostly consists of sidewalks along major streets. Local streets typically do not have sidewalks. There is a paved mid-block walkway in the Northcrest neighborhood. A few paved and unpaved trails in the vicinity of The District provide recreational walking and biking opportunities and include the Burnt Bridge Creek Trail, the Blandford Canyon Trail, and trails in David Douglas Park.

The upper left photo shows a stretch of Mill Plain Boulevard with a five foot wide sidewalk separated from the roadway by a narrow landscape buffer. The noticable lack of trees or other vertical landscape elements is unsafe because it limits pedestrian comfort and increases the speed of traffic.

The upper right photo shows that Devine Road between Mill Plain and MacArthur Boulevard has curb-tight sidewalks on both sides about six feet wide, which provide continuous pedestrian routes. While there is no landscape buffer, on-street parking could provide a buffer between pedestrians and moving traffic. However, street parking is currently infrequent and inconsistent due to frequent driveway interruptions and fairly low-intensity development, thus exposing pedestrians to moving traffic for significant stretches. As described above, at driveways the existing sidewalk dips to accommodate driveway aprons, necessitated by the lack of a planter strip, which makes for an uneven walk and a challenging condition for people with mobility devices. There is also a lack of ADA ramps at intersections.

The lower left photo photo shows the typical condition on local streets in the neighborhoods around The District. Local streets in the neighborhoods around The District tend to be wide, in the range of 32 to 40 feet. With few exceptions, neighborhood streets lack sidewalks or any other pedestrian facilities, forcing people to walk in the street.

The lower right photo shows the existing paved mid-block walkway in the Northcrest neighborhood provides a walking route from Mill Plain Boulevard deep into the neighborhood. This walkway counteracts the otherwise limited connectivity and allows for a more direct walking route for residents to transit and destinations along Mill Plain Boulevard. However, this pathway has no signage or marked crossings where it comes out at the street edge.

*5’ sidewalk with narrow buffer*

*6’ curb-tight sidewalk*

*No sidewalk*

*Mid-block connections in neighborhoods*


*Figure 59: Pedestrian Network*

## PEDESTRIAN CROSSINGS

Pedestrian crossings in The Heights District and its immediate vicinity include full traffic signals, pedestrian-activated signals, four-way stops, and marked crosswalks.

This table identifies crossing locations and control devices. The City's Transportation System Plan (TSP) identifies the four-way stops as future signal locations, but as of this writing, there are no plans underway to improve any of the intersections.

| Location | Traffic Control | Notes |
|---|---|---|
| *Mill Plain Blvd & Brandt Rd/Rhododendron Dr* | *Full signal* | |
| *Mill Plain Blvd & Ogden Ave/MacArthur Blvd* | *Full signal* | *Crossing of right turn slip lane onto MacArthur Blvd not signal protected* |
| *Mill Plain Blvd & Devine Rd* | *Full signal* | |
| *Mill Plain Blvd 750 feet west of Andresen Rd* | *HAWK (High intensity activated crosswalk)* | *Aligned with walkway in Northcrest neighborhood and 2 bus stops* |
| *Mill Plain Blvd & Andresen Rd* | *Full signal* | |
| *Mill Plain Blvd & Garrison Rd* | *Full signal* | |
| *MacArthur Blvd & Devine Rd* | *4-way stop* | *TSP identified future signal location* |
| *MacArthur Blvd & Burdick Ave* | *Marked crosswalk* | *East side of Burdick Ave only* |
| *MacArthur Blvd & Andresen Rd* | *4-way stop* | *TSP identified future signal location* |
| *Andresen Rd & Burnt Bridge Creek Trail* | *Pedestrian-activated signal* | |
| *Andresen Rd & Wichita Dr* | *Marked crosswalk* | *North side of Wichita Dr only* |
| *Andresen Rd & Louisiana Dr* | *Marked crosswalk* | *South side of Louisiana Dr only* |

*Figure 60: Proposed Future Pedestrian Crossings*


*Full Traffic Signal*

*Pedestrian Activated Signal*


*Four Way Stop*

*Marked Crosswalk*

The distances between crossings are significant and do not contribute to the fine-grained network indicative of a walkable environment and critical for a 20-minute neighborhood. For instance, the distance between the signal at Devine Road and the pedestrian-activated HAWK signal on Mill Plain Boulevard is almost half a mile, or about a ten minute walk. The tables below provide an overview of the walk times between pedestrian crossings along each of the three major roadways – Mill Plain Boulevard, MacArthur Boulevard, and Andresen Road.

| Roadway segment | Approx. distance *feet* | Approx. walk time (4 ft/sec3) *minutes* |
|---|---|---|
| *Brandt Rd to MacArthur Blvd* | *2,650* | *11.0* |
| *MacArthur Blvd to Devine Rd* | *1,300* | *5.4* |
| *Devine Rd to HAWK signal* | *2,350* | *9.8* |
| *HAWK signal to Andresen Rd* | *750* | *3.1* |
| *Andresen Rd to Garrison Rd* | *2,750* | *11.5* |

*Figure 61: Walk times along Mill Plain Boulevard*

| Roadway segment | Approx. distance *feet* | Approx. walk time (4 ft/sec3) *minutes* |
|---|---|---|
| *Mill Plain Blvd to Devine Rd* | *2,200* | *9.2* |
| *Devine Rd to Burdick Ave* | *1,700* | *7.1* |
| *Burdick Ave to Andresen Rd* | *1,450* | *6.0* |
| *Andresen Rd to Morrison Rd* | *1,850* | *7.7* |

*Figure 62: Walk times along MacArthur Boulevard*

| Roadway segment | Approx. distance *feet* | Approx. walk time (4 ft/sec3) *minutes* |
|---|---|---|
| *Burnt Bridge Creek Trail to Mill Plain Blvd* | *2,850* | *11.9* |
| *Mill Plain Blvd to Wichita Dr* | *1,000* | *4.2* |
| *Wichita Dr to MacArthur Blvd* | *1,350* | *5.6* |
| *MacArthur Blvd to Louisiana Dr* | *350* | *1.5* |

*Figure 63: Walk times along Andresen Road*

## WALKSHEDS

This diagram shows five-minute walksheds centered on each of the pedestrian crossings in the Heights District. The area circumscribed by each circle represents how far the average person can walk in five minutes – approximately a quarter of a mile. The five-minute walkshed is a helpful tool in analyzing walkability, particularly with consideration of the 20-minute neighborhood concept. One can imagine a resident walking from their home along the edge of a walkshed, crossing at the center, and walking to the destination at the opposite end of the walkshed – a round trip of 20 minutes.

However, because of the disconnected street network, the effective walking routes do not capture the entire walkshed, that is to say, in many instances the edge of the walkshed is beyond a five-minute walk. As a result, walkability of the surrounding neighborhoods is limited, as suggested in the Walk Score discussion previously.

In summary, the pedestrian network has challenges due to limited access with few routes, incomplete sidewalks of varying quality and often unsafe walking conditions, facilities that do not provide ADA accessibility, and few pedestrian crossings spaced far apart, leading to either significant out-of-direction travel or unsafe crossings at uncontrolled locations.

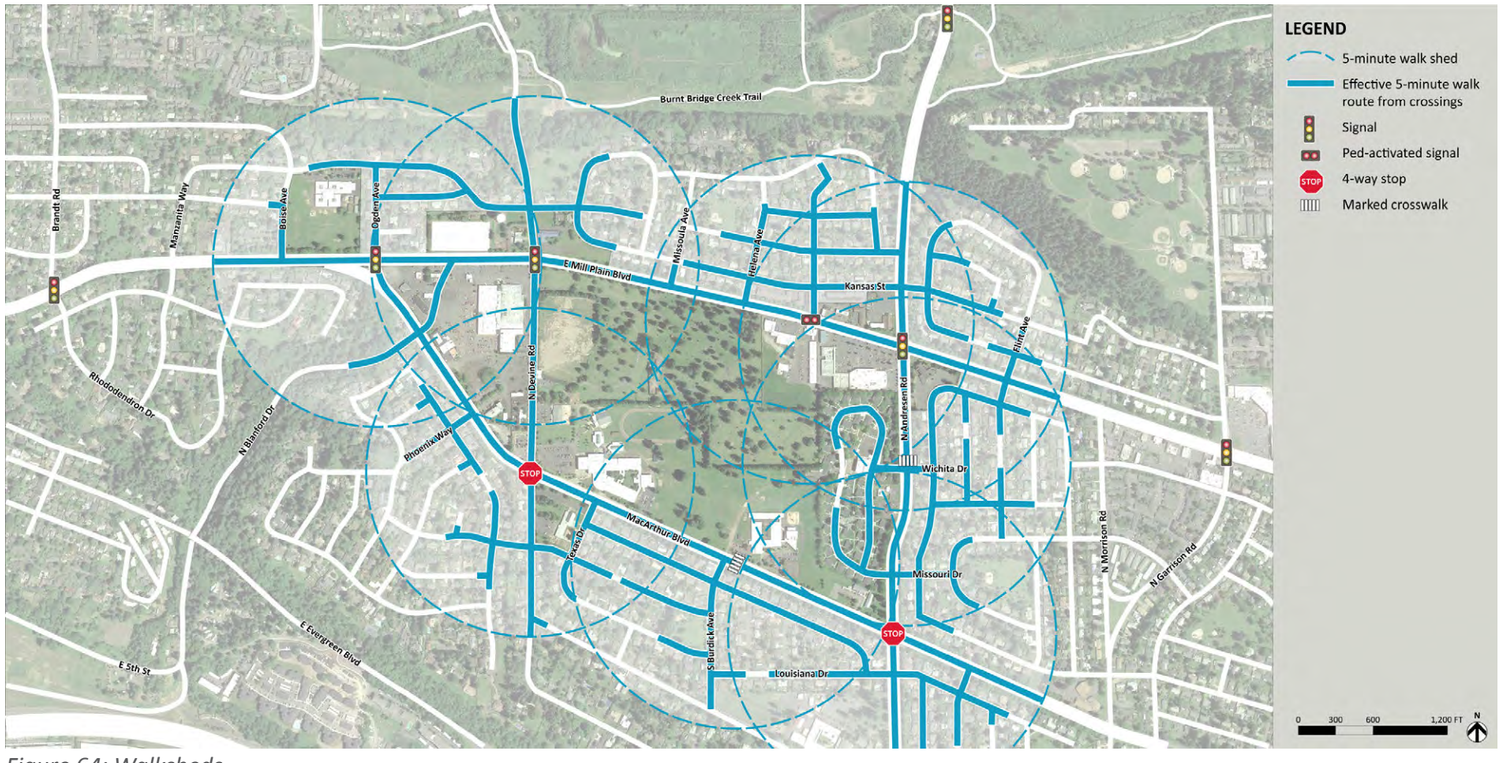



*Figure 64: Walksheds*

## BICYCLE NETWORK

Within the District, dedicated bike facilities exist on Mill Plain Boulevard and MacArthur Boulevard. Beyond the District boundary, bike lanes exist on Andresen Road north of Mill Plain Boulevard, on Brandt Road, and on Evergreen Boulevard west of Blandford Drive.

A commonly used east-west route roughly parallels Mill Plain Boulevard, utilizing 13th Street and Idaho Street in the Harney Heights neighborhood, and Kansas Street in the Northcrest and Northwood neighborhoods. This east-west route is somewhat circuitous, and the uncontrolled crossing at Andresen Road can be challenging due to the amount of vehicular traffic. Other routes include Andresen Road south of Mill Plain Boulevard, although the posted speed of 35 miles per hour far exceeds the recommended speed for a shared facility, and Devine Road between Mill Plain Boulevard and MacArthur Boulevard, which has a posted speed limit of 25 miles per hour. Blandford Drive, also with a posted speed limit of 25 miles per hour, provides connections to bike routes on Evergreen Boulevard and 5th Street. However, while scenic, the roadway is narrow and winding and has significant slopes. The Burnt Bridge Creek Trail is relatively close by and provides great east-west regional connectivity, but access to the trail from the Heights is limited.

While some dedicated bike facilities exist in or near The Heights District, the bike lanes on Mill Plain Boulevard and Andresen Road offer no separation from traffic, the shared roadways without bike facilities can be challenging, and the connections to the regional network – including Evergreen Boulevard and the Burnt Bridge Creek Trail – are tenuous. As such, the bicycle network and facilities fall short of meeting the City of Vancouver's Complete Street Policy, which specify that such facilities serve all users and modes, including people traveling with different levels of ability. As such, the existing bike lanes on Mill Plain Boulevard are insufficient, as are some of the shared roadways lacking any type of dedicated bike facilities. The Complete Street Policy also states the need to provide interconnected networks, recognizing that people require a network of safe, convenient travel routes. The existing bicycle network falls short of that principle due to the gaps in the network caused by lacking or inadequate bike facilities.


*Figure 65: Bicycle Network*

## BICYCLE FACILITIES

The upper left image shows that bicycle facilities in the Heights District include buffered bike lanes on MacArthur Boulevard. Unlike conventional striped bike lanes, buffered bike lanes include a horizontal buffer in form of painted roadway striping, which offers added safety to bicyclists by separating them a few feet further from moving vehicle traffic.

The upper right image shows that a recent bike box on MacArthur Boulevard at Mill Plain Boulevard provides added safety and visibility for bicyclists at that intersection.

The lower left image shows that conventional striped bike lanes are provided on Mill Plain Boulevard but offer no separation from traffic. Striped bike lanes on a high volume and high speed roadway are higher stress and have limited appeal to all but the most experienced bicyclists as they have to ride next to fast moving cars.

The lower right image shows Kansas Street. Kansas Street in the Northwood neighborhood is part of a commonly used neighborhood street network that provides a safer alternative to using Mill Plain Boulevard. As discussed above, the route is circuitous and the unmarked crossing at Andresen Road is challenging.

In summary, while some dedicated bike facilities exist in or near The Heights District, the bike lanes on Mill Plain Boulevard and Andresen Road offer no separation from traffic, the alternative neighborhood streets can be challenging, and the connections to the regional network – including Evergreen Boulevard and the Burnt Bridge Creek Trail – are difficult.


*Striped Buffer Bike Lane*


*Bike Box*

*Striped Bike Lane*

*Shared Road*

## TRANSIT ROUTES AND ACCESS

Two C-TRAN bus routes provide service to The Heights District. Route 32 operates on Andresen Road and connects the Heights District with Downtown Vancouver to the west and Vancouver Mall to the northeast. Route 37 provides frequent bus service on Mill Plain Boulevard and connects The District with Downtown Vancouver to the west and East Vancouver, including the Fisher's Landing Transit Center to the east. C-TRAN is currently working on a plan for Bus Rapid Transit (BRT) on Mill Plain Boulevard, which could improve service to and from the area.

In The District, though the internal connectivity to the north and east is fairly accessible, crossing Mill Plain Boulevard is a huge barrier for safety reasons: the width of the road combined with speeds and traffic volumes. MacArthur Boulevard is a barrier for those that need ADA accessible facilities.

Existing conditions include a variety of bus stops: in-lane stops without shelter, in-lane stops with shelter, and bus pullouts. The future BRT stop locations are not determined at this time and may differ from the current Route 37 stops.

In summary, The District transit has standard access with two routes, one of which has frequent service. However, the lack of sidewalks and curb ramps coupled with street widths make access to transit very difficult for those that are mobility impaired. Mill Plain Boulevard is a huge barrier, even if crossing at a signal. Access to bus stops from surrounding neighborhoods is more circuitous and may require crossing a major roadway.

*In-lane stop without shelter*


*In-lane stop with shelter*

*Bus pullout with shelter*

## CONCLUSIONS

The Heights District has some of the ingredients necessary to establish a 20-minute neighborhood concept, a goal of the City's Strategic Plan. These ingredients include:

- Access to transit service with connections to downtown, transit hubs and employment centers
- Existing mix of retail, service and civic uses within the District and proximity of established residential areas with latent demand for more or improved retail and services
- Some recent existing pedestrian and bicycle improvements providing a foundation for additional improvements
- An adopted complete streets policy providing regulatory means to make necessary mobility improvements

The challenges to substantially improving access and mobility for both motorized and non-motorized traffic in and around the Heights District include:

- A fragmented street network with access limitations, burdening few streets and generating out-of-direction travel
- Limited internal connectivity which causes reliance on a few major roadways
- An auto-oriented circulation network and development pattern
- Challenging crossings for pedestrians and bicyclists
- Lack of safe and accessible facilities for pedestrians and bicyclists
- Limited and circuitous connections to the larger network of bikeways and trails

As stated above, people traveling on foot or bike tend to be sensitive to real or perceived safety hazards, inconvenient or uninteresting routes, and facilities lacking in quality or amenities. Therefore, in order to provide an incentive to travel by means other than an automobile, mobility improvements in the Heights District should range from the macro level (network, connectivity) to the micro level (sidewalk and bike lane design).


*Figure 66: Mobility and Access*

# 3.4 INFRASTRUCTURE

## MUNICIPAL UTILITIES OVERVIEW

The following section provides an overview of existing infrastructure conditions. The City is the municipal utility provider for water, sewer, and storm drainage. Irrigation is not separately provided. Similarly, storm drainage is provided by the City for areas within public right-of-way. Storm drainage for private property is the responsibility of the property owner and developer. In general, public utilities are available and extended throughout The District and all properties within the district are considered served with public utilities.

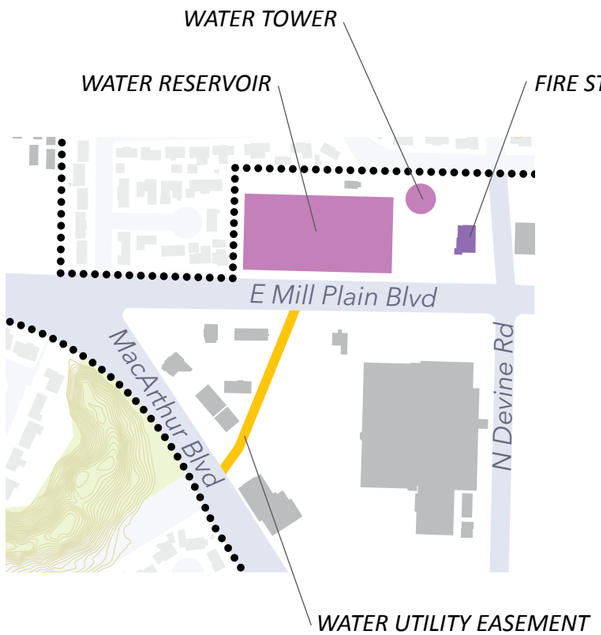



*Figure 67: Water Utility and Fire Station Detail*

## MUNICIPAL WATER

Existing water is generally available throughout the District. The City's Water Station No. 5 is located within the District. It includes an 8.0-million gallon (MG) partially buried water reservoir and an elevated 0.75-MG water tank. The reservoir serves the Heights Low Pressure Zone and a connected booster pump supplies water to the water tank, which serves the Heights High Pressure Zone.

The District is located within the Heights High Pressure Zone. The City's water system plan identifies a number of distribution system improvements necessary within the Heights High Pressure Zone and within close proximity of The District. However, the improvements are primarily located outside the limits of The District. These improvements include replacing the transmission line in Blandford Drive with a new 30-inch-diameter transmission main and a new transmission line (T-27) paralleling Mill Plain to the north connecting Water Station No. 5 to 87th Avenue.

Water Station No. 5 improvements are expected to occur between 2021 and 2024. These improvements will primarily consist of replacing the existing 8 million gallon reservoir with two 4 million gallon tanks, sized at 200' diameter by 20' depth. The tanks must be reconstructed at the same elevation to maintain the necessary water pressure. The water utility is open to integrating other uses on the site, so long as the security of the water reservoir is maintained.

Additionally, there is an existing water utility easement running under the Redevelopment Site along Blandford Drive. This utility would need to be relocated if it is to be built upon. The cost to do this is unknown at this time.

Development projects are required under the Vancouver Municipal Code (VMC) to construct on-site and related water system improvements necessary to support their development. The City has indicated that depending upon the demands and final configuration of any redevelopment, some water system improvements will likely be required. However, without additional information, it would be difficult to determine the extent and cost of those improvements.

## MUNICIPAL SEWER

Sewers are generally available throughout The District and generally flow towards to the southwest. Service capacity for The District is considered stable and available. District schools (MLK, McLoughlin, and Marshall), Park Hill Cemetery, Skyline Crest, the water station, and the churches are all considered well served. The District is located in Sewer Basin G1 and is summarized in Sheets 119 and 120 of Volume 2 of the 2011 General Sewer Plan (GSP). The basin is not mentioned in Section 7 of Volume 1 of the GSP, which indicates that no major sewer system improvements are necessary.

Most of the sewers within the District contribute to a trunk sewer located in MacArthur Boulevard with flows directed to the west. The trunk sewer turns to the southwest in Blandford Drive and heads south toward the Columbia River.

VMC 14.04.280, 14.08.050, and 14.16.010 state that developing lots are required to provide new public sewers as needed. The City identified that redevelopment of the Park Hill Shopping Center and Town Plaza properties will likely require extension of sewers depending upon redevelopment concepts.

The trunk sewer that occupies the existing water utility easement in Figure 67 is due for rehabilitation and will likely require a cured-in-place liner if not relocated as part of the Tower Mall redevelopment.

The City's sewer system ultimately discharges to one of two treatment plants located along the Columbia River. The City's treatment plants have the ability to divert flows depending upon capacity between the two treatment plants. The City's treatment plants have sufficient capacity for the range of flows expected from any redevelopment within The Heights District.

## MUNICIPAL STORMWATER

The City's storm drainage system within the Heights District is focused on providing stormwater capture and conveyance for areas within the public right-of-way. On-site stormwater is handled by individual property owners.

The City's storm drainage system is primarily located in North Devine Road and discharges south through a 36-inch-diameter storm drain. New or redeveloped areas within The District will need to meet new stormwater management regulations, including requirements to use low impact development (LID) techniques where feasible. In addition to LID, stormwater leaving redeveloped areas would need to meet current standards for water quality and runoff quantity likely requiring on-site treatment and detention. Many of the residential streets within the Heights portion of the City appear to rely predominantly upon infiltration to manage stormwater. Infiltration facilities, when properly designed and registered according to Underground Injection Control requirements, can meet the new LID standards.

## FRANCHISE UTILITIES

Franchise utilities are likely not a limiting factor for redevelopment within The Heights District. The Heights District is largely fully built-out and includes a number of commercial and school facilities. Telecommunications facilities are in place throughout the District and serve the existing properties within. Of particular interest are the school and commercial nodes, which would already be served with broadband communications infrastructure. Similarly, customers in this area would have an option for service between at least two competing communication/cable franchisees.

Electrical power is provided by Clark Public Utilities. Local electrical transmission distribution infrastructure is provided primarily along the Mill Plain corridor. There are four distribution feeder circuits encompassing the District. The additional electrical loads anticipated from redevelopment should be able to be split amongst the existing circuits. If the proposed redevelopment project requires that existing overhead circuits be placed underground, additional capital improvements costs to do this work will be required. System Development Charges or installation fees will apply to all new electrical services.

Natural gas is provided by NW Natural. Natural gas is available within the District and provides service to many of the existing properties. Distribution system improvements are not anticipated to be necessary to provide for redevelopment; however, local distribution systems will be necessary to provide service for any redevelopment. NW Natural Gas reviews system reinforcement improvements as proposed redevelopment occurs.

## VANCOUVER FIRE DEPARTMENT

Fire Station #3, a 5160 square foot structure with three employees, located at the northwest corner of Mill Plain Boulevard and Devine Road on a 65,000 square foot parcel, is currently planning to relocate to an area southeast of The Heights District. This is dependent on a capital recommendation package that will go to ballot in 2019. If the bond passes, the station will likely be demolished by 2022, freeing up the parcel for redevelopment.

## AFFORDABLE HOUSING

The Heights District currently contains Skyline Crest, a 138-unit affordable housing campus. All units were renovated in 2016, and a community center containing a health clinic and job center was recently completed. A 28-unit apartment building targeted at youth transitioning from homelessness is currently under construction and will be completed in June 2019.

## VANCOUVER PUBLIC SCHOOLS

There are three Vancouver Public Schools (VPS) facilities currently located in the Heights District, including Martin Luther King Elementary, Marshall Elementary, and McLoughlin Middle School. In February 2017, voters approved a school bond measure that will fund replacement and upgrades to several Vancouver Public Schools, including reconstruction of King Elementary, and construction of a new building that will house both Marshall Elementary and McLoughlin Middle School, which is currently under construction. The building currently occupied by Marshall Elementary will remain and become the new home of VPS's Lieser Campus.

These capital upgrades to schools within The Heights District coincide with The Heights District Plan community planning process, and provide opportunities to consider how the two projects can reinforce each other and work together to accomplish shared goals. Sustainability is a district-wide focus within Vancouver Public Schools, and faculty have expressed interest in working together to identify ways that public space within the Tower Mall Redevelopment Area can provide opportunities for students and families.

## PARKS AND CEMETERY

There are several existing parks and open spaces within or adjacent to The Heights District. This includes Park Hill Cemetery as well as parks and natural areas located within residential areas adjacent to The Heights District.

Park Hill Cemetery was founded in 1911 and is owned and operated by the City of Vancouver. The cemetery contains sections for standing monuments, flat markers, an ash columbarium, and an ash scattering garden. About 25,000 graves are occupied, and 10,000 are sold but unoccupied. In recent years, demand for burial plots has decreased as cremation has become more popular. Given this reduced demand and the current rate at which burial plots are purchased, the cemetery has 91 years of existing capacity, not counting the vacant area where Vanco Golf Range is currently located. Internal roads are currently used for light recreational activity such as biking and dog walking as well as parking during burials. The cemetery currently has a staff of two full time employees. It is open to the public and largely unfenced, with the exception of the fence on the southern side of the cemetery, adjacent to Marshall Elementary and McLoughlin Middle School. Through the Heights District Planning process, there are opportunities to create new connections within the cemetery to neighboring properties, and to explore potential community activities that may take place in the cemetery.

Eight neighborhood parks are located within close proximity of The Heights District, as well as David Douglas Community Park, the city's largest but most underutilized community park. David Douglas is an 88-acre site with 50 acres of wooded areas and the remainder committed exclusively to softball and Little League Baseball fields. This park is a high priority for revitalization to maximize the recreation potential of this hidden gem and provide the needed interconnection to the surrounding neighborhoods and trail system.

Burnt Bridge Creek, located to the north and connected to The Heights District by Devine Road, is part of the Burnt Bridge Creek Greenway and regional trail system, with eight miles completed. Blandford Canyon extends to the southwest of the subarea between MacArthur and Evergreen Highway. This 20-acre natural area offers a passive trail corridor and extensive open space to the surrounding area.


*Figure 68: Cemetery Existing Conditions*

**Not verified through technical survey boundary*

## PLANNED CAPITAL IMPROVEMENTS

There are several planned projects currently scheduled for The Heights District known to the project team through interviews with the relevant public authorities.

Vancouver Housing Authority is removing its office on the west side of its property at Skyline Crest and replacing it with Caples Terrace, a 28-unit housing complex for youth transitioning from homelessness. Caples Terrace will be the final piece of a larger renovation at Skyline Crest, which included rehabilitation of existing housing, the addition of new landscaping, and construction of a community center that includes a health clinic and employment services. It will include a new parking lot to the south of the structure.

Vancouver Public Schools has plans to rebuild Martin Luther King Elementary School and McLoughlin Middle School. A new building that will house both McLoughlin Middle School and Marshall Elementary is currently under construction. The building currently occupied by Marshall will stay, and will become the new home of VPS's Lieser Campus.

To remove deteriorated buildings and impermeable surfaces and to create opportunity for the Tower Mall Redevelopment Plan, the City plans to demolish Town Plaza (formerly known as the Tower Mall) in 2021.

The Vancouver Fire Department plans to vacate the existing Fire Station #3 and build a new station at a to-be-determined site to the southeast of the Heights District. The approximate timeline for this move is two to five years.

Vancouver Water Station #5 plans to renovate its existing tanks immediately southwest of the water tower. The two 8-million gallon tanks need to be replaced to ensure water security in the aftermath of a seismic event.

C-TRAN is currently planning a Bus Rapid Transit (BRT) corridor along Mill Plain Boulevard. The corridor plan will likely relocate and reconfigure bus stations and possibly modify the right of way on Mill Plain Boulevard.


*Figure 69: Planned Capital Improvements*

# 3.5 OPPORTUNITIES AND CONSTRAINTS


*Figure 70: Land Use Opportunities and Constraints Key Map*

## (A) Commercial Areas

The commercial areas of The Heights District have the greatest land use opportunities. They have the most flexible and permissive zoning and are underutilized relative to their zoned capacity, with a majority of the lots used as surface parking and single story structures where mid-rise structures are permitted. The existing commercial, office, and miscellaneous uses have a large capacity to expand, but the greatest underutilization of the land is currently the lack of residential uses. The area could contain several city blocks of mid-rise apartment units if the market would support it.

The existing constraints on land use in the commercial areas include fragmented parcelization, which can inhibit large, coordinated developments, existing lease agreements that run far into the future, and zoning regulations that still require some buffers and setbacks where they may not be needed.

**Key constraint: Fragmented ownership pattern**
**Key opportunity: Zoned capacity**

## (1) Gateway

The land at the corner of MacArthur and Mill Plain has the potential to serve as a gateway for The Heights District. The triangular nature of this area is a constraint that makes development challenging, but there are opportunities to create a gateway through landscaping or art.

## B Water Utility and Fire Station

The parcels on the northwest corner of Mill Plain and Devine contain the fire station, a water tower, and a water tank shed structure. The fire station is planned to be removed, so the corner parcel will open for redevelopment. A regulatory constraint here is the single-family zoning currently on this parcel. The water tank shed, as part of its scheduled renovation, also has the potential to be rebuilt in a more open configuration, creating open green space around the new tank structures. A pedestrian plaza and interpretive park could be developed at the site of the Fire Station #3.

**Key constraint: Retaining utility**
**Key opportunity: Public open space**

## C Houses of Worship

The Heights District currently contains five freestanding churches. To keep churches sustainable community institutions as congregations downsize and The Heights District densifies, they could be consolidated, re-imagined as multi-purpose spaces, or redeveloped with a multifamily affordable housing component that supports the church mission. This possibility is constrained by current zoning, which would permit very few, if any units to be built in conjunction with a church.

**Key constraint: Zoning**
**Key opportunity: Affordable housing**

## D Schools

Vancouver Public Schools is already proceeding with its own capital improvement plan which limits possibilities to take advantage of land use opportunities. However there is some flexibility to coordinate on specific opportunities to be determined.

**Key constraint: Existing CIP**
**Key opportunity: Devine lot**

## 2 Devine Lot

The Vancouver School District has in the past considered the idea of creating subsidized teacher workforce housing on lands owned by the School District. This idea should be further explored as the planning process evolves.

## E Cemetery

Park Hill Cemetery is an ungated facility open to the public. It is currently used as an active cemetery. However, as a passive open space, local residents often use the space for casual walking and dog walking.

**Key constraint: Existing use**
**Key opportunity: Non-motorized connections**

## 3 West Cemetery

The western area of Park Hill Cemetery is is owned by the City and currently has a lease through 2020 with the Vanco Golf range. The City may or may not extend the lease agreement in the future. Vancouver Housing Authority has expressed an interest to develop new affordable housing units and office space on the golf range site. No formal decisions have been reached at this time.

VHA's current projected needs are 120 units of workforce housing, 80 units of senior housing, and a 14,000 SF office for themselves, with the possibility of additional space required by related service providers. The site will need a children's playground as well as good access to the community center in Skyline Crest.

## F Skyline Crest

Skyline Crest is an affordable housing development owned by Vancouver Housing Authority. Much like VPS, VHA has its own capital improvement plan. All units at Skyline Crest were renovated in 2016, so there is unlikely to be a major renovation on the horizon. The community center, health clinic, and employment center facilities however are new to the site, and there may be opportunities to integrate these uses into the wider neighborhood to increase the return on these investments.

**Key constraint: Already built out**
**Key opportunity: Integrating community facilities into District**

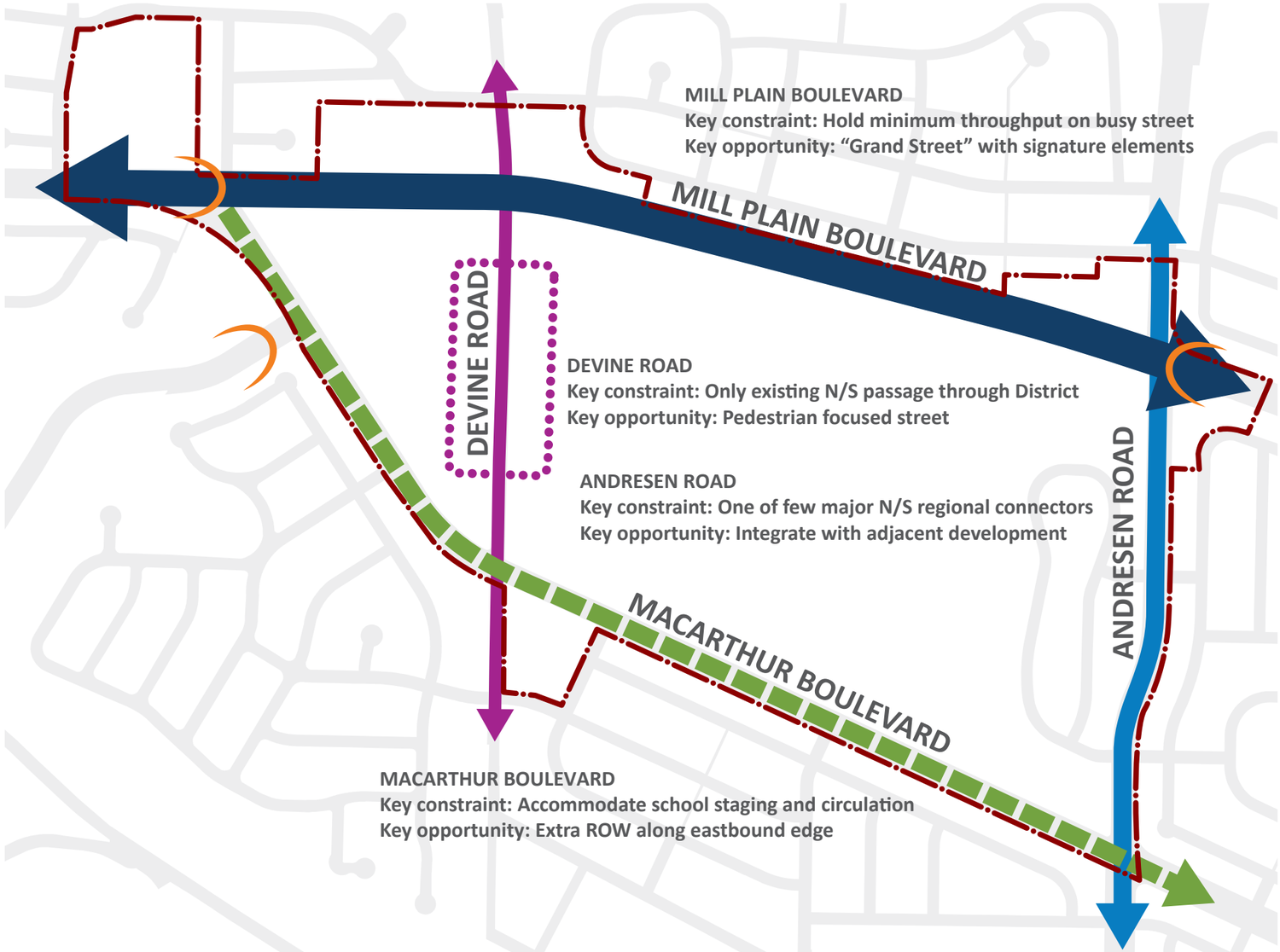



*Figure 71: Mobility Opportunities and Constraints: Streets*

## Opportunities to Improve Streets

Although streets in The Heights District are currently sufficient for motorized access, there are opportunities to improve the streets for non-motorized users. The bike path network currently in place could be upgraded from a striped system to one physically separated from traffic. The sidewalk could also be separated from vehicle traffic with a consistent buffer. Street improvements should focus on improving the safety and comfort of all users and should include street trees, bus shelters and adequate pedestrian safety crossings at key locations.

## Mill Plain Boulevard

Mill Plain Boulevard is the primary access route to The Heights District. Within the District, it connects the Redevelopment Site to the node of activity at the intersection of Andresen Road. The opportunities along this road are critical to achieving success in the District, focusing on making the District a destination rather than an area to be driven through. This includes adding new cross streets at the Redevelopment Site as well as reconfiguring extra road capacity to serve placemaking objectives, making it a "Grand Street" with signature elements, defining The Heights District as a unique place. The restriction on this opportunity is that a minimum required throughput must be maintained along this arterial.

## Devine Road

Although it is the narrowest and lowest-capacity road within The Heights District (not considering the internal streets of Skyline Crest), Devine is the only existing cross-street in the Redevelopment Site, with the Redevelopment Site running along both sides of its length as it passes through The District District. The opportunity here is to create a more intimately scaled, pedestrian oriented streetscape enabled by the comparatively lower traffic volumes and noise relative to the other existing roads. This street would be the best candidate to implement a curbless street and/or a festival street.

## MacArthur Boulevard

Although MacArthur is the second largest right of way in The Heights District, it has relatively low traffic. It notably has vehicle lane-widths repainted for bikes as well as a wide green strip on its westbound side. It borders the Redevelopment Site on its West edge, and serves as a loading zone for the schools to the southeast. There is opportunity to use this space more efficiently to create robust Green Stormwater Infrastructure (GSI) and dedicated pedestrian/bicycle pathways, and given the school frontage, it is critical to create conditions for safe and comfortable mobility for all ages. There is also an opportunity to re-align it at the intersection with Mill Plain, creating something closer to a right angle. This would allow the road to be more space efficient and align more closely with the boundaries of what could be developable parcels.

## Andresen Road

Andresen Road runs along the eastern border of The Heights District along with non-motorized mobility improvements along its length, there are opportunities to better integrate it with Skyline Crest and the commercial center at the corner of Mill Plain Boulevard.

## Gateway Opportunities

There are three main approaches to The Heights District that could be leveraged to create a gateway experience when coming into the site. These gateway experiences could provide a point of orientation, a sense of arrival, and a sense of identity to The Heights District. These are approaches from the east or west along Mill Plan Boulevard, which is the primary arterial road serving the site, as well as up from the ravine along Blandford Drive.

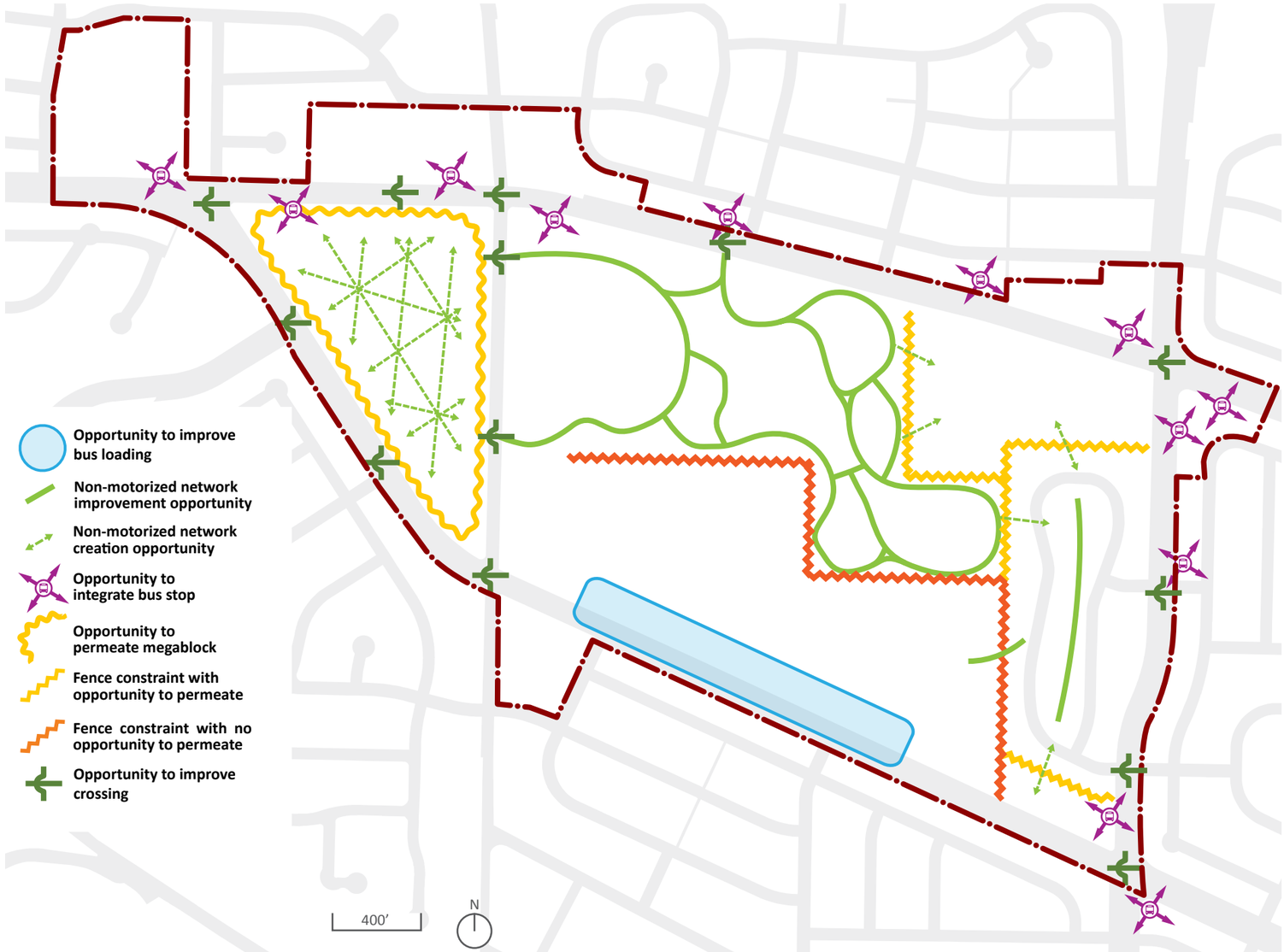



*Figure 72: Mobility Opportunities and Constraints: Other*

## Opportunity to Improve Crossing

Crosswalks are a vital part of the districtwide non-motorized network. There are several opportunities to create or improve crosswalks. These improvements would have to be negotiated with traffic flow considerations.

## Opportunity to Improve Bus Loading

The long stretch of westbound MacArthur in front of the two adjacent schools is a school bus loading area. It could be reconfigured with additional infrastructure to improve the safety and comfort of students.

## Non-Motorized Network Improvement Opportunity

On existing non-motorized paths in Park Hill Cemetery and Skyline Crest there are opportunities to make these paths more accommodating to users, such as providing light and shelter or mitigating conflicts between cyclists and pedestrians.

## Non-Motorized Network Creation Opportunity

There are opportunities to create new non-motorized networks throughout the site, either by connecting existing ones or creating entirely new ones to follow non-motorized desire lines across parcels within the district. This would be supplemented by a framework of complete streets, which would ensure that all streets accommodate non-motorized traffic as well as cars.

## Opportunity to Permeate Megablock

The triangular area formed by MacArthur Boulevard, Devine Road, and Mill Plain Boulevard is a very large area with no access through it, stifling opportunities to utilize the interior of the block. Creating new streets and non-motorized paths through this “megablock” would allow access to central areas, allowing for the land to be better utilized. It would also improve mobility across the district, improving access from Blandford Drive to the cemetery, for example.

## Fence Constraint with Opportunity to Permeate

Skyline Crest, Heights Shopping Center, and Park Hill Cemetery are separated from one another by a system of fences. There is an opportunity to strengthen the connection and improve access between living, shopping, and recreation by permeating these fences with non-motorized paths. This would also improve the districtwide non-motorized network, improving access to various destinations in the district from surrounding neighborhoods.

## Fence Constraint with No Opportunity to Permeate

Vancouver Public Schools has indicated that they would not allow additional permeations in the fence surrounding their property. This constrains access across The Heights District in the north/south direction as well as access to the cemetery and the Heights shopping center from neighborhoods south of The Heights District.

## Opportunity to Integrate Bus Stop

The Heights District is served by two C-TRAN bus routes: route #37 running east and west on Mill Plain Boulevard and route #32 running north and south on Andresen Road. Any changes to The Heights District should take the bus stops into account, particularly creating non-motorized infrastructure that follows desire lines toward the bus stop. Furthermore, with the planned upgrade of the Mill Plain Boulevard route to a BRT line, there are opportunities to enhance bus stop facilities, such as seating and shelter, as well as relocate the bus stops to coordinate with new development.

There is also an opportunity to create a pedestrian connection from neighborhoods to the north to the new planned BRT bus stops to the Redevelopment Site as part of the water utility facility project.

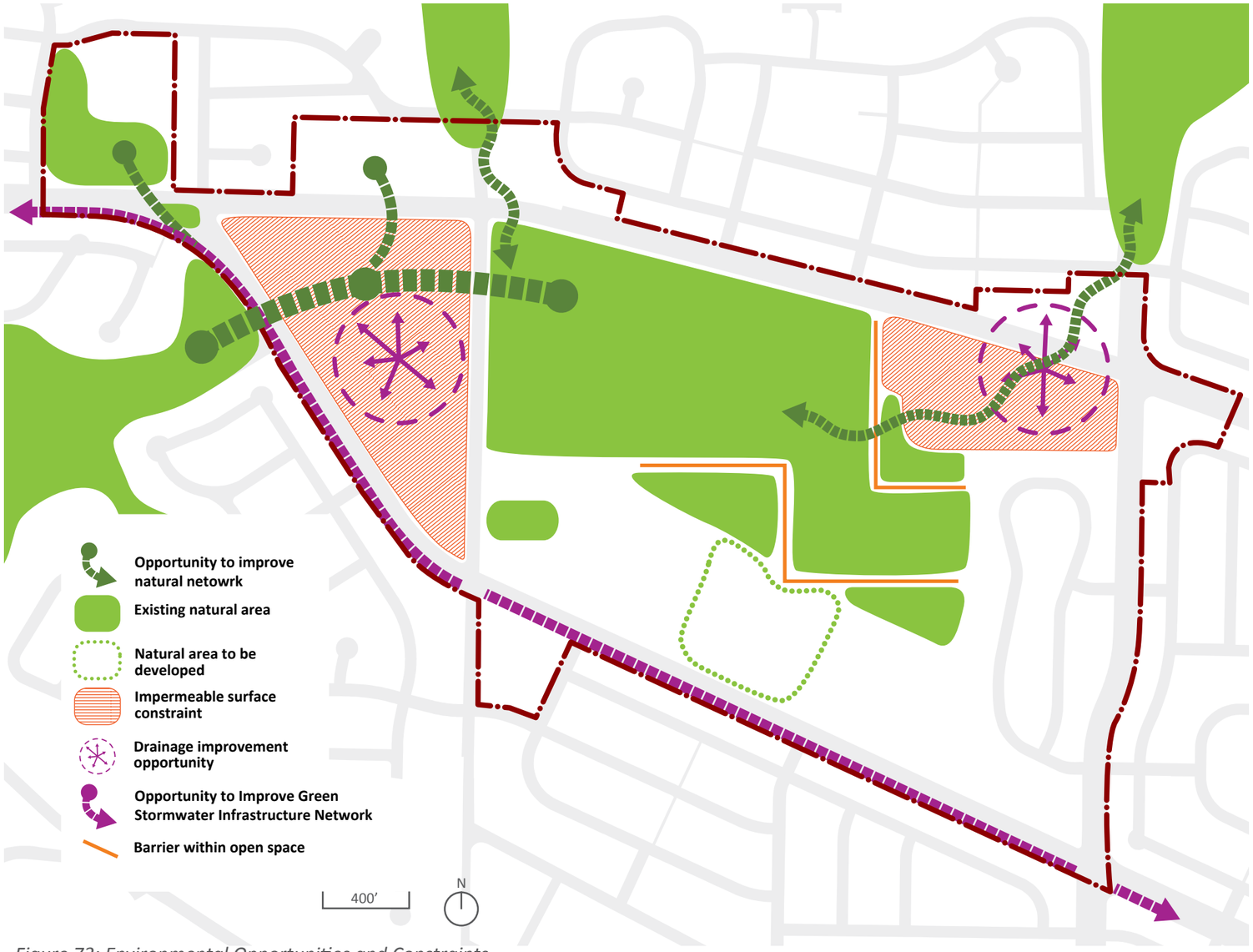



*Figure 73: Environmental Opportunities and Constraints*

## Existing Natural Area

The Heights contains and is nearby several natural areas of various sizes and characters. The large natural areas are Park Hill Cemetery and the ravine that runs along Blandford Drive, which contains South Cliff Park and Dubois Park. The small natural areas are the field of Martin Luther King elementary school, the "island" at the intersection of MacArthur Boulevard and Mill Plain Boulevard, and green "fingers" that run along Devine Road and Andresen Road that run from the plateau down to Burnt Bridge Creek, a large natural belt north of the area depicted in the diagram.

Development and roads constrain the borders of these environmental areas, but there are opportunities to preserve them and enhance their quality both as places of recreation as well as functional stormwater mitigation and habitat zones.

## Opportunity to Improve Natural Network

The primary opportunity to improve upon the existing natural network is to connect the ravine that runs along Blandford Drive to Park Hill Cemetery. Although they are two very different kinds of green spaces — one narrow, densely planted, and steep while the other is wide, more sparsely planted, and flat — they both serve functions in channeling stormwater, wildlife, and recreational activity and both would be more effective if connected.

The secondary opportunity is to make a stronger connection to Burnt Bridge Creek to the north by creating a natural connection from The Heights District along Devine Road and Andresen Road toward the creek. This would improve stormwater management as it drains off the plateau as well as give access for pedestrians and wildlife from The Heights District to the extensive regional natural network formed by the creek.

## Opportunity to Improve Green Stormwater Infrastructure Network

MacArthur Boulevard has a wide setback on its south side which is currently open grass. There is an opportunity for this to become part of the natural network by creating green stormwater infrastructure (GSI) running along its length. This would facilitate stormwater drainage for the south side of The Heights District, which has fewer natural areas to drain to than the north side. It would also create a network for wildlife.

## Natural Area to be Developed

The green field between George C Marshall Elementary School and McLoughlin Middle School is scheduled to be filled in with a new school and outdoor facilities.

## Impermeable Surface Constraint

The commercial areas of The Heights District are currently covered in impermeable surfaces. These are primarily parking lots and secondarily building footprints. The dark asphalt of parking lots creates a “heat island” effect where the surrounding area is unnaturally warm. This can exacerbate the negative effects of high temperatures in the summer. The large amount of impermeable surfaces also contribute to polluted stormwater runoff. This runoff is left untreated by facilities that no longer meet current stormwater treatment requirements. There is an opportunity to improve this by reducing the parking area, adding vegetation to it, or changing the surface to be lighter and more permeable.

## Drainage Improvement Opportunity

Large areas of impermeable surfaces can cause undesirable effects through runoff such as groundwater pollution and erosion. There is an opportunity to improve drainage at impermeable surfaces such as rooftops, parking lots, and streets by integrating GSI, making the surfaces permeable, or reducing the surface by adding vegetation.

## Barrier Within Open Space

The existing fencing between Park Hill Cemetery and Vancouver Public Schools property, as well as the fencing between the cemetery and the southwest part of Heights Shopping Center, divide the open green space in the center of The Heights District. This may serve as a barrier for some wildlife.

# APPENDIX A: CASE STUDIES

## Introduction

The following case studies showcase a variety of contexts, development models, methods, and results of subarea planning. These case studies were selected because some of their aspects may be relevant to The Heights District.

## GREENBRIDGE (King County, WA)

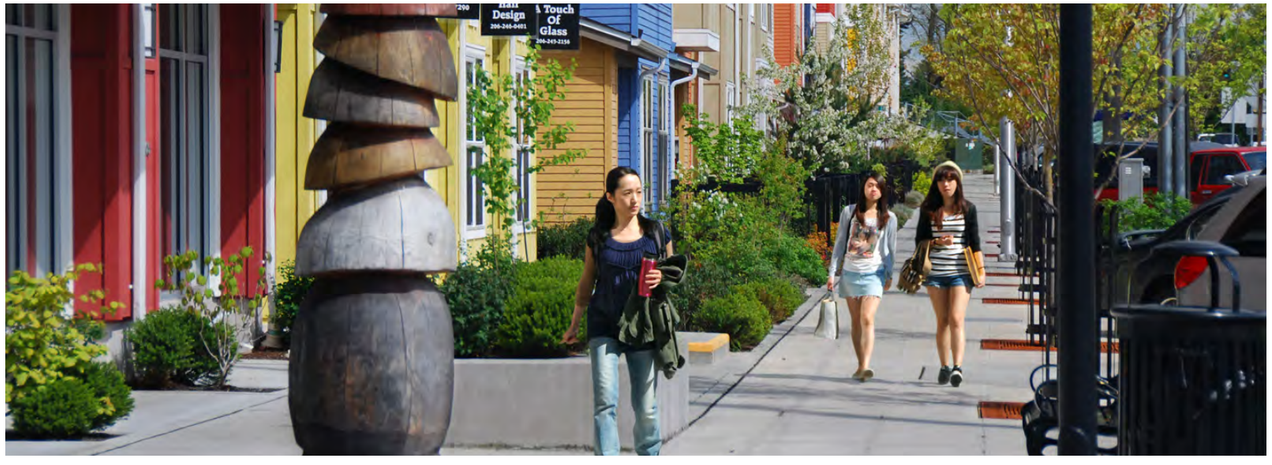
### Highlights

- Mixed-Income housing district
- Sustainable demonstration project
- 1,000 units of housing (phased)
- Catalyst for local redevelopment
- Incubator retail to complement main street
- Bus transit
- Transformational project
- Active Design Award winner

### Takeaways

- Range of housing typologies
- Range of incomes
- Integrated community services
- Live/work and experiential retail
- Neighborhood connectivity
- Park system
- Cultural expression
- Sustainable stormwater infrastructure

# APPENDIX A: CASE STUDIES



## HOLIDAY NEIGHBORHOOD (Boulder, CO)

### Highlights

- Adaptive re-use (vacant drive-in theatre)
- New Urbanist form
- Mixed-income / mixed product
- 2-3 story massing
- Small main street
- Neighborhood park amenity
- Integrated neighborhood-family friendly
- Regional bus pass for residents

### Takeaways

- Complete neighborhood
- Local amenities
- Mixed-Income / mix of uses
- Located within urban context (lower density)
- Focus on sustainability
- High quality plaza and park

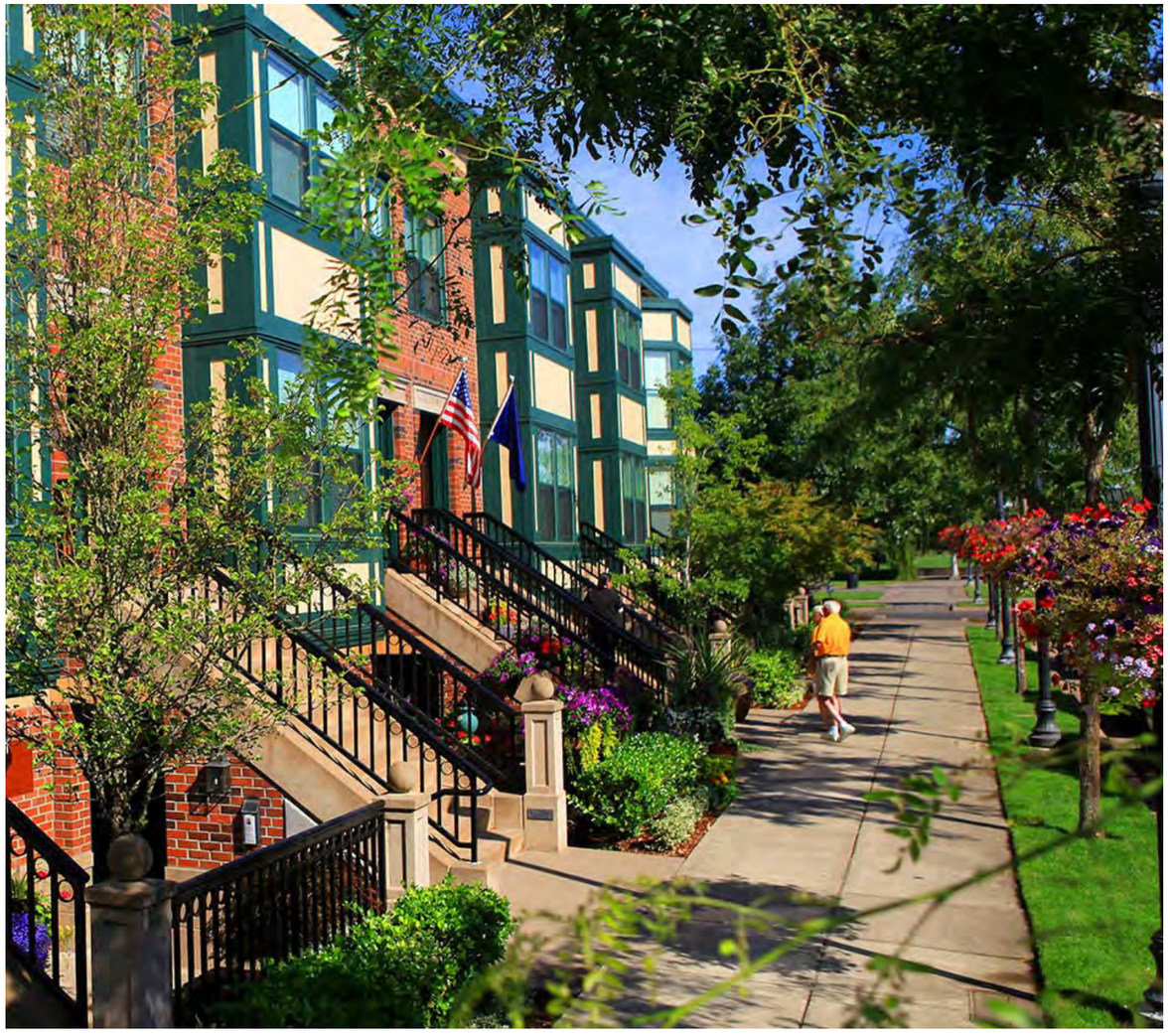
# APPENDIX A: CASE STUDIES

## WOODSTOCK TOWN CENTER (Woodstock, GA)


# APPENDIX A: CASE STUDIES

**ORENCO STATION (Hillsboro, OR)**

# APPENDIX A: CASE STUDIES




## RINO ARTS DISTRICT (Denver, CO)

### Highlights

- Individual artists / production artist began moving in after decline of  industrial uses
- Creative businesses, artists, and galleries
- Taxi Building (Phase I) / Drive Building (Phase 2) provides creative space for artists and designers
- Ground-level retail and residential (top level)

### Takeaways

- Transitional area
- Located near downtown
- Physically separated from downtown
- Artists as development drivers
- Potential for groundswell movement
- Mixed-use and incubator spaces for small businesses serve as catalyst

# APPENDIX A: CASE STUDIES

## CANARY COMMONS (Toronto, ON)

### Highlights

- Community theme of Health & Wellness
- Network of walkable streets and parks
- Walk score of 95/100
- Bike score of 100/100
- Transit score of 94/100
- Retail, restaurant, and office space
- Includes family supportive services: Primary School, Community Center, YMCA
- 19% of the multi-family housing includes 2-3 bedroom suites to accommodate families

### Takeaways

- Began as host to the 2015 Pan Am/Parapan American Games Athletes Village
- 35-acre master-planned district
- Includes 82,000 sq.ft. YMCA, student residences, other residential buildings
- Health-focused, vibrant Front Street Promenade
- 18-acre Corktown Common park with connecting trails

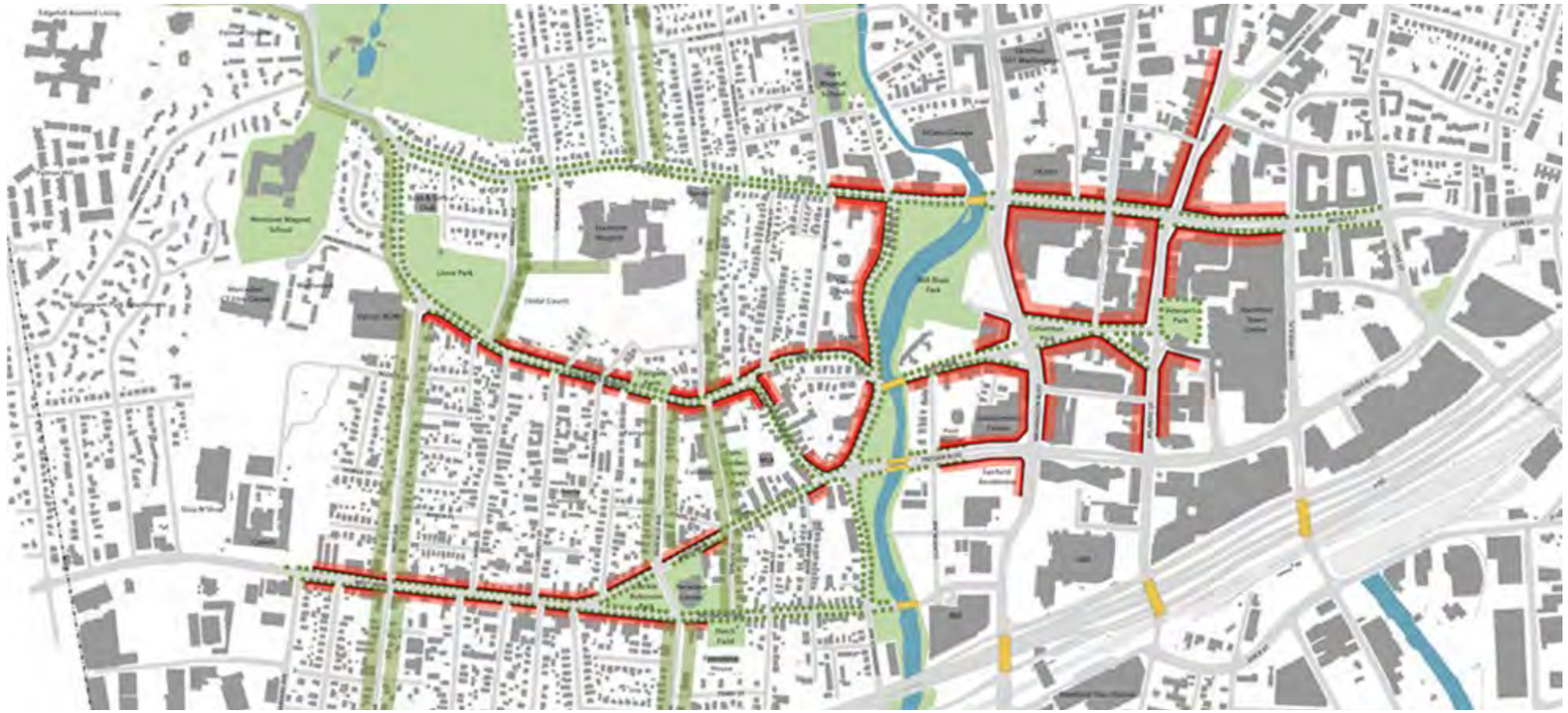
## VITA HEALTH AND WELLNESS DISTRICT (Stamford, CT)

### Highlights

- Partnership between affordable housing provider, hospital, and city
- Mixed income housing community
- Communal urban farm
- Retail, restaurant, and office space
- Social support services, job training, nutrition
- Aid for small business

### Takeaways

- Wellness theme drives community lifestyle programs
- Mix of triplex, lowrise, and midrise structures
- Integration of new structures with adaptive reuse
- Concept integrated into surrounding neighborhoods
- Green open space positioned for wider community use



# APPENDIX A: CASE STUDIES

## UNITED CHURCH OF CANADA (BC, CA)

### Highlights

- Aging church buildings and decreasing congregation numbers led to province-wide strategy to repurpose underused properties owned by United Church of Canada (BCCUCC)
- Desire for multi-purpose or shared spaces for casual interaction between housing residents and congregation members
- Building form, shared amenity, and parking requirements differ based on municipality
- Congregation and municipality have expressed desire for church to be distinguishable, even when housed within non-traditional church building
- Each congregation has a development team that volunteers time to provide input on design process

### Takeaways

- Affordable housing framework
- Enables church ministries to give back to community
- Nonprofit / market housing developers partnership
- Portfolio model where one redeveloped property can leverage future opportunities for other properties
- Emerging model of churches building less purpose-specific venues
- Faith-based communities retain ownership of housing projects on their land
- Helps maintain affordability over the long term

## GLOBAL INNOVATION EXCHANGE (GIX) (Bellevue, WA)

### Takeaways

- Competed in 2017 (part of the larger Spring District transit-oriented development in Bellevue)
- 100,000SF Innovation hub 36 acre Transit Oriented Development (TOD)
- Public / Private Partnership
- Wright Runstadt (developer)
- Microsoft
- University of Washington
- Tsinghua University, Beijing, China
- Symposium and presentation space
- Maker spaces, design studios, and technology labs
- Major corporate sponsor ($40M seed money)
- Focus on science, tech, engineering, and design
- Entrepreneurship and practical business programs


Innovation Competition
The Final Round
The First Prize
The First Prize
The First Prize

# APPENDIX B: PUBLIC INPUT COMMENTS

***The following are unedited comments received at various public outreach events as part of The Heights Visioning process.***

## LEADERSHIP SUMMIT INPUT (MAY 3 2018)

**How do you identify (describe) your neighborhood?**

1. Old/ rundown
2. Historic
3. Stuck in time
4. Run down
5. Dilapidated
6. Historic
7. Water tower
8. Rich in social services
9. Cemetery- interesting
10. Vanco- how much used?
11. VHA Rehab of Skyline Crest
12. Boys and Girls Club and forthcoming community center
13. Schools
14. Swimming Pools
15. Bike lane on MacArthur
16. Churches
17. Schools
18. Open green space
19. Heavy metal brewing 'yea'
20. Active neighborhood associations
21. Central
22. Non-descript
23. Unanchored
24. Homogeneous development
25. Older commercial development
26. Underdeveloped
27. Vacant space
28. Residential
29. Disjointed uses
30. Single family-owner occupied
31. Limited MF
32. Underdeveloped infrastructure (paving, lighting, etc.)
33. Underutilized
34. Established
35. Lots of roads
36. Not enough access to your destination
37. Unconnected population
38. Devoid or limited commercial services
39. Well served by transit
40. Densely populated
41. Family oriented – four people can travel together
42. Adjacent neighborhoods- socio-economically diverse
43. Diverse: economically, age, ethnically similar to the rest of the city
44. Families
45. Long term home owners
46. Middle class
47. Diverse population
48. Quiet crossroads
49. Perception that it is uninviting/ no reason to go there
50. TM/ Redevelopment area- not pleasant to walk through/ no vegetation
51. Welcoming
52. Affordable
53. Sleepy

**What excites you about your community and the Heights planning opportunity?**

1. Bring different elements of community together
2. Bringing the neighborhoods together
3. Live/work/play, community center
4. It looks like the heart, like a center point
5. Opportunity for creative design
6. Freedom for risk, innovation in design
7. Opportunity for citywide anchor- arts/ commercial institutional
8. Could become a magnet- people come there for amenities/ retail/ fun
9. A new public gathering place where community can experience art, culture, music, and gather
10. Parks for people to gather, exercise
11. Central gathering place- events
12. Vibrant public spaces for gathering, diverse, safe. Activate spaces
13. Public space
14. Activation of green spaces
15. Add vegetation, remove asphalt

## LEADERSHIP SUMMIT INPUT (CONTINUED)

16. Underground utilities- big trees, fast growing, leafy no visual dist.
17. Parks and active transportation
18. Murals that reflect heritage/ involve kids/ students
19. Opportunity for new identity
20. A place for all ages to enjoy and have access to
21. Potential for library
22. Employment workspace/ co-working
23. Inclusionary housing/ mixed income/ different life stages
24. Variety of housing sizes/ types
25. Multi-family housing
26. Growth opportunities
27. Economic growth for established businesses
28. Increase in property values
29. Mixed uses, supporting each other
30. More people, more money, better schools
31. Local convenience (shopping options)
32. Having something to walk to
33. Essential business amenities nearby again
34. Opportunity that a public/ private partnership can offer planning for future generations
35. A chance for rejuvenation
36. Opportunity to rethink land uses with schools
37. Opportunity for density done well
38. Increased walkability, mixed income housing, economic vibrancy, jobs
39. Shared service space
40. Integrate services into new development
41. NPO/ Health/ Resources in one place
42. Opportunity to serve local community (social/health)
43. Improve food access
44. Opportunity for integrated 20 minute neighborhood
45. Next to BRT line on Mill Plain
46. Transit
47. Center- BRT, station with amenities, transit align with services
48. Ability to connect parts of the city
49. Link to downtown
50. To connect employment centers
51. Connection between Blandford, Burnt Bridge Creek Green way
52. Enhanced connectivity/ accessibility
53. Connection through Blandford Dr.
54. Connection for trail park
55. Bring neighborhoods together/ bridge/ connect
56. Connect to Burnt Bridge trail
57. Reconfigure traffic flow for safety, smoothness, especially Mill and 4th, walkability for all abilities
58. Widen sidewalks, more options for car-free mobility
59. No-car zones
60. Cycle territory
61. Potential for MacArthur Blvd.
62. Potential for Blandford Canyon
63. Unique opportunity with city right of way “MacArthur Corridor”
64. Central location to I-5 and I-205
65. Proximity to schools
66. Increased efficiency
67. Build on/ revive historical context
68. Transition from what is to what will be
69. Keep grocery store
70. Redevelop without gentrification
71. Stabilize neighborhood

**What concerns do you have?**

1. No easy access to SR-14
2. More employees at HD Quote center- not well connected
3. Need better access for future amenities
4. Gentrification that leads to displacement
5. Gentrification
6. Gentrification
7. Impact on housing affordability
8. Non-profits losing their spot
9. Design for many implementors- not one size fits all
10. Include implementation steps, not just broad goals
11. Not meeting objectives
12. Who will live in new housing- this has been expressed by Nbd’s, need to educate
13. Buy in for property owners
14. Status quo thinking (design)
15. NIMBYism- include all voices
16. Miss the community needs
17. Seeing the project through
18. Scale and fit into space
19. Merging new and old

## LEADERSHIP SUMMIT INPUT (CONTINUED)

1. Don’t want this area to die again
2. Flexibility in internal road network
3. Traffic and pedestrian safety
4. Need for broader transportation safety plan
5. Blandford and cyclists, Evergreen

**List Measures of success?**

1. Plan that attracts developers and private investment
2. Retail and community uses on site
3. Wine bar, quality restaurants
4. Scaled for profit
5. Attract people and businesses from outside area
6. Ice cream
7. Broadband/ free wifi/ fiber
8. Quality design/ appearance
9. Support of the plan by neighborhoods
10. Broad support from community neighborhood
11. Public/ political support
12. Engaging neighborhoods, businesses
13. Not just associations
14. Outreach to families through schools, community centers, (Boys and Girls Club)
15. Talking to businesses further down Mill Plain (Rally Pizza, etc.)
16. Potential open house locations
17. Outreach/ engagement
18. Canvassing
19. Online
20. School outreach
21. Block party/ events
22. Get people excited!
23. Distinctiveness
24. When people take pride in the neighborhood
25. It’s a place I want to move to
26. Trees, kids, activity, feels inviting
27. Clear vision
28. Happy people
29. Provides point of pride
30. Iconic identity
31. Social services and family support services on site
32. Measurable socioeconomic indicators for undeserved communities
33. New offers the opportunity for all including non-profits
34. Connectivity achieved
35. No parking or right sized parking (ML)
36. Designed to encourage transit
37. In step with changing economics/lifestyles now and going forward
38. Seasonally responsive
39. Economically viable
40. Sustainable timeline

## OPEN HOUSE INPUT (JUNE 23, 2018)

**What do you love about your neighborhood?**

1. Affordable, low income housing
2. Interesting houses
3. Lots of parks and green spaces
4. Open with lots of green space
5. Parks
6. Green space & parks
7. Love Sam Brown Park
8. Near open green walking space --> Cemetery
9. Open
10. Love New Restaurants
11. Centrally Located
12. Old established neighborhood
13. Large Lots
14. Beautiful views
15. Beautiful Views
16. Bikable
17. Close to everything
18. Accessibility to the rest of the city
19. Easy access to all things -- airport, downtown, transportation
20. Close to schools, parks, and stores
21. Easy Access to Portland
22. Accessible
23. Connected
24. Close to Bridge and Downtown
25. Freeway access
26. Easy Access to Highways
27. I like the proximity to both freeways and SR14 — grocery store, gas, park, bank, cleaners, health care — all good!
28. Near freeway access
29. Low Traffic
30. Safe Walking
31. Walkable and Safe
32. Lots of safe walking & biking areas
33. Safe Walking
34. Walkability
35. Walkable
36. Walkability
37. Wide streets
38. Wide streets - good for walking and biking
39. Low, middle, and high income
40. Multicultural community
41. More young families
42. Family-Oriented
43. Friendly
44. Friendly
45. Friendly
46. My Neighbors
47. Neighborly
48. “All American City”
49. Clean
50. Low Density
51. Quiet walks
52. Quiet
53. Quiet neighborhood due to the horseshoe shaped streets with limited access. Don’t ever change those streets
54. Quiet
55. Quiet
56. Quiet
57. Quiet
58. Quiet
59. Quiet neighborhoods
60. Quiet
61. Quiet
62. Stable

**What excites you about the future of The Heights?**

1. The chance to create a “place” identity
2. Diversity
3. Interior community space
4. An area like Esther Short with green space for neighborhoods to gather— playgrounds, housing, and businesses access and a special park for dogs
5. Community plaza (like Farmers Market)
6. Green spaces
7. Safe community green spaces
8. Green space

## OPEN HOUSE INPUT (CONTINUED)

1. Urban green spaces that draw people to sit, talk, eat among the retail areas
2. Open Spaces
3. Open/artistic spaces to enjoy
4. Add awesome playground, like Columbia Tech Center Nature Area
5. Young children, play area (inside) (outside)
6. Opportunity to master plan a large area in a thoughtful and comprehensive approach
7. Visual appeal
8. Less disgusting asphalt
9. Beautify derelict area
10. Please add good space for high income businesses (i.e. law offices, arch, retail estate, consultants, IT)
11. Increase density to support new businesses, restaurants, and walkability
12. Walking access to food, retail, entertainment venues
13. Projects like “The Mill”
14. New restaurants
15. Fun restaurants and shops
16. Restaurants
17. Shops
18. Add shops and restaurants to walk to
19. Community Center, people oriented with shops and restaurants
20. Pub/restaurant within walking distance and affordable
21. Small businesses
22. Neighborhood restaurants
23. Small shops, coffee shops, and bakeries — walkable
24. Adding retail that people want/need
25. Walkable shopping (Retail, Grocery)
26. Specialty grocery (New Seasons or like grocery)
27. Excited to have retail for food within walking distance (A New Seasons market, perhaps)
28. A small grocery store would be nice (Trader Joe’s, New Seasons)
29. Natural food stores
30. A Whole Foods or New Seasons would be a real added value (walkable)
31. Affordable housing
32. Increasing the variety of housing stock
33. Red brick multifamily housing with retail below, making the site a community in of itself, but open to the neighborhoods around
34. Apartments to purchase for seniors
35. Community swimming pool accessible to all
36. Great schools
37. Public neighborhood/center with classes held in school or public inside area
38. Library in the neighborhood
39. This a short, flat commute to tech areas easy (HP. Banfield, etc.) --> Jump on that angle
40. Easy to Portland and Downtown Vancouver
41. Love the idea of an active neighborhood — tracks, bikes, easy walkability
42. Wheelchair/stroller accessible sidewalk curbs
43. Walkability & bike network
44. Better walkability
45. Bike/walk/transit safety + opportunity
46. Bikability/walkability
47. Walkability
48. Walkability
49. Bicycle access
50. Safe walking paths
51. Walking and biking trails
52. Sidewalks on residential streets

**What concerns do you have about the neighborhood?**

1. Striking a balance between improving the neighborhood and keeping it affordable
2. Affordability impact
3. Impact on affordability
4. I would like to see housing and commercial rents stay reasonable so we can accommodate local businesses
5. Poorly designed (cheap) apartment buildings
6. Quality and attractiveness of housing planned
7. Avoid the newer, multi-storied apartments (over 3 levels) that the city has allowed Downtown
8. Housing to blend in with existing housing
9. Don’t want high density in Northcrest
10. Low income --- No!!!!
11. Low-income housing needs to be carefully & mindfully maintained
12. Low income housing is a horrible idea! It will destroy our neighborhood
13. Avoid over concentration of low income housing and social services
14. Low income housing mixed with more expensive housing improves diversity and provides more opportunity for a variety of businesses. Let’s not become elitist!
15. Mix retail + housing + community center
16. We need to be open to diversity of all kinds and welcome all kinds of people
17. Add more single family homes
18. Crime
19. No homeless shelter!!!
20. Architecture that prevents homeless camping & bench sleeping, use “hostile architecture”

## OPEN HOUSE INPUT (CONTINUED)

21. Impact on existing neighborhoods
22. Respect established neighborhoods
23. Existing businesses?
24. Multi generational income gap - Blue collar jobs disappearances -- no new mid-high income jobs
25. Not enough parking for commercial/residential
26. Please account for care + maintenance of what you build. Take care of stuff!
27. We shouldn't have to send our kids to private school
28. Value of education: schools need to perform to attract young
29. Taxes being raised dramatically + pot sale will drop house values
30. Poorly maintained parks
31. Keep tree on south side of water reservoir -- like park-like look
32. Preserve tree along water facility
33. Concerns about Sam Brown Park
34. Enough parks & rec for increased population
35. Make water station & fires station park-like
36. Satellite paths to connect neighborhood
37. Not enough sidewalks
38. Lack of sidewalks
39. No sidewalks
40. Lack of sidewalks
41. Decreased or eliminated non-neighborhood car traffic
42. Clean up medians please
43. Bad road surface conditions
44. Liesser + MacArthur intersection needs a traffic light. It's a "free for all" right now

**What opportunities are we missing?**

45. High rise or mid rise housing — affordable
46. More affordable housing for young people — amenities to make it attractive for them
47. Seize schools and utilize land to build A+ development that attracts people with money. Then rebuild schools to A+ performance that will attract people which will make development prosper
48. Look at Vancouver as a growing space — program events and incentivize businesses to locate here
49. Increase beauty and accessibility for most businesses and offices
50. Incorporation of low-income housing into mixed-income developments
51. Redevelop the Plaza Area (shops, restaurants, etc.)
52. Accessible housing for seniors
53. More senior housing
54. Put solar panels on top of water facility
55. Raze Tower Mall but save/reuse any material
56. Include an off-leash dog park proximate to higher density housing
57. Too much pavement and gravel at present
58. Giant asphalt lot needs to be broken up and greened up — trees, grass, fountains
59. Green space — park, community garden, low-maintenance plantings, shade
60. Open area with fountains, places for families to feel safe
61. Fields for baseball, tennis, etc. — Only two in the entire area
62. Need way more trees
63. Trees
64. More trees
65. Make the architecture appealing
66. More young people and families to revitalize the neighborhood and schools
67. Draw young and old people to live here and spend their money here
68. Keep the "family feel"
69. Exciting opportunity to plan a community inviting to all
70. Brand to the Heights, Vancouver, the PNW
71. Install murals/sculptures like downtown
72. Sidewalks and better pedestrian access
73. Traffic calming: Narrow streets by adding sidewalks where they don't exist
74. Need better traffic lights on MacArthur at Lieser and Andresen — please!
75. Walkable paths for everyone
76. Flexible use spaces — event space that is enclosed and convertible
77. A central area to provide for summer concerts or movies
78. Public square
79. Community center
80. Opportunities for small business and co-work space. Live/work in the same area
81. Community entertainment
82. A farmers market location
83. Love a natural foods store/restaurants
84. New Trader Joe's store
85. We need an upscale grocery store (like New Seasons)
86. Decent grocery store option
87. Grocery store
88. Need a New Seasons grocery store
89. We need to work with Safeway to be sure they stay for all purpose for everyone
90. More walkable, bikeable, and healthy living areas
91. Population is aging, but wants to stay fit
92. Encourage library to move headquarters here when lease expires
93. Small business, fitness shops, food
94. Chuck's — please come!

## OPEN HOUSE INPUT (CONTINUED)

1. Decent restaurant
2. Restaurants
3. Need more local shops and restaurants to walk to
4. Social services used to be at Tower Mall on a bus line, lots of parking. New OSHS has moved. Social Security is Downtown (pay parking!) Please put “help” on a bus line — need more low cost housing
5. I want everything now

**What are measures of success?**

1. Tidy and maintained private and public spaces
2. Make space for what people do
3. Lively interactive spaces (spaces for coffee, housing, dry cleaners, yoga class, active)
4. Neighborhood involvement
5. Jobs paying a livable wage
6. Ample job opportunities that pay a living wage
7. Use local artists, garden sculptor
8. Enhance all property values — bring in more young families
9. Open Space
10. Dog park
11. Community garden
12. Fountain
13. Dog Park
14. Green space
15. Include small “pocket” parks, at least two, in the redevelopment area
16. People want to live and work here
17. Something Vancouver can be proud of
18. Transparency and community involvement
19. Livable and vibrant neighborhoods
20. Healthy schools
21. Schools that people want to attend
22. Improved performance at schools
23. Lower percentage of suspensions and expulsions at schools
24. Bicycle access
25. Connectivity between housing an retail
26. Connection
27. No red lights
28. Paved sidewalks
29. Walkability
30. Attractive, appealing, quality architecture and public spaces
31. Mixed income housing from subsidized to high-end look the same
32. Business incubator space
33. Community meeting spaces “flex spaces”
34. Housing accessible for seniors
35. Units that can thrive
36. Orenco Station type of multi-use development (dense, attractive, places to eat, shop, gather, live work)
37. Prepared take-out or specialty grocery restaurants
38. Food truck pod
39. Food truck pod, family-oriented microbrewery
40. Restaurants
41. Walkable shops, restaurants, bakery
42. Shopping (New Seasons, Whole Foods, something healthy)
43. Shops
44. Bike shop
45. Cinema
46. Good close retail that is walkable
47. Thriving small businesses
48. Tower Mall Area needs to be a “destination” -- shops, restaurants, easier pedestrian access, outdoor dining, etc.

**Where are areas of opportunity and concern?**

1. Need more city maintained public parks
2. Better park signage needed at each entry points of Carl Gustafson Park
3. No expansion preferred for the existing cemetery
   Saving existing trees and neighborhood parks
4. Green space needed near new developments and schools
5. Community Garden can be added
6. Dog Parks are needed
7. Community Hall/ center needed
8. Library needed
9. Upscale grocery stores are needed
10. Post office/ package delivery services are needed
11. Electric fuel station can be added
12. Bike Park can be added
13. Small skate park can be added
14. Pickle ball court can be added in McLaughlin Middle School
15. Public square with water features can be added
16. Center median floods on MacArthur Blvd

18. Fix storm drainage at Missouri and Andresen Rd
19. Disconnected sidewalks in MacArthur Blvd, poorly maintained sidewalks
20. Adding curbs and sidewalks throughout
21. Ensure pedestrian safety in the crossings near schools
22. Green walk and bike ways away from E Mill Plain Blvd will provide better ways to get to the new town center
23. Better pedestrian and bike path are needed along N Devine Rd
24. Improving bike access across the city
25. MacArthur has one of the best bike lanes in the city
26. High speed traffic and dangerous intersection near Montana Ln and Pocatello Ave
27. Pedestrian and bikers safety concern in S Blandford Dr
28. Pedestrian and bike way opportunity to provide better access and connections between S Blandford and Evergreen Blvd
29. Adding speed bumps and sidewalks in Highland dr.
30. Ensuring pedestrian safety in Roundabouts
31. Better street lighting, traffic signal and roundabouts near the intersection of MacArthur Blvd and S Andresen Rd.
32. Closing Buena Vista Dr. at S Andresen Rd and adding stop signage can solve a range of current traffic issues (?)
33. Need direct bus service to the airport on E Mill Plain Blvd
34. S Morrison Rd needs street lights
35. Slowing down traffic within the neighborhoods adjacent to SE Middle way
36. Better street lighting and traffic control (improvement needed regarding signals, 4 way stops, flashing lights, and roundabouts)
37. Save existing grocery stores and coffee shops
38. Encourage/increase locally owned shops and restaurants
39. Encourage mixed use development (Local businesses + housing + Improved pedestrian and bike connection + Green space and parks + adequate parking)
40. Homeless population concentration and camps near natural areas, cemetery, public parks and schools
41. More low cost senior housing are needed
42. Apartments/condos integrated with green space and parks
43. Ensure good aesthetics and architecture for new developments in the area that fits the neighborhood character and identity
44. Keep housing height maximum of two or three stories
45. Make sure residents have more say than property owners and developers
46. Listen to neighbors who will be most affected by the changes

## CAC #2 WORK SESSION (JULY 12, 2018)

**Economic Development**

1. Small Business
2. Business relevant to neighborhood
3. Local Business
4. Affordable Commercial rent
5. Environmental studies
6. Food truck park
7. Focus on local independent non-chain businesses
8. Niche market vs. general
9. Rental rates vs. types of rental restaurants
10. Urban form as an economic driver
11. Draw people here
12. Mid century modern character
13. Something unique to Vancouver, WA
14. Less is more size
15. Learn to say “NO” if there is no longevity
16. Productivity for the family
17. Live/Work development
18. Limited corporate influence
19. Living wage jobs

**Mixed-Income Housing**

1. Senior housing
2. Mixed housing types including low, mid and higher income
3. Inclusionary zoning
4. Stigma of low-income
5. Fear of negative impacts of mixed-income
6. Design for mixed income and benefit of it
7. Condos, Home ownership vs. rentals, Apartments
8. “Work Force” Hosing
9. Provide for affordable options
10. “Modesty” is key

**Urban Character/Form**

1. Broad appeal in appearance
2. Destination center

## CAC #2 WORK SESSION (CONTINUED)

1. Mini “Pioneer Square”
2. “Town” feeling rather than “Urban”
3. Compliment existing neighborhood
4. Sense of Place
5. Theme
6. MCM Design
7. 5-6 stories max.
8. Design that inspires
9. Breathe “new” life in “older” community
10. Make the streetscape ….Breath in width??
11. Vertical element not present
12. Daring design

**Community Health, Wellness & Equity**

1. Inclusive
2. Walk-In Clinic
3. Medical/ Dental office
4. Social services
5. ADA
6. Access to “Healthy Living”- food, open space, physical amenities
7. Farmer’s market
8. Specialty grocery vs. affordable grocery
9. Existing public health services
10. Playgrounds
11. Accessibility
12. Feeling safe
13. Driving range provides valuable access for youth to athletes
14. Access to healthy food

**Connectivity**

1. Improve Devine and Balanford  (Car, walk, bike)
2. Improve access (bike/walk/wheelchair through out)
3. MacArthur bike connection-Extremely important
4. Redevelop connections along perimeter
5. River connection
6. Grand central access from Blandford
7. MacArthur - Traffic counts, appears lightly traveled
8. Vehicular traffic to Mill Plain - slower/ multi-modal traffic to MacArthur
9. Devine - Concern about loss of a connection, how to replace if Devine is lost
10. Pedestrians have priority
11. Woonerf “Devine”

**Sustainability**

1. Flexible design
2. Earthquake Standards
3. Design for long haul
4. Design sustainability
5. Environmental vs. resiliency
6. Material choices
7. “LEGO” like community
8. Focus on draining the Mill Plain and addresses business so they don’t move away

**Public Realm**

1. Sustained funding for maintenance for public space
2. Regional Destination
3. Walkable
4. Devine - shared street
5. Green spaces
6. Gateway - great intro to the space
7. Quiet-ish gathering space
8. NACTO Street Design guide
9. MacArthur Promenade - space is there

**Arts/Culture**

1. Mini amphitheater
2. Space for local art display
3. “First Friday” event space
4. Dedicated space for arts and related activities
5. Tie to Heights/ Vancouver history
6. Community “Participates” - creates art
7. Destination
8. DT Vancouver’s culture is the reason for it’s revitalization
9. Encourage creativity
10. Encourage higher learning facility of traditional pottery glassware
11. Color on the horizontal

# APPENDIX C: TRAFFIC ANALYSIS

## Memo

Date: Wednesday, July 25, 2018

Project: The Heights District Plan

To: Jennifer Campos and Rebecca Kennedy, City of Vancouver

From: Jeremy Jackson and Tom Shook, HDR

Subject: Existing Conditions Traffic Analysis Memorandum (DRAFT)

## Introduction

The purpose of this memo is to summarize the existing conditions traffic analysis and results within The Heights District Plan area. The analysis will support the multi-modal transportation analysis, alternatives development, Draft Environmental Impact Statement, and inform transportation needs for the District Plan.

## Traffic Data Collection

Weekday, 3-hour AM (7 AM to 10 AM) and 4-hour PM (2 PM to 6 PM) peak period turning movement counts were collected at the following intersections (see Figure 1):

1. E. Mill Plain Boulevard at Brandt Road/Rhododendron Drive
2. E. Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue
3. E. Mill Plain Boulevard at N. Devine Road
4. E. Mill Plain Boulevard at N. Andresen Road
5. E. Mill Plain Boulevard at Garrison Road
6. E. Mill Plain Boulevard at N. Lieser Road
7. MacArthur Boulevard at N. Lieser Road & St. Helens Avenue
8. MacArthur Boulevard at N. Andresen Road
9. MacArthur Boulevard at Devine Road
10. N. Andresen Road at NE. 18th Street
11. N. Devine Road at E. 18th Street

Turning movement counts were collected in early June before area schools were out for the season and included a 15-minute breakdown of pedestrians, bicyclists, passenger vehicles, and heavy vehicles. Data collection also consisted of obtaining existing signal timing from the City.

## Peak Hour Determination

The existing AM peak hour for the majority of the study area intersections was determined to be 7:45 AM to 8:45 AM. During the PM period, however, the peak hour varied significantly. As noted in the data collection, traffic volumes were collected between 2:00 PM and 6:00 PM to account for traffic near the local area schools. Because multiple intersections were heavily influenced by school traffic, it was determined that the individual peak hour for each intersection would be used for the PM peak analysis. The AM and PM peak hours used for analysis at each intersection are show below in Table 1.

**Table 1. Intersection Peak Hours**

| Intersection | AM Peak | PM Peak |
|---|---|---|
| E. Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 7:45 – 8:45 | 3:00 – 4:00 |
| E. Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 7:45 – 8:45 | 3:00 – 4:00 |
| E. Mill Plain Boulevard at N. Devine Road | 7:45 – 8:45 | 3:30 – 4:30 |
| E. Mill Plain Boulevard at N. Andresen Road | 7:45 – 8:45 | 4:30 – 5:30 |
| E. Mill Plain Boulevard at Garrison Road | 7:45 – 8:45 | 4:45 – 5:45 |
| E. Mill Plain Boulevard at N. Lieser Road | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Boulevard at N. Lieser Road & St. Helens Avenue | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Boulevard at N. Andresen Road | 7:45 – 8:45 | 2:45 – 3:45 |
| MacArthur Boulevard at Devine Road | 7:45 – 8:45 | 3:30 – 4:30 |
| N. Andresen Road at NE. 18th Street | 7:45 – 8:45 | 4:30 – 5:30 |
| N. Devine Road at E. 18th Street | 7:45 – 8:45 | 4:00 – 5:00 |

## Traffic Operations Analysis

A traffic operations analysis for the project area intersections was performed using Synchro (version 9). The analysis results are based on the Synchro output with the exception of the unsignalized intersections on MacArthur Boulevard at N. Lieser Road and N. Andresen Road. Synchro was not reporting results for these intersections due to the configuration and the HCM 2010 AWSC reports were instead used. For unsignalized intersections, the overall intersection delay is based on the worst stop-controlled approach. A summary of the AM and PM peak hour intersection delay and level-of-service (LOS) is provided in Table 2 and Table 3. A summary of the AM and PM peak hour intersection volume-to-capacity (v/c) ratios is provided in Table 4.

As shown below, most project area intersections are operating at LOS D or better except for the unsignalized MacArthur Boulevard and N. Lieser Road/St. Helens Avenue intersection, which is operating at LOS F in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E. Multiple intersections are operating over-capacity, with v/c ratios that exceed 1.0; including E. Mill Plain Boulevard and N. Andresen Road in the AM peak hour and the unsignalized MacArthur Boulevard and N. Lieser Road/St. Helens Avenue intersection in both the AM and PM peak hours. The E. Mill Plain Boulevard and N. Lieser Road intersections is operating close to capacity (v/c of 0.95) in the PM peak hour.

**Figure 1. Traffic Count Locations**

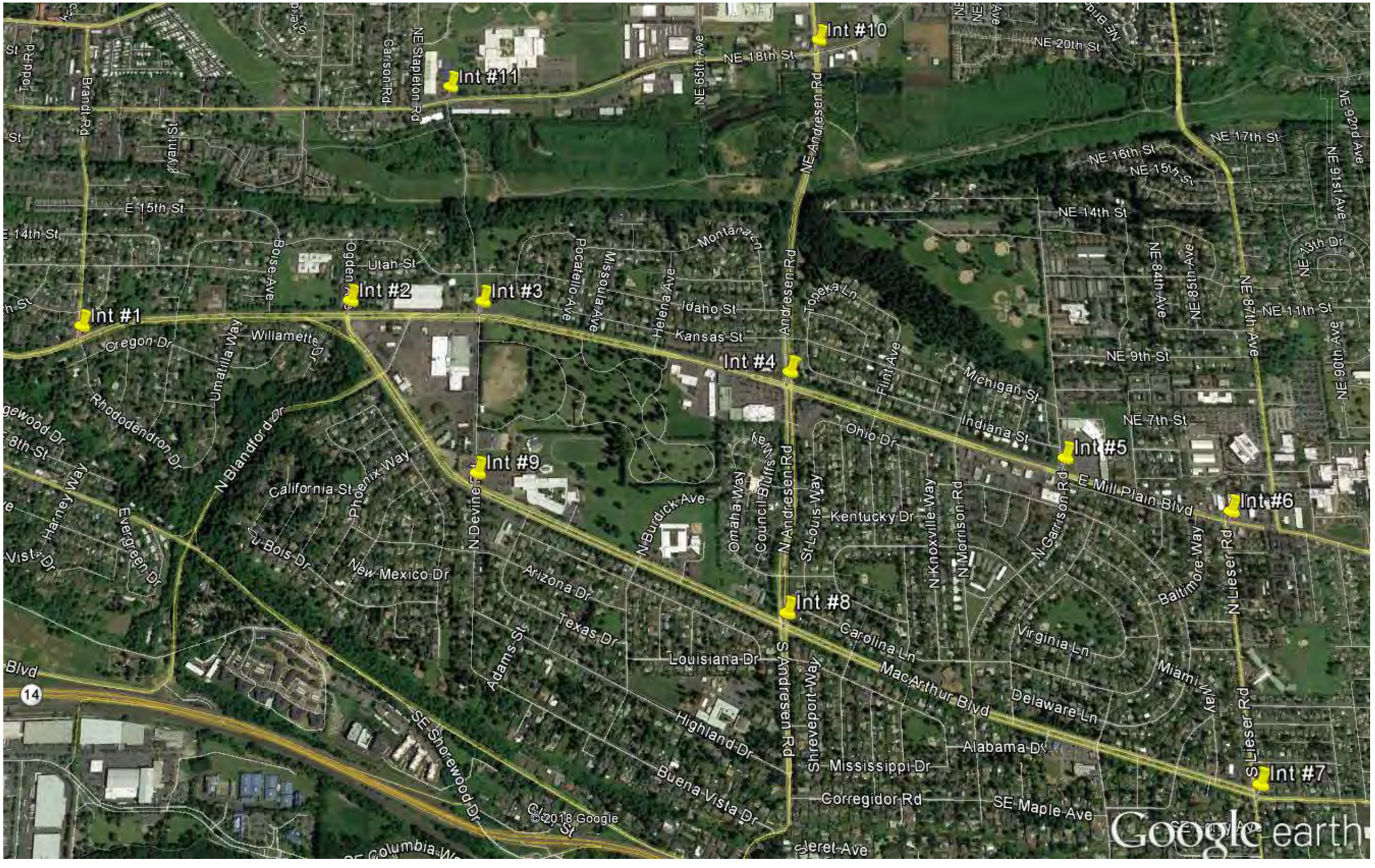


**Table 2. Intersection Delay and Level of Service – AM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E. Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.4 | A | 8.5 | A | 23.2 | C | 56.0 | E | 16.3 | B |
| E. Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 6.9 | A | 8.0 | A | 22.8 | C | 12.4 | B | 9.8 | A |
| E. Mill Plain Boulevard at N. Devine Road | 23.7 | C | 30.0 | C | 41.7 | D | 38.9 | D | 31.1 | C |
| E. Mill Plain Boulevard at N. Andresen Road | 30.0 | C | 29.2 | C | 33.6 | C | 71.2 | E | 46.4 | D |
| E. Mill Plain Boulevard at Garrison Road | 15.2 | B | 10.4 | B | 24.4 | C | 32.5 | C | 14.9 | B |
| E. Mill Plain Boulevard at N. Lieser Road | 15.9 | B | 18.4 | B | 26.5 | C | 31.1 | C | 19.2 | B |
| MacArthur Boulevard at N. Lieser Road & St. Helens Avenue** | 107.6 | F | 69.6 | F | 149.0 | F | 97.8 | F | 149.0 | F |
| MacArthur Boulevard at N. Andresen Road** | 18.8 | C | 18.8 | C | 16.2 | C | 21.3 | C | 21.3 | C |
| MacArthur Boulevard at Devine Road** | 10.1 | B | 9.5 | A | 10.2 | B | 10.3 | B | 10.3 | B |
| N. Andresen Road at NE. 18th Street | 52.6 | D | 59.4 | E | 25.4 | C | 30.6 | C | 35.6 | D |
| N. Devine Road at E. 18th Street | 11.6 | B | 11.1 | B | 20.5 | C | 19.3 | B | 14.0 | B |

**Table 3. Intersection Delay and Level of Service – PM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E. Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.2 | A | 8.8 | A | 12.0 | B | 32.4 | C | 12.0 | B |
| E. Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 9.0 | A | 8.4 | A | 29.1 | C | 12.7 | B | 13.0 | B |
| E. Mill Plain Boulevard at N. Devine Road | 37.1 | D | 38.3 | D | 35.6 | D | 29.4 | C | 36.4 | D |
| E. Mill Plain Boulevard at N. Andresen Road | 33.2 | C | 24.1 | C | 52.1 | D | 47.9 | D | 36.3 | D |
| E. Mill Plain Boulevard at Garrison Road | 14.2 | B | 11.4 | B | 54.5 | D | 48.6 | D | 18.5 | B |
| E. Mill Plain Boulevard at N. Lieser Road | 28.7 | C | 27.7 | C | 38.8 | D | 39.1 | D | 30.0 | C |
| MacArthur Boulevard at N. Lieser Road & St. Helens Avenue** | 42.9 | E | 25.9 | D | 93.5 | F | 54.8 | F | 93.5 | F |
| MacArthur Boulevard at N. Andresen Road** | 18.2 | C | 14.0 | B | 14.9 | B | 15.4 | C | 18.2 | C |
| MacArthur Boulevard at Devine Road** | 11.6 | B | 9.9 | A | 10.4 | B | 13.7 | B | 13.7 | B |
| N. Andresen Road at NE. 18th Street | 50.2 | D | 77.5 | E | 23.1 | C | 28.6 | C | 37.7 | D |
| N. Devine Road at E. 18th Street | 15.8 | B | 17.0 | B | 20.8 | C | 20.1 | C | 17.7 | B |

**Table 4. Intersection V/C Ratios**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E. Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.24 | 0.32 | 0.49 | 0.38 | 0.13 | 0.14 | 0.86 | 0.77 | 0.86 | 0.77 |
| E. Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.18 | 0.33 | 0.43 | 0.28 | 0.62 | 0.77 | 0.23 | 0.11 | 0.62 | 0.77 |
| E. Mill Plain Boulevard at N. Devine Road | 0.32 | 0.77 | 0.80 | 0.78 | 0.61 | 0.66 | 0.59 | 0.36 | 0.80 | 0.78 |
| E. Mill Plain Boulevard at N. Andresen Road | 0.52 | 0.69 | 0.73 | 0.65 | 0.47 | 0.61 | 1.20 | 0.78 | 1.20 | 0.78 |
| E. Mill Plain Boulevard at Garrison Road | 0.49 | 0.74 | 0.40 | 0.48 | 0.42 | 0.70 | 0.57 | 0.82 | 0.57 | 0.82 |
| E. Mill Plain Boulevard at N. Lieser Road | 0.49 | 0.54 | 0.81 | 0.95 | 0.75 | 0.82 | 0.11 | 0.23 | 0.81 | 0.95 |
| MacArthur Boulevard at N. Lieser Road & St. Helens Avenue** | 1.11 | 0.85 | 0.96 | 0.62 | 1.22 | 1.08 | 1.07 | 0.92 | 1.22 | 1.08 |
| MacArthur Boulevard at N. Andresen Road** | 0.51 | 0.55 | 0.55 | 0.33 | 0.37 | 0.36 | 0.57 | 0.40 | 0.57 | 0.55 |
| MacArthur Boulevard at Devine Road** | 0.18 | 0.32 | 0.26 | 0.21 | 0.16 | 0.12 | 0.22 | 0.45 | 0.26 | 0.45 |
| N. Andresen Road at NE. 18th Street | 0.75 | 0.80 | 0.68 | 0.90 | 0.64 | 0.70 | 0.69 | 0.46 | 0.75 | 0.90 |
| N. Devine Road at E. 18th Street | 0.53 | 0.56 | 0.22 | 0.39 | 0.61 | 0.59 | 0.03 | 0.18 | 0.61 | 0.59 |

***Unsignalized intersection; worst stop-controlled movement used for each approach and overall intersection v/c ratio.*
*Red = Approach or intersection v/c ratio exceeds 1.0*

# APPENDIX D: APPLICABLE CODES AND STANDARDS

***The following is a summary of applicable City of Vancouver Codes and Standards and the relationship these regulations may have on The Heights District planning process.***

| VANCOUVER MUNICIPAL CODE | |
|---|---|
| Citation | Summary and Key Issues |
| Plan Districts – General. VMC 20.610.<br><br>VMC 20.610 establishes the criteria and method for adopting a subarea plan.<br><br>. | • The Heights District Plan would need to be adopted under a Type IV procedure per VMC 20.210. Subarea plans do not need to follow normal calendar for plan amendments.<br>• The plan must meet the following four criteria (VMC 20.610.040)<br>1. *The area proposed for the plan district has special characteristics or constraints of a natural, economic, historic, public facility, transitional land use or development nature that are not common to other areas of the City;*<br>2. *Existing base and overlay zone provisions are inadequate to achieve a desired public benefit or to address an identified problem in the area;*<br>3. *The proposed plan district and regulations are the result of a legislative study or plan documenting the special characteristics or problems of the area and how a plan district will best address relevant issues; and*<br>4. *The regulations of the plan district are in conformance with the Comprehensive Plan and continue to meet the general purpose and intent of the base zone, and any overlay zones applied in the district and do not prohibit uses or development allowed by the base zone without clear justification.* |
| Existing Zoning (R-4, R-6, R-18, CC, CN, Park) | If existing zoning does not align with the land uses and/or densities proposed under the plan, rezoning or amendments are subject to VMC 20.285. This will include minimum/maximum lot sizes, block sizes, setbacks, and proposed land uses. |
| Existing land use designations (COM, UH, P/OS, PF) | If existing designations do not align with the land uses proposed under the subarea plan, plan amendments will be required subject to VMC 20.285.060. |
| Archaeological Resource Protection (VMC 20.710) | • The Predictive Model maps the majority of the area is within Level B (Lower Probability), however the northwest tip near the confluence of Mill Plan Blvd and McArthur Blvd is mapped as Level A (Higher Probability).<br>• Lots vacant and or serving as parking lots, both paved and unpaved, could contain subsurface cultural resources that could be affected by proposed developments |
| Parks. VMC Title 15. | The City of Vancouver will continue to collect park impact fees for all new residential housing units constructed in Park District #2. Any new parks will require a rezoning to Park. |
| Off-Street Parking. VMC 20.945.070 | Minimum off-street parking requirements are set by land use per VMC Table 20.945.070-2. Off street parking requirements will need to be assessed in light of potential increases in density. Parking is determined at the time development occurs. |
| Cemeteries. VMC 20.895.030 and 13.04. | No issues identified related to Park Hill Cemetery. |
| Wellhead Protection Areas. VMC. 14.26 | The majority of the area is located within a wellhead protection area (Vancouver Water Station 4 – 1, 5, and 10 year). Development may require compliance with protective measures and certain uses may be either prohibited or discouraged within especially sensitive areas (e.g., users of high-risk contaminants such as wood preserving/treating). |
| Fish and Wildlife Habitat Conservation Areas. VMC 20.740.110. | Mapped non-riparian Habitat Conservation Area is associated with the Southcliff/Blandford Canyon Greenway and the Burnt Bridge Creek Greenway. Development may require a critical areas report and permit if within the mapped area or buffer. |
| Geologic Hazard Areas. VMC 20.740.130 | Mapped landslide hazards are associated with the Southcliff/Blandford Canyon Greenway and the Burnt Bridge Creek Greenway. The entire area is designated NEHRP Class C, which is designated as a seismic hazard by the City. Development may require a critical areas report and permit, with a supporting geotechnical analysis. These areas may not be appropriate for certain sensitive land uses, such as emergency healthcare facilities. |
| VANCOUVER COMPREHENSIVE PLAN 2011-2030 | |
| **Citation** | Summary and Key Issues |
| Community Development Policies (Ch. 1) | • **CD-2 Efficient development patterns**: Encourage efficient development throughout Vancouver to ensure achievement of average density of 8 units per acre set by countywide planning policies. Encourage higher density and more intense development in areas that are more |

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| | extensively served by facilities, particularly transportation and transit services.<br>• **CD-3 Infill and redevelopment**: Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.<br>• **CD-4 Urban centers and corridors:** Achieve the full potential of existing and emerging urban activity centers and the corridors that connect them, by: (a) Promoting or reinforcing a unique identity or function for individual centers and corridors (b) Planning for a compact urban form with an appropriate mix of uses (c) Working with stakeholders to develop flexible standards to implement the vision for that center or corridor (d) Encouraging innovative, attractive private development that efficiently uses available land and resources (e) Establishing connectivity within each center and to other areas to provide accessibility (f) Providing a range of transportation options (g) Investing in public facilities and amenities to enhance livability<br>• **CD-5 Mixed-use development**: Facilitate development that combines multiple uses in single buildings or integrated sites.<br>• **CD-6 Neighborhood livability**: Maintain and facilitate development of stable, multi-use neighborhoods that contain a compatible mix of housing, jobs, stores, and open and public spaces in a well-planned, safe pedestrian environment.<br>• **CD-7 Human scale, accessible development, and interaction**: Facilitate development that is human scale and encourages pedestrian use and human interaction.<br>• **CD-8 Design**: Facilitate development and create standards to achieve the following: (a) Increased street front use, visual interest, and integration with adjacent buildings (b) Improved pedestrian connections and proximity of uses within developments (c) Enhanced sense of identity in neighborhoods and subareas (d) Publicly and/or privately owned gathering spaces facilitating interaction | | • **CD-9 Compatible uses:** Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.<br>• **CD-10 Complementary uses**: Locate complementary land uses near one another to maximize opportunities for people<br>• **CD-12 Integrated area planning**: Promote cohesive, integrated planning of areas and sites through use of subarea planning, master planning, and planned developments, or other methods.<br>• **CD-14 Connected and integrated communities:** Facilitate the development of complete neighborhoods and subareas containing stores, restaurants, parks and public facilities, and other amenities used by local residents.<br>• **CD-16 Sustainability:** Facilitate sustainable land use development though measures including but not limited to the following: (a) Develop integrated land use patterns and transportation networks that foster reduced vehicle miles traveled and associated greenhouse gas emissions (b) Develop individual buildings that minimize energy and resource consumption. Encourage home based efficiencies such as insulation retrofits, efficient water and air heating systems, and use of solar panels or other forms of energy capture. (c) Implement recommendations of the Vancouver-Clark County Sustainable Affordable Residential Development Report |
| | | Economic Development Policies (Ch. 2) | • **EC-6 Efficient use of employment land:** Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites. |
| | | Housing Policies (Ch. 3) | • **H-1 Housing options:** Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.<br>• **H-5 Housing placement near services and centers:** Facilitate siting of higher density housing near public transportation facilities and in designated centers and corridors. |
| | | Environmental Policies (Ch. 4) | • **EN-2 Stewardship:** Demonstrate and promote environmental stewardship and education. |

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| | • **EN-8 Water quality and quantity:** Enhance and protect surface water, stormwater, and groundwater quality from septic discharge, impervious surface runoff, improper waste disposal, and other potential contaminant sources. Ensure safe and adequate water supplies and promote wise use and conservation of water resources.<br>• **EN-9 Trees and other vegetation:** Conserve and restore tree and plant cover, particularly native species, throughout Vancouver. Promote planting using native vegetation. Protect historic and other significant trees. Work towards the Vancouver Urban Forestry Program goal of covering 28% of Vancouver's surface area with tree canopy.<br>• **EN-11 Hazard areas:** Manage development in geologically hazardous areas and floodplains to protect public health and safety. |
| Public Facilities and Services (Ch. 5) | • **PFS-4 Transportation system:** Develop and maintain an interconnected and overlapping transportation system grid of pedestrian walkways, bicycle facilities, roadways for automobiles and freight, transit and high-capacity transit service. Include support programs such as traffic operations, transportation demand management, neighborhood traffic management, and the regional trails program. Work towards completing and sustaining individual components and programs to ensure success of the entire system.<br>• **PFS-6 Transportation safety:** Ensure high safety standards for motorists, pedestrians, and bicyclists through the development and capital improvement processes. Allocate city capital resources to high risk and collision locations for motorists, bicyclists, and pedestrians<br>• **PFS-10 Livable streets**: Design streets and sidewalks and manage vehicular traffic to encourage livability, interaction, and sense of neighborhood or district ownership in linkage with adjacent land uses. Encourage multi-modal travel, and provide accessible, human scale opportunities for transferring between travel modes.<br>• **PFS-13 Neighborhood traffic:** Protect and enhance neighborhoods with an active program that focuses on safety, safe routes to school, traffic calming, education, and enforcement. |
| | • **PFS-18 Street design:** Design city streets to achieve safety and accessibility for all modes. Arterial streets shall provide facilities for automobile, bike, pedestrian and transit mobility, and shall include landscaping and adequate lighting.<br>• **PFS-25 Stormwater management:** Manage storm water to safely pass floodwaters, maintain and improve water quality of receiving streams, lakes, and wetlands, protect and enhance fish and wildlife habitat, promote recreational opportunities, and enhance community aesthetics.<br>• **PFS-30 Open spaces and parks:** Provide and maintain parks, open spaces, and recreational services for all segments of the community consistent with adopted level-of-service standards. Facilities and services should support recreational activities, environmental or historical resource protection, and should preserve and enhance neighborhood identity and function.<br>• **PFS-31 Trails**: Provide a system of trails linking public and private open spaces, parks, recreational uses and transportation facilities within and between jurisdictions. Encourage use of greenspaces and riparian corridors as pedestrian and nonauto-oriented linkages within the urban area, in balance with habitat protection. |

| NEIGHBORHOOD ACTION PLANS | |
|---|---|
| Citation | Summary and Key Issues |
| Neighborhood Action Plans (General) | • The general purpose of a neighborhood action plan is to identify issues that are of concern to the residents of the neighborhood, and to devise strategies for addressing these concerns. It should be noted that many of these plans were created 10-20 years ago and reflect the views of residents at that point in time. There have been many changes in conditions to the area and city at large since these plans were developed.<br>• The general policy statements included in the action plans were intended to be used by the City Council to guide future decisions involving development proposals and plan amendments affecting the neighborhoods. |
| Vancouver Heights Neighborhood Action Plan (1997) | • This plan was developed in 1997 reflects the views of residents at that point in time.<br>• The Vancouver Heights action plan vision focuses on a "home town" feel within the big city, and the routing traffic |

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| | around the neighborhoods, with alternative transportation options (walking, biking) throughout. Objectives focus on community appearance, community building, economic development, housing, land use, mobility, noise/nuisance, open space and recreation, public facilities, and public safety.<br>• The Vancouver Heights plan area is larger than the Heights District boundaries: "The neighborhood is bounded on the east by 98th Ave., on the north by Mill Plain Boulevard, on the west by Devine Road, and generally on the south by MacArthur Boulevard from Devine Road, east to Friedel where the boundary steps down to SR14, and then follows the North side of 98th Avenue."<br>• Most objectives are not specific to the portion of the planning area that overlaps with the Heights District area, or are transportation-related and may not reflect the existing conditions of the area and changes that have occurred since 1997. For example, one objective is to "create a tree lined boulevard along MacArthur", which has occurred since the plan was published. |
| Harney Heights Neighborhood Action Plan (2001) | • This plan was developed in 2001 and reflects the views of residents at that point in time.<br>• Action plan area overlaps with the Heights District in two locations north of E Mill Plain Blvd: to the west at the MLK Elementary school and to the east at N Andresen Road and Kansas Street,<br>• There are no objectives or actions specific to the area where the plans overlap. |
| Northcrest Neighborhood Action Plan (2001) | • This plan was developed in 2001 and reflects the views of residents at that point in time.<br>• Action plan area overlaps with the Heights District only in the north portion bounded by Idaho Street to the north and Kansas Street to the east.<br>• The plan contains an action to "Investigate options for traffic calming and/or additional stop control at the following intersections: At Montana Lane and Kansas; At Montana Lane and Idaho."<br>• The plan also contains an action to "Improve the ineffective crosswalk on Mill Plain Blvd. 500 feet west of Andresen or replace with pedestrian traffic signal," however this crosswalk no longer appears to exist. |
| Evergreen Highlands Neighborhood Action Plan (1996) | • This plan was developed in 1996 and reflects the views of residents at that point in time.<br>• Action plan area overlaps with the Heights District only in the portion south of MacArthur Blvd., bounded by N Devine Road, Arizona Drive, and Texas Drive.<br>• The plan notes concerns over the intersections of Devine Road and Arizona Drive, and Arizone Drive and Texas Drive.<br>• The plan notes that residents value the presence of the Vancouver Heights United Methodist Church as contributing to open space and a sense of community. |
| | • |

| TRANSPORTATION | |
|---|---|
| Citation | Summary and Key Issues |
| Devine Road | • Designated as a 2-lane Collector Arterial - Will need to meet City street design standards.<br>• TSP 20-year plan identifies the road as a proposed bike route. |
| MacArthur Blvd | • Designated as a Minor Arterial - Will need to meet City street design standards.<br>• TSP 20-year plan identifies new signals at Andresen and Devine; proposed pedestrian improvements; and bike lanes. |
| E Mill Plain Blvd | • Designated as a Primary Arterial - Will need to meet City street design standards.<br>• TSP 20-year plan identifies blvd as a Phase I ITS Route; and Tier 1 corridor w/ transit nodes at Devine and Andresen |
| Andresen Rd - Arterial | • Designated as a Principal Arterial - Will need to meet City street design standards.<br>• TSP 20-year plan identifies proposed pedestrian improvements; and proposed bike lanes. |
| Blandford Dr – Public/Other | • Designated as a Collector Arterial south of MacArthur and a local road north of MacArthur - Will need to meet City street design standards.<br>• TSP 20-year plan identifies proposed pedestrian improvements |

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| Bus rapid transit (BRT) | C-Tran is planning and designing the Mill Plain Bus Rapid Transit Project. |
| Complete Streets Program | The adopted *What's Next Vancouver! Building Our City's Future 2016-2021 Strategic Plan* includes goals relating to establishing a complete streets program, and a Complete Streets ordinance was adopted in 2017. One project underway is a Complete Streets project extending from Reserve Street to MacArthur Boulevard along McLoughlin Boulevard, Brandt Road, and Mill Plain Boulevard. |
| PUBLIC AMENITIES/FACILTIES | |
| Citation | Summary and Key Issues |
| Schools:<br>*Marshall Elementary*<br>*McLoughlin Middle School*<br>*MLK Elementary* | • Both McLoughlin Middle School and Marshall Elementary are undergoing construction over the next few years, which will rebuild the schools as connected structures.<br>• The subarea plan will need to take into account the new site plan for the two connected schools, including the new traffic patterns that this will create along MacArthur Blvd. |
| Parks and Greenways:<br>*Southcliff/Blandford Canyon Grwy West*<br>*Burnt Bridge Creek Greenway / Trail*<br>*Columbia Lancaster neighborhood park*<br>*Sam Brown neighborhood park*<br>*General* Andresen *neighborhood park* | • The plan will need to consider proposed expansions or acquisitions under the Vancouver *Comprehensive Parks, Recreation & Natural Areas Plan - 2014-2020*. This includes a proposed shared use path from Marine Park to Burnt Bridge Creek Trail along Devine and MacArthur. |

# APPENDIX E: AFFORDABLE HOUSING SUPPLEMENTAL READ

## AFFORDABLE HOUSING IN VANCOUVER

In the early 1940s, a population influx helped to establish the Vancouver Housing Authority (VHA) which developed over 11,000 temporary, affordable units. Since then, these units have been sold and rebuilt, giving way to Vancouver's current neighborhoods. Given the region's current affordable housing crisis, Vancouver still possesses a need for affordable and supportive housing for those with low incomes, those with special needs, and those teetering on the edge of homelessness.

However, developing supportive housing is difficult, and conceivably, nothing feels as staggering as the dwindling supply of affordable housing subsidies and entitlements. For example, the Clark County HOME program alone saw a 39% decrease in entitlements from 1992-2016 and a 45% decrease from 2000-2016. This has stirred the community to create new sources, such as Vancouver's affordable housing levy to fund the Affordable Housing Trust Fund.

As of 2015[2], Vancouver had 97 sites with at least one affordable housing unit. These sites held 3,953 affordable units, accounting for 65% of the County's affordable housing stock and 6.2% of the greater region's (Clackamas, Clark, Multnomah, and Washington Counties). The VHA alone houses 3,400 households in subsidized housing and provides an additional 1,600 units of affordable apartments. Still, the community finds itself in an affordable housing deficit which mirrors the state[2]. A non-profit affordable housing developer that works in the region explains it by using a well-known narrative: "if you build it, they will come."

## IMPLICATIONS TO DEVELOPING AFFORDABLE HOUSING

Today, financing affordable housing requires a piecemeal approach; multiple affordable housing equity sources are needed to cover the cost of development. Because these funding sources are highly competitive and regulated, it often takes longer to develop affordable housing projects as well. Teaming up with an affordable housing development consultant is often necessary to streamline the process and to help sidestep avoidable hurdles. Because many affordable housing subsidy sources do not pair well together, an affordable housing development consultant can also provide essential advice and lessons learned.

Further, populations served by a proposed project may affect the project itself (e.g. project size, architectural style, and location). To explain, a requisite to using most affordable housing sources is that a percentage of the total units are reserved for households with lower incomes. These requirements create rent caps which limit returns. And, because communities have land use and zoning laws, other challenges are created, like limitations in the number of units permitted per acre and design constraints like minimum setbacks and height requirements. Ultimately, this can make it difficult to generate the densities or economies of scale necessary to make an affordable housing project pencil.

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[1] *Oregon Metro. (2015). 2015 Regional Inventory of Regulated Affordable Housing Summary Report.*

[2] *"There is a shortage of nearly 164,000 affordable homes for the most vulnerable, extremely-low income Washingtonians, an increase of 53,000 from 2000," Retrieved from Office of U.S. State Senator Maria Cantwell. (n.d.). Meeting the Challenges of the Growing Affordable Housing Crisis. Expanding and Improving the Housing Tax Credit.*

## IMPLICATIONS TO USING THE LOW-INCOME HOUSING TAX CREDIT

Here we provide a brief summary of one of the most prominent affordable housing funding sources, the Low-Income Housing Tax Credit. Over the last decade alone, the 9% LIHTC funded over 8,500 affordable housing units in Washington state, nearly half of which were reserved for extremely low income or homeless households. (Office of U.S. State Senator Maria Cantwell. (n.d.). Meeting the Challenges of the Growing Affordable Housing Crisis. Expanding and Improving the Housing Tax Credit.)

**Low Income Housing Tax Credit Considerations**

The Low-Income Housing Tax Credit (LIHTC) is a federal program which allocates an income tax credit to states to pass on to developers as a way to incentivize the construction and rehabilitation of affordable housing. The program has helped develop most of the affordable housing that the U.S. has today.

There are two program distinctions. The first is referred to as 4% LIHTC, where the credits subsidize 40% of eligible project costs (qualified basis). The second distinction is referred to as 9% LIHTC, where the credits subsidize 70% of eligible project costs.

Jurisdictions managing LIHTC evaluate applications across a range of selection criteria. One important requisite is target population. Because the LIHTC program is intended to target households earning at or below 60% of Area Median Gross Income (AMGI), there is a federally mandated minimum set aside of affordable housing within the project. A developer may limit 40% of the project's units to households earning at or below 60% AMGI (40/60 test), or they may limit 20% of the project's units to households earning at or below 50% of AMGI (20/50 test).

Washington's Compliance and Procedures Manual for the LIHTC program indicates that the tax credits may only go toward "costs associated with the affordable units and not for market-rate units and that the economics generally promote properties that are 100% or nearly 100% 'low-income'". Even with LIHTC allocation, the project will likely still have a gap requiring more density (i.e. more rent to cover debt service) or additional affordable housing resources and capital.

Different target populations and project scales will mean different capital stack options (e.g. 4% vs. 9%). Here are some additional considerations for each option:

| LIHTC 4% | LIHTC 9% |
|---|---|
| ▪ Non-competitive process<br>▪ Lower credit rate<br>▪ Typically, rehabilitation and acquisition<br>o New construction if also financed with tax-exempt bonds or other federal funds | ▪ Competitive process<br>▪ Higher credit rate<br>▪ Typically, new construction and substantial rehabilitation[3]<br>▪ Limits use of other federal funds |

*[3] To use the 9% LIHTC for rehabilitation, a developer must get preauthorization (i.e. you are encouraged to go after 4% for rehabilitation in most cases), a project must have been placed in service 20 years before the year of the 9% application (e.g. only 15 years is required for 4%), the developer must get a 20-year Capital Needs Assessment (CNA) from a 3rd-party consultant, and minimum hard costs per unit must be at least $40,000 and supported by the CNA.*

# APPENDIX F: MARKET DATA AND TRENDS DETAIL

## DEMOGRAPHIC TRENDS

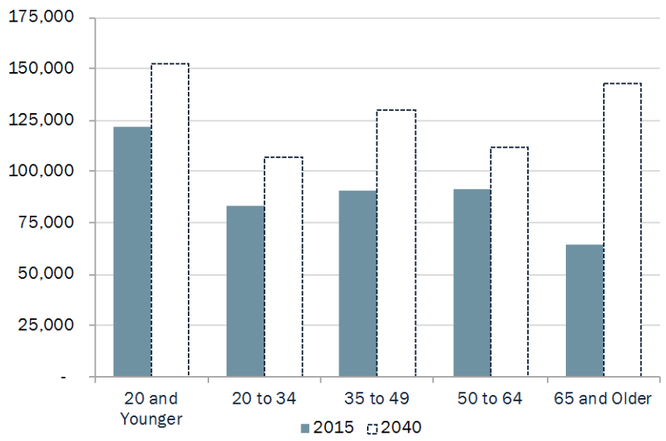
This section shows population forecast data for Clark County and income distribution data for Vancouver and comparative regions.

## CLARK COUNTY POPULATION FORECAST

**In Clark County, all age groups are forecast to grow by 2040.**
From 2015 to 2040, those aged 20 and younger will grow by 25%, those aged 20 to 34 by 28%, those aged 35 to 49 by 43%, those aged 50 to 64 by 23%, and those aged 65 and older by 121%.

Those aged 65 and older are forecast to grow the most, by 78,132 people by 2040.

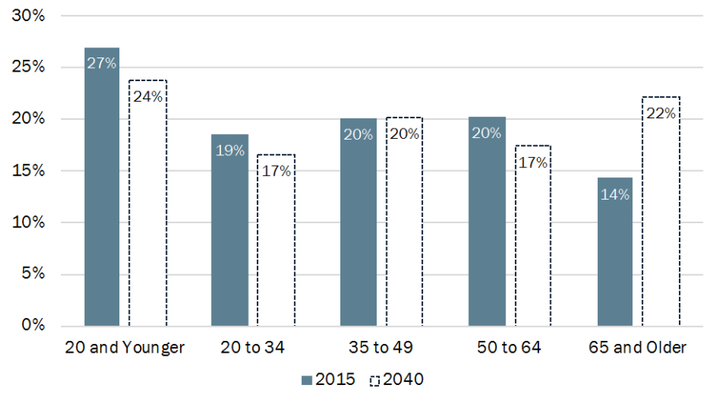
**Population Growth Forecast by Age, Clark County, 2015 to 2040**
Source: Washington Office of Financial Management.




**By 2040, age distribution in Clark County will also change with those aged 65 and older and 20 and younger making up the largest share of the population.**
That said, the share of the population aged 20 and younger, 20 to 34, and 50 to 64 will decline from 2015 to 2040.

The share of the population aged 35 to 49 will stay the same from 2015 to 2040 and the share of the population aged 65 and older will be the only age group to grow.

**Forecasted Change in Age Distribution, Clark County, 2015 to 2040**
Source: Washington Office of Financial Management.

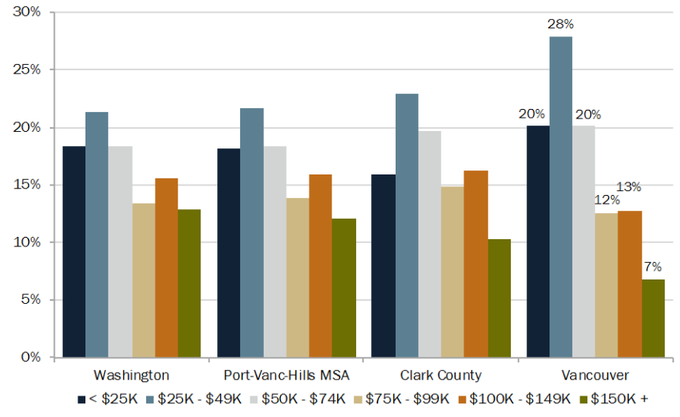



## COMPARISON OF REGIONAL INCOME DISTRIBUTION

**Nearly 30% of households in Vancouver make between $25,000 and $50,000 annually.**
Vancouver has a larger share of households making less than $25,000 per year as compared to the county, metro area, and state.

In Vancouver only 32% of households make over $75,000 per year compared to 41-42% of households in comparative regions.

**Household Income Distribution, Vancouver, Comparative Regions, 2012-2016**
Source: U.S. Census Bureau, 2012-2016 ACS 5-year estimate, Table B19001.



# APPENDIX F: MARKET DATA AND TRENDS DETAIL

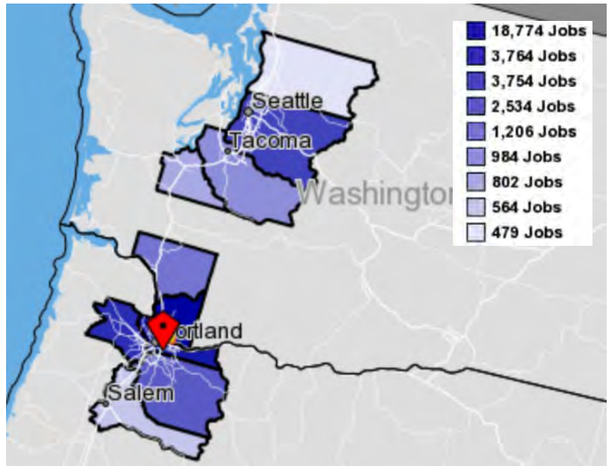
## ECONOMIC TRENDS

This section shows commute trends for Vancouver residents and employment characteristics for Clark County and Southwest Washington.

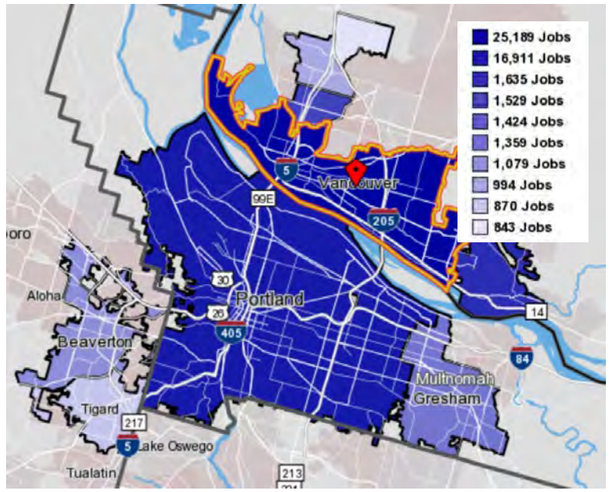
## COMMUTE TRENDS

**A majority of Vancouver residents work in the Portland-Vancouver-Hillsboro Metropolitan Statistical Area (MSA). Many also commute to the Seattle-Tacoma-Bellevue MSA.**

**What Counties do Vancouver Residents Work in? 2015**
Source: Census on The Map



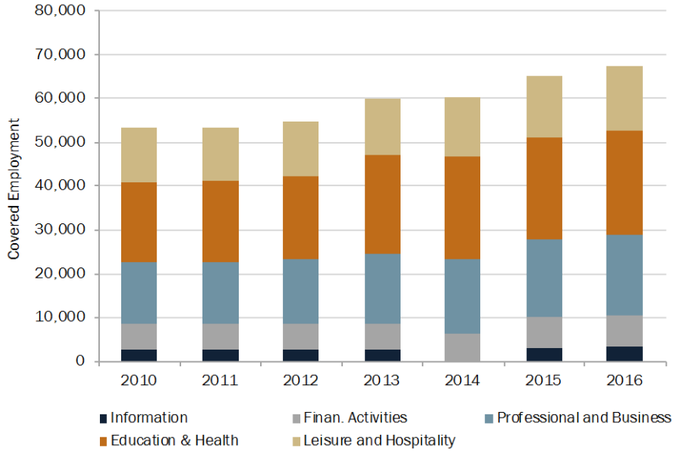

**Vancouver Residents that Live and Work in the MSA, 2015**
Source: Census on The Map



## EMPLOYMENT

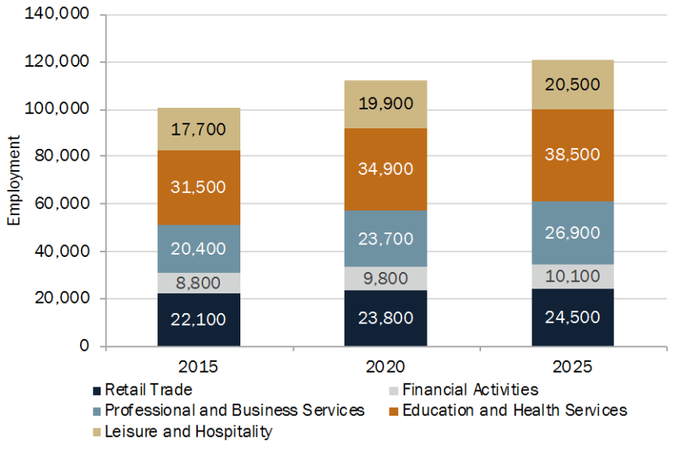
**In Clark County from 2010 to 2016, employment in Financial Activities grew the most at 32%.**
This was followed by Professional & Business Services, which grew 30%, and growth in Education and Health, which grew 29%.

**Change in Service-Providing Covered Employment, Clark County, 2001 to 2016**
Source: U.S. Bureau of Labor Statistics.



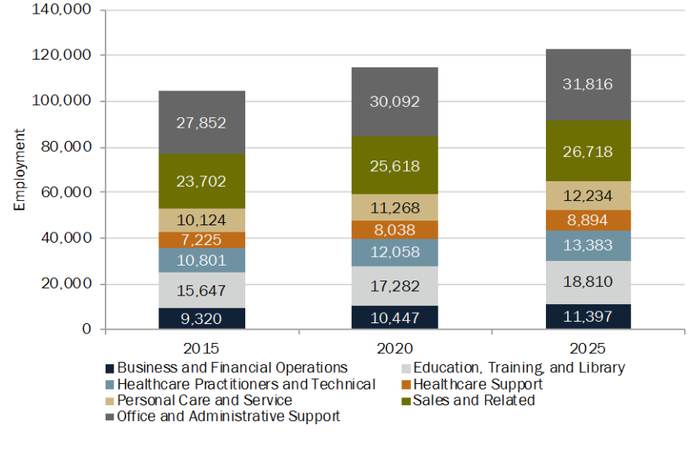

**In SW WA, Professional & Business Services will grow the most, by 32% from 2015 to 2025, followed by Construction at 29% and Education and Health at 22%.**
From 2015 to 2025, Retail Trade will grow by only 11%.

**Industry Projections, SW Washington, 2015 Est., 2020, and 2025**
Source: Washington Office of Financial Management.




**By 2025, employment within Office and Administrative Support and Sales and Related will continue to make up a larger portion of occupational projections.**

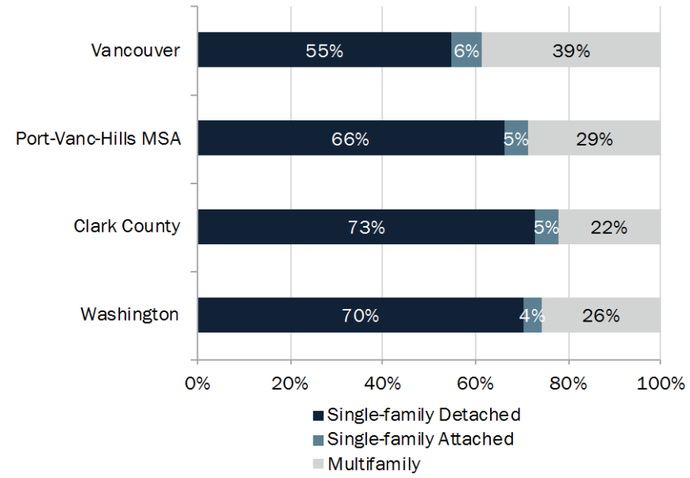
**Occupational Projections, SW Washington, 2015 Est., 2020, and 2025**
Source: Washington Office of Financial Management.



## REAL ESTATE TRENDS

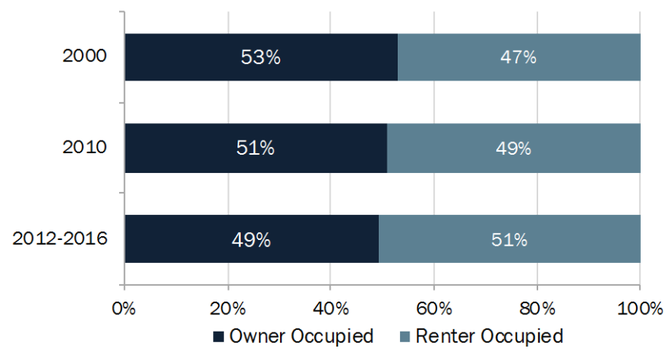
**About 55% of Vancouver's housing stock is single-family detached housing.**
Vancouver has a smaller share of single-family detached housing types and a larger share of multi-family housing types than the county, MSA, and state.

**Housing Mix, Vancouver, Comparison Regions, 2012-16**
Source: US Census Bureau, 2012-2016 ACS Table B25024.



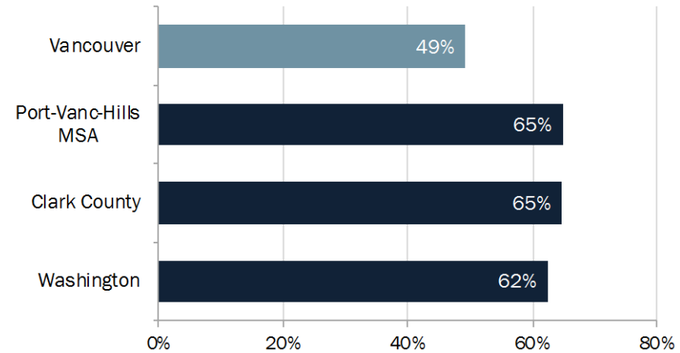

**Vancouver's homeownership rate has declined by 4% since 2000.**

**Tenure, Occupied Units, Vancouver, 2012-2016**
Source: Census Bureau, 2000 Decennial Census SF1 Table H004, 2010 Decennial Census SF1 Table H4, 2011-15 ACS Table B24003.




**Vancouver's homeownership rate is below that of the county, MSA, and state. Slightly less than half of Vancouver's population live in owner-occupied dwelling units.**

**Homeownership for Occupied Units, Vancouver, Comparison Regions, 2012-2016**
Source: Census Bureau, 2012-2016 ACS Table B25003.



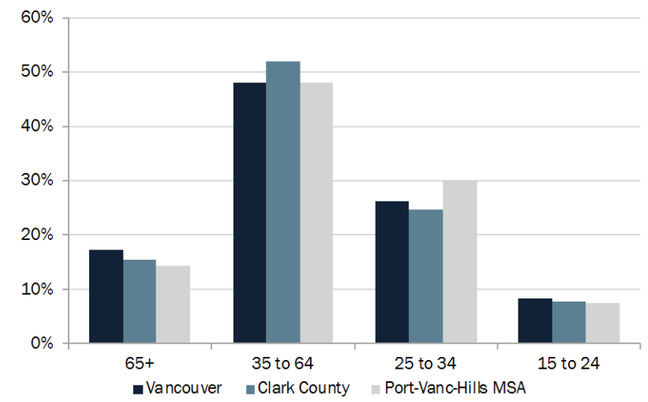

Vancouver residents that own versus rent their home is split roughly 50/50 while residents in Clark County and the Portland Metro area skewed more toward home ownership.

**Tenure by Age Group, Vancouver, Clark County, and Portland-Vancouver-Hillsboro MSA, 2012-2016**
Source: U.S. Census Bureau, ACS 5-Year estimates, 2012-2016, Table B25007.

| Age | Vancouver | | Clark County | | Port-Vanc-Hills MSA | |
|---|---|---|---|---|---|---|
| | Renters | Owners | Renters | Owners | Renters | Owners |
| 15 to 24 | 2,861 | 188 | 4,508 | 629 | 22,480 | 1,844 |
| 25 to 34 | 8,999 | 3,020 | 14,381 | 9,293 | 87,845 | 39,585 |
| 35 to 64 | 16,465 | 20,100 | 30,137 | 67,720 | 139,875 | 282,679 |
| 65 + | 5,897 | 9,812 | 9,008 | 28,678 | 41,713 | 111,562 |
| Total | 34,222 | 33,120 | 58,034 | 106,320 | 291,913 | 435,670 |
| Tenure | 51% | 49% | 35% | 65% | 40% | 60% |

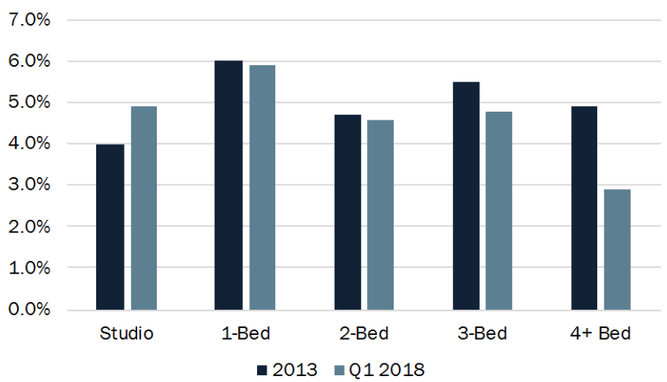
**Vancouver has a slightly higher proportion of residents that rent who are 65 years of age and older.**

**Renters by Age Group, Vancouver, Clark County, and Portland MSA, 2012-2016**
Source: U.S. Census Bureau, ACS 5-Year estimates, 2012-2016, Table B25007




**Vacancy rates for different unit types indicate an increased need for family-sized units.**

**Vacancy Rate for Multifamily Units by Bedroom Size, Vancouver, 2013 and 2018 Q1**
Source: CoStar



# APPENDIX G: STAKEHOLDER INTERVIEW NOTES

***As a part of the planning process, the consultant team met with several local and regional developers to learn more about the current market conditions and what opportunities may exist with the redevelopment of The Heights study area. The input received is informational only.***

## LAND USE

- The proximity to other parts of the region is great.
- The topography (the hill) is a big barrier to many types of development
    - The Heights is always going to be an island
- "Local job growth is exceeding expectations" vs. "We need more jobs"
    - Several interviewees opined that Vancouver needed to aggressively pursue more economic development and expand employment opportunities. There have been several high profile office relocations recently—Fisher Investments and Banfield Pet Hospital being the most prominent. Interviewees were concerned that if job growth didn't keep it's current pace, that Vancouver's economy would backslide.
- There's good local leadership in Vancouver
- Local perceptions of Vancouver is changing. Many consider the city up and coming.
- What's concerning (that would affect development)?
    - "National level stuff"
    - Escalating costs are concerning
    - The City of Vancouver has few incentives to offer
    - "Twelve property owners is scary"
- What would you like to see to support development at The Heights?
    - Infrastructure
    - Parks
    - Transportation/transit – Interviewees were mixed in their views about transit. Some saw transit—especially a potential BRT line—as a potential boost to development at The Heights. Others were skeptical, unsure that high capacity transit would have a net positive effect on development at The Heights.
    - Tax abatement program – Vancouver's tax abatement program was brought up in every conversation as a positive incentive for new development. Many interviewees suggested expanding the program to The Heights area
    - Waive fees
- How does this site compete?
    - "This is a multifamily site. That's how it competes."
- This area has changed. It used to be quite affluent. Now there are many older folks in the neighborhood.
    - The local neighborhood is concerned about what is going The Heights is going to become.
- "What is the City's appetite for contributing to development? Will they provide the same level of investment that they did at the Waterfront?"

# APPENDIX G: STAKEHOLDER INTERVIEW NOTES

- **Housing**
  - I see a demand for larger multifamily units, attached housing, and senior housing.
  - A mix of ages would work well here [because of the nearby schools and central location.]
  - There is stuff getting built; most rents top out just over $2.00/SF.
  - Costs are climbing quickly. They're at least 20 percent higher than they were last year.
  - Condos would be tough to build due to the lack of market demand, tail-regulations, and parking necessary to make it work.
  - There have been previous attempts at multifamily housing at the site. They were shut down due to NIMBYism.
  - "Downtown and the waterfront will outcompete The Heights for multifamily residents" Many residents are looking for amenity rich areas like downtown
  - The Heights may appeal to residents looking to be proximate to downtown, but are seeking a quieter area
  - "Don't make this just an affordable housing project or a senior housing center. Better to blend incomes and ages."

- **Retail/Office**
  - The Heights is not the best location for retail due to other successful competitive areas, the topography of the land, and the orientation of the roads—it's too easy to drive by quickly on Mill Plain. No great north/south connector.
  - Traffic counts are high, which is great for retail generally, but there are better locations for retail elsewhere.
  - Retail has followed high income demographics eastward over the past couple decades. There are already several grocery store locations in the area. Grocery would not compete well at the site.
  - Garrison Square (Killian's project) is a good example of what can happen in the area, if a developer is able to get property at a low basis.
  - Costs to develop projects in WA vs OR are basically the same. Sales tax here balances with fees in other costs in OR.
  - SDCS are higher in Portland
  - Rents have been around mid $20 Full Service Gross, and have gone up only a little. We're now targeting mid 20s Triple Net.
  - "We don't see this as an office site. Maybe medical office, but not traditional office."
  - Retail has been tough to lease at the site.
  - There's no draw as a location for an anchor retail tenant.

## AFFORDABLE HOUSING

- Reach CDC has completed several projects in Clark County.
    - They're currently building a project at Orenco Station in Hillsboro (50+ units, many family units. They have 902 people on the waiting list. It will open in late summer.) (Orenco came up several times as a possible model for development)
- LIHTC projects
    - Depends on the type that you're pursuing 4% or 9%. This will have implications about the size of the project that you can build and your capital stack.
    - 9% tax credits in WA are intended to target the lowest incomes. Generally, WA state is more focused on homelessness and OR is focused on low income family households.
    - 4% projects can target workforce housing (but this is harder to finance, needs more local gap money)
- There's a ton of demand for subsidized housing in Clark County. "If you build it, they will come"
- We target many different populations.
    - Usually incomes range from $17k to $60k or up to 60% MFI.
    - We also have projects targeting seniors on fixed incomes, working mothers, addicts, and domestic violence survivors.
- Transit and parking for affordable projects?
    - We don't actually need that much parking because our residents don't demand it as much as others. We can make 1.0 parking ratio work, especially for senior housing projects. At a 1.5 parking ratio, we're overparked. About 1/3 of our residents are car owners.
    - We need transit, otherwise our residents are "trapped." We're excited about the BRT system in Vancouver.
- We look for other services and amenities nearby. These can include: workforce development services, community college, other services.
    - It's a win/win to be close to other services.
    - Services cannot pay commercial rents. We provide flexible space for them to use, but typically do not lease to them.
    - Proximity to other amenities, including parks, has implications about LIHTC scoring.
- Many workforce units are being solved by private developers.
- Cost to develop
    - We always have a financial gap. We can get more density, which helps, but we need resources to close the gap.
    - Vancouver has a property tax exemption program, but it doesn't work well for us. The program is only a 12 year exemption. Our LIHTC projects we need to underwrite for at least 15 years. That gap causes issues.
    - The City should be thinking about the size and type of affordable project that they want at The Heights. Different populations and project scales will mean different capital stack options (e.g. 4% vs 9% tax credits).
    - Construction rates are going up everywhere.
    - The local levy that just passed it a positive step.
    - The local SDCs and other fees are affordable.
    - Even with sales tax, it's cheaper for us to develop in Vancouver. On a Clark County project, we recently paid $800k is sales tax, but the economics still work better here than in Portland.
    - To build a project in Vancouver, we would need to layer state financing.
- How the target development area gets platted is really important for understanding where and how to fit in an affordable project.

## TRANSIT/BRT AND PARKING

- Vancouver is still a car town.
- Parking is generally plentiful and people expect it.
- Paid parking is still cheap ($50 to $60 a month in downtown)
- “BRT is seen as generally positive. It depends on how it’s designed.”

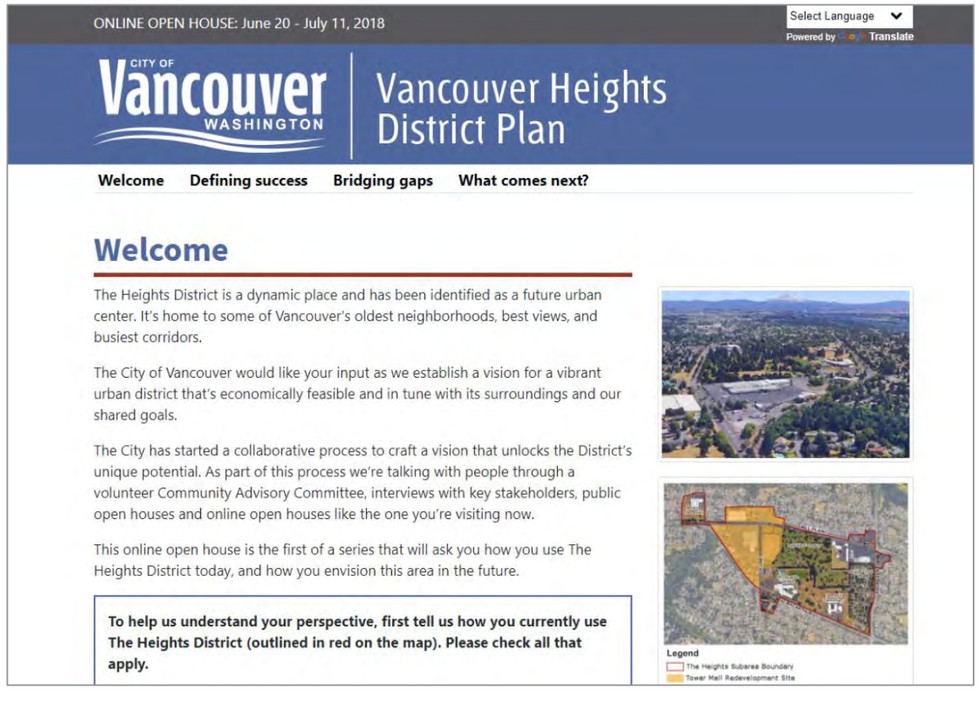
# APPENDIX H: ONLINE OPEN HOUSE #1 RESULTS

## Introduction

The first online open house for The Heights District Plan was publicly available June 20 through July 11, 2018. It was one way in which project stakeholders were able to learn about and provide input to the project, and complimented a community open house that was held June 23, 2018. Two additional online engagement opportunities are planned for future project phases.

Goals for online open house included to:

- Introduce the project, inform and connect with the community
- Broaden engagement
- Gain actionable input on the big picture and key opportunities




*Screen-shot of online open house.*

## Summary of findings

Respondents provided input through the online open house on what they like about Vancouver and The Heights District currently, and what they desire in the future. Respondents were also able to provide geographically-specific comments on transportation challenges they would like to see addressed in and around The Heights. The online open house was not a statistically valid survey as participants self-selected and answered as many or few of the questions as they chose.

EnviroIssues compiled and analyzed the survey results and summarized findings to inform future decision-making for the Heights District Plan as the project moves from the community vision phase and into phases focused on analysis and exploration of alternatives. Summarized findings include:

- Respondents appreciate Vancouver's quiet and neighborly character, existing businesses and recent development successes. They enjoy easy access to parks and nature, businesses, and to Portland.
- Respondents' favorite parts of The Heights District currently include the close-by, quiet residential neighborhoods with trees and mature landscaping, as well as existing stores, restaurants and coffee shops. Respondents also said they enjoy walking in and around the Heights, both for pleasure and to reach existing destinations.
- In both The Heights and city-wide, respondents said they would like to see more shopping opportunities, restaurants, and walkable neighborhoods. Specific to The Heights, respondents indicated a desire for community spaces for events and gatherings, new and improved parks, and grocery stores.
- Many respondents expressed their enthusiasm for the opportunity the project will provide to revitalize The Heights by making it more appealing and vibrant. Respondents said they desire improved walkability, including better pedestrian facilities and destinations that people want to walk to.

### Responses from people of lower income

Demographic information collected through the online survey made it possible to identify and analyze input from people of lower income, identified as those with household incomes of less than roughly 200 percent of the poverty threshold for Clark County.[1] Respondents of low income accounted for between seven and 12 percent of total responses for each of the survey questions included.

Overall, respondents of lower income said they appreciate Vancouver's diversity of residents, history, and small-town feel. They said affordable housing for renters, seniors, and to serve future residents is needed.

Specific to The Heights, respondents of lower income said multi-modal travel options, affordable housing and sustainable development are important opportunities for the planning process. They recommended including community gathering places and open spaces in future plans. They also said addressing problems related to homelessness is important to make The Heights a place where they would like to spend more time.

[1] 200 percent of poverty, annual household (Clark County poverty guidelines):

- $24,280 for a single-person household
- $32,920 for a two-person household
- $41,560 for a three-person household
- $50,200 for a four-person household

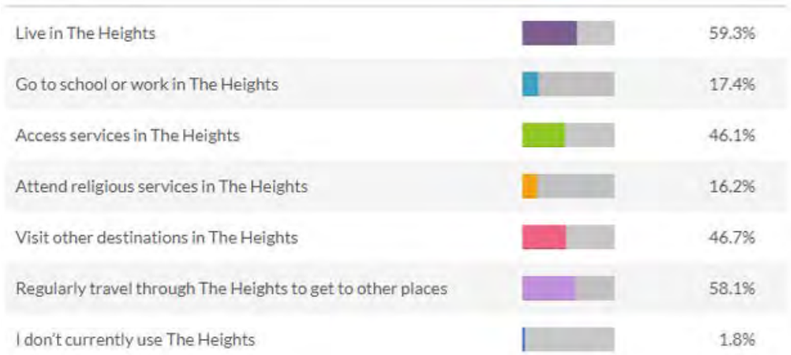
# APPENDIX H: ONLINE OPEN HOUSE #1 RESULTS

## Analytics and user demographics

167 unique users responded to questions in the online open house out of 420 who visited the site. Users spent an average of about two minutes on the site.

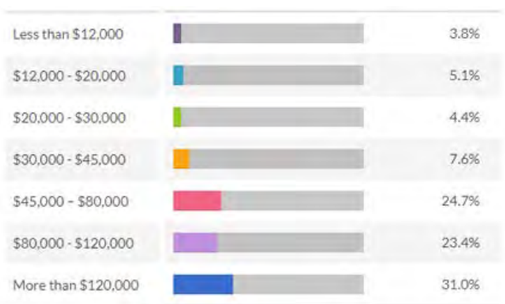
The largest share of traffic to the online open house was from social media channels including Facebook, Twitter, Nextdoor, and Instagram. Users also came from the City of Vancouver website and directly to the online open house URL. Users were nearly evenly split between use of desktop computers and tablets/mobile devices.

Demographic questions asked through the online survey showed that most respondents live in The Heights and surrounding areas. A majority also said they regularly travel through The Heights. Nearly half said they access services in The Heights.




*How respondents said they use The Heights*

When asked about travel mode, nearly 90 percent of respondents said they drive, and over 40 percent walk. Transit users made up less than five percent of respondents.




*Annual household income*

Respondents tended have higher incomes than most residents, with nearly one third reporting annual household income of over $120,000. For comparison, the median household income for Clark County is $62,879 (Census Quick Facts, 2017 estimate).

Respondents were also of relatively long tenure, with 75 percent living in Vancouver for more than 10 years. Over 80 percent of respondents own their home.

## Open-ended questions

Responses to each of the open-ended questions provided through the online open house are summarized below, including the number of responses for each. Summary information from respondents of lower income is broken out.

***Q1) What do you like most about Vancouver today?*** (130 responses)


The most common things respondents said they like most about Vancouver are its livability, sense of community, local businesses, urban character and access to amenities.

- **Livability:** Respondents said they like the small-town feel of Vancouver. Some said they appreciate its neighborhoods and low traffic streets.
- **Community:** Respondents appreciated having friends and family close by, and people working together to solve problems and make things better.
- **Businesses:** People appreciate businesses providing jobs and access to goods and services; particularly restaurants, coffee shops and breweries.
- **Urban character:** Many respondents said they like they ways in which Vancouver is redeveloping. Many mentioned the waterfront and Esther Short Park.
- **Access to amenities:** Many respondents said they appreciate easy access to parks and nature, local businesses, and close proximity to Portland.

Respondents with lower income (16) also identified Vancouver's **small-town feel**, **community** and **urban character** as things they like most. Some also identified the **diversity of community members**, its **history** and **community events** as things they appreciate.

# APPENDIX H: ONLINE OPEN HOUSE #1 RESULTS

***Q2) What opportunities would you like to see in Vancouver that don't currently exist?*** (122 responses)


The most common opportunities respondents said they would like to see in Vancouver include shopping, restaurants and walkable neighborhoods, entertainment and affordable housing. Several respondents also noted grocery stores, parks, jobs, and neighborhood businesses, access to nature, arts and culture, light rail service, and educational services are important opportunities.

- **Shopping:** Many people said more retail options would be appreciated, including shopping centers, more upscale shopping options, as well as retaining existing businesses. Many noted additional grocery store options would be appreciated.
- **Restaurants:** Many respondents noted more restaurant options are desired. These comments were often in the context of overall neighborhood amenities, including shopping, cafes, and neighborhood gathering spots that encourage walking and experiencing the community. Some said they desire more nightlife activity and a variety of dining options.
- **Walkable neighborhoods:** Many respondents said they would like increased walkability and suggested mixed uses with more destinations including parks and shopping, more and better sidewalks and trails, including those accessible to people with disabilities. A specific suggestion for pedestrian connectivity was for a pedestrian bridge over Highway 14 from Cascade Park. Several people connected increased walkability with Vancouver's ability to attract employers and revitalize neighborhoods.
- **Entertainment:** Many respondents suggested additional entertainment options, both for children and adults. Suggestions included museums, a performing arts center, an amusement park, theater, aquarium, pools, shooting range and golf course.
- **Affordable housing:** Many respondents noted a need for more affordable housing, both rentals and owner-occupied. Some said it's important that seniors and long-time residents aren't priced out through gentrification. Some said affordable housing should not be clustered in any one area, and several suggested mixed-income housing opportunities are important. Some suggested affordable housing to serve families and as a component of sustainable development. One dissenting commenter said low-income and multifamily housing invites crime and should not be promoted.

Respondents with lower income (13) recommended **affordable housing** for renters that are being priced out of current rental housing, for seniors, and to serve current and future residents.

***Q3) What excites you about your community and The Heights planning opportunity?*** (58 responses)

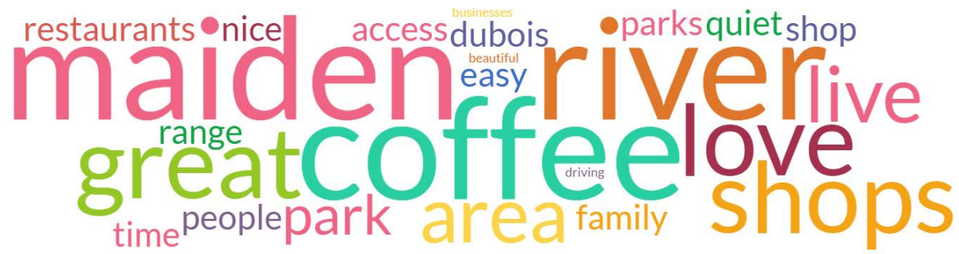

The most common thing respondents said excites them about The Heights planning opportunity was revitalizing the area. Other prevalent elements included improving walkability, food and dining, having easy access to amenities, and spaces where people can gather.

- **Revitalization:** Many commenters said The Heights appears neglected and there's an opportunity to make it a more vibrant area through new development. Many commenters said the area would benefit from being refreshed through new development including more businesses, jobs and residents. Some mentioned the Tower Mall site specifically as an area where redevelopment is needed.
- **Walkability:** Related to revitalization, survey respondents said there is great opportunity to improve walkability through The Heights District Plan. Many would like to see better sidewalks to provide an alternative to cars for getting around the District. Respondents said they would like to be able to walk for recreation and to reach desired amenities including parks, restaurants and shopping in The Heights.
- **Access to amenities:** Many respondents said they are excited about the opportunity to access services, jobs, dining and shopping closer to home and without having to travel downtown or to East Vancouver. Several said they support a 20-minute neighborhood. Shopping, restaurants and spaces for the community to gather where all prominently mentioned among responses.

Respondents with lower income (5) recommended **community gathering places** most often as an exciting opportunity. **Revitalization**, **walkability**, and **restaurants** were also prominent in the responses, along with **access to multi-modal travel options**, **affordable housing**, and **sustainable development**. Regarding community gathering spaces respondents suggested **open spaces for events**. One referenced Esther Short Park as a good example.

# APPENDIX H: ONLINE OPEN HOUSE #1 RESULTS

***Q4) What are your favorite parts of The Heights District currently?*** (57 responses)




Respondents identified coffee shops, residential neighborhoods, shopping, restaurants, its quiet character, and walkability most often as favorite parts of the Heights District and its surroundings currently.

- **Coffee shops:** The most common response regarding favorite current parts of the District among respondents was coffee shops, including River Maiden and Albina Press.
- **Residential neighborhoods:** Respondents mentioned nearby neighborhoods including Dubois Park and Southcliff as beautiful places. Residential neighborhoods are appreciated for older homes and places where people can walk, see neighbors and appreciate mature landscaping and trees.
- **Shopping:** Respondents said they appreciate shops including those at Garrison Square, Ben's Bottle Shop, a vintage book store, a grocery store, a hardware store, and a shoe repair shop at Tower Mall.
- **Restaurants:** Multiple respondents said Ducktales Kitchen and The Mill are favorites. Muchas Gracias, and Dairy Queen were also noted among restaurants respondents appreciate in the area.
- **Quiet:** Several respondents noted that they like that the Heights is relatively quiet and safe, but with good access to other parts of the city and to Portland.
- **Walkability:** Several respondents said that they enjoy that walking in the area is easy and enjoyable, with destinations accessible by foot.

Respondents of lower income (5) also said they appreciate the **residential neighborhoods** near The Heights. Other responses included that **recreation**, **transportation access**, **open spaces**, **bike facilities**, **services available close-by**, and **parking** as favorite parts of The Heights.

***Q5) What would make The Heights District a more desirable place to spend time?*** (59 responses)


Respondents most often identified restaurants, shopping, community spaces, and walkability as things that would make The Heights District a more desirable place to spend time. The desire for one or more new grocery stores, park space, open spaces and arts and cultural opportunities were also identified prominently in responses.

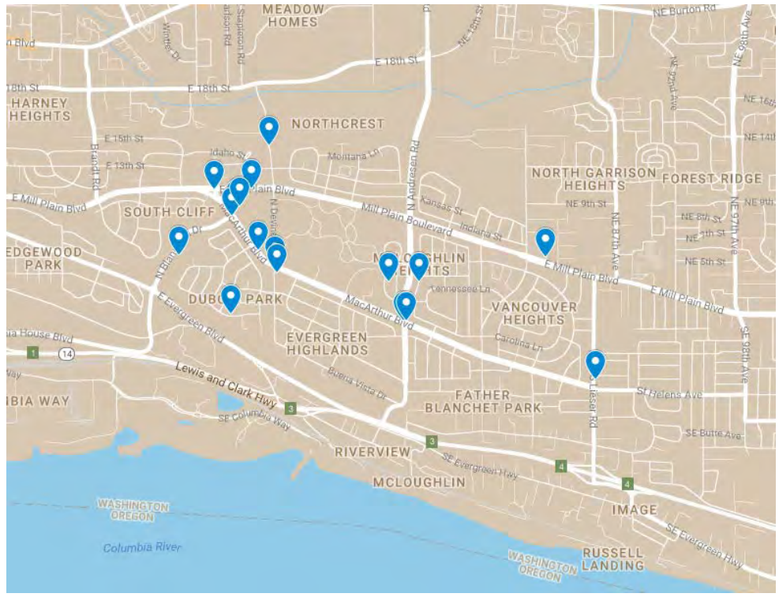
- **Restaurants:** Many respondents suggested restaurants are needed in The Heights as a way to encourage people to use the District. Many identified a desire for new restaurants and dining options. Some noted it is also important to support existing restaurants and other businesses so they are not priced out of the neighborhood in the future. Many expressed a desire that new restaurants are unique and local. The desire for both high-end and affordable and family-friendly restaurants was expressed by respondents. Some respondents also recommended breweries and cafes would make the District a more desirable place to spend time.
- **Shopping:** Similar to restaurants, many respondents said shops would make the District a more desirable place to spend time. Specific suggestions included higher-end businesses, reasonably priced boutiques, and small and local shops.
- **Community space:** Many respondents identified community spaces to make the Heights more desirable for people to spend time, host events, and be with others. Suggestions included indoor and outdoor spaces for use during all seasons, community gardens and parks, and space for live music. Some respondents said community spaces should be beautiful and include greenery.
- **Walkability:** Building upon suggestions for destinations (like shopping, restaurants and community spaces) many respondents said they support increased walkability though the clustering of these destinations within comfortable distances, along with paths and sidewalks that encourage pedestrian use. Some suggested an improved pedestrian environment would benefit businesses in the District, along with their customers.
- **Grocery:** Several respondents recommended a new grocery store. Specifically, a small grocery store serving locals was mentioned, along with an organic market, Whole Foods, Trader Joe's, and Chuck's Market.

- **Parks:** Several respondents suggested new and improved parks, including spaces for recreation and families, greenery, and for community gatherings.

In addition to restaurants, shopping, and walkability, mentioned above, respondents of low income (5) said **open spaces**, **safety**, **reduced visible homelessness**, **retention of current businesses and residents**, and a **gas station** are desired in The Heights. The most mentioned thing to make The Heights a desirable place to spend time in responses from those of low income was **community spaces** including gardens, indoor and outdoor gathering spaces, and places to be around other community members.

***Q6) Where are there transportation challenges, like gaps, barriers, or safety concerns, that could be addressed to help you travel within The Heights?***

Respondents suggested a number of specific areas where there are challenges to travel in The Heights currently. A total of 36 comments were received, 15 of which included a mapped location. Suggestions included walking and biking improvements, improved pedestrian crossings on MacArthur and Mill Plain, traffic calming and increased traffic safety, better transit access, needed traffic signals, and adequate parking. Some said they did not support improvement for biking.




*Respondents were asked to mark locations where transportation challenges could be addressed to help travel in The Heights. A map with clickable comments is available online.*

## Location-based comments

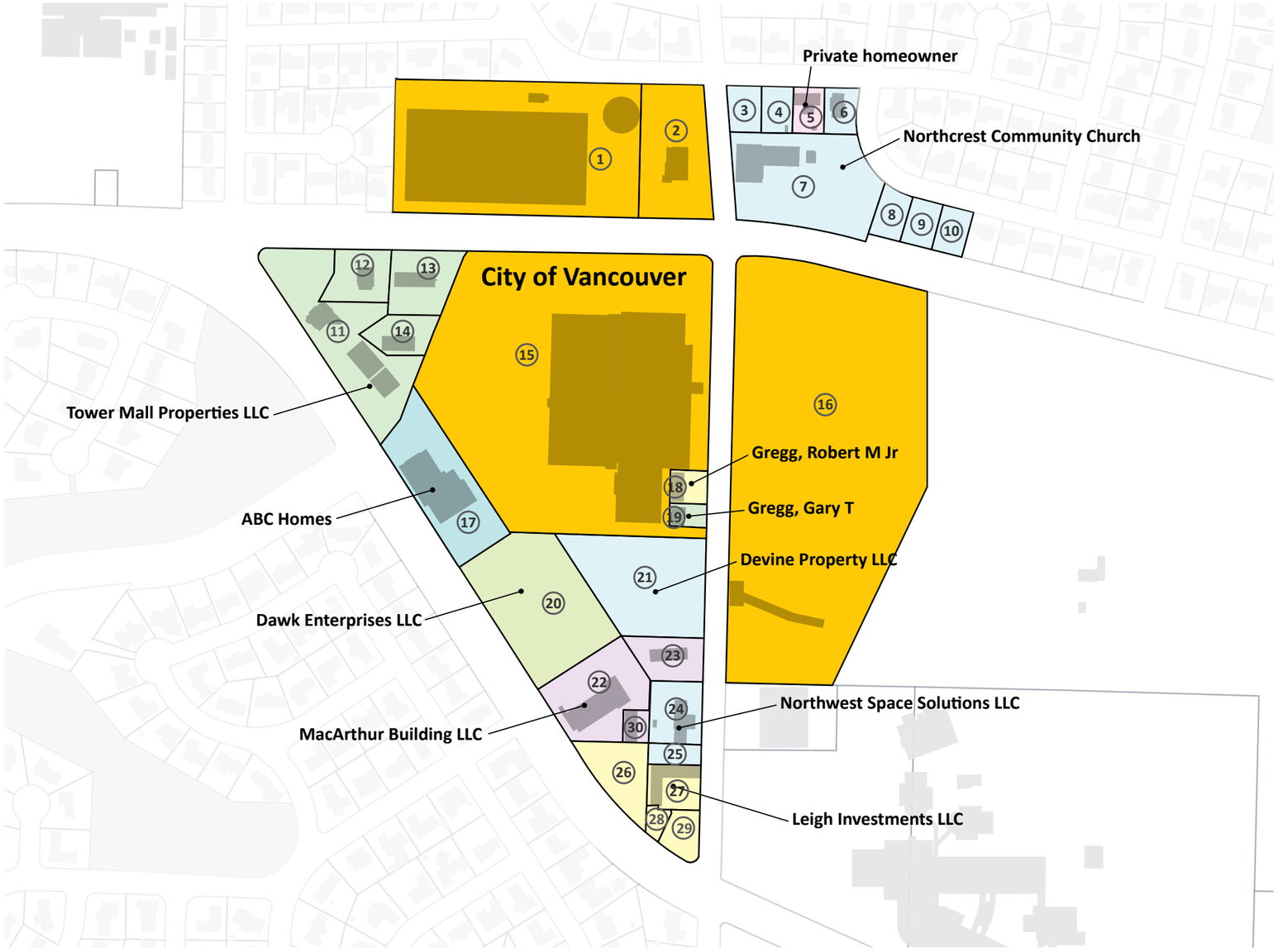
| Location | Comment |
|---|---|
| MacArthur Blvd. at N. Devine Rd. | 4 way stop that is next to a school and often drivers do not respect kids crossing. Also, a lot of the sidewalks especially along MacArthur are bad. |
| MacArthur Blvd. at N. Devine Rd. | My daughter who takes the bus has to walk out of the Dubois neighborhood where we live all the way down to Mill Plain to reach a bus. Does the bus even travel long MacArthur? |
| MacArthur Blvd. west of N. Devine Rd. | People don't understand how to turn off of MacArthur and stay out of bike lanes! |
| MacArthur Blvd. at N. Andresen Rd. | Drivers routinely ignore the light here, and pedestrians (including school children and their crossing guards) are frequently in jeopardy |
| MacArthur Blvd. at N. Andresen Rd. | This should not be a four-way stop. This should be signal-controlled or roundabout. |
| MacArthur Blvd. at Mill Plain Blvd. | There is green paint all over the road at the south side of the intersection facing north. Why would my gas tax, registration fees go to put green paint on the road I drive on? |
| MacArthur Blvd. at N. Blandford Dr. | The corner of Blandford Dr. and MacArthur is treacherous for pedestrians, bikes, and cars. |
| N. Blandford Dr., south of MacArthur Blvd. | Improve walk/bike down Blandford to connect to waterfront (also Grand, Evergreen, and Andresen) |
| N. Blandford Dr., between MacArthur Blvd. and Mill Plain Blvd. | The short road between MacArthur Blvd and Mill Plain can be dangerous with cars taking it as a shortcut and driving way too fast. |
| N. Blandford Dr., between MacArthur Blvd. and Mill Plain Blvd. | Safer walking/biking access around current Tower Mall site. Walking/biking to River Maiden and Heavy Metal is not so great through that parking lot since there are no marked pathways. |
| Mill Plain Blvd., east of N Blandford Dr. | Older median areas sometimes are overgrown and sidewalks are narrow for safe space along high traffic |
| E Mill Plain Blvd., west of NE 82nd Ave. | Traffic into my neighborhood is dangerous—they come speeding into my street. |
| N. Devine Rd., north of Idaho St. | This area of Devine is not pedestrian or cyclist friendly and has serious line of sight issues for speeding drivers. |
| St. Louis Way, south of Kentucky Dr. | No sidewalks in surrounding neighborhoods |
| S. Lieser Rd., south of Mt. Olympus Ave. | Lieser/McArthur/St. Helens. Needs a signal (NO ROUND ABOUTS) |

# APPENDIX H: ONLINE OPEN HOUSE #1 RESULTS

## Additional comments (locations not mapped)

| |
|---|
| The main roads; Mill Plain and MacArthur have sidewalks but many of the streets in the neighborhoods do not. When I walk I have to either walk on someone's yard or walk around cars parked on street. |
| Closest bus stop is 5 miles away. |
| I don't know what you are talking about. We have some of the best bike lanes (you even took away a car lane for it on MacArthur), we have bus service and lots of sidewalks. |
| Concern about cars parking on Brandt hill just before 15th. The corner is blind with cars parked there. (Maybe just outside your area of concern.) |
| If buses were full of upper-class people and families, and if their routes/destinations were more easily accessible to me, I might consider riding it. I would REALLY need to be persuaded that the bus |
| Would love to be able to bike to the Fort without having to deal with traffic on Blandford or Mill Plain. Devine Road is dark and for some reason there are always cars parked on the side of the road |
| I would still drive and hope there is adequate parking. I don't have the convenience of time to do mass transit and the heights would be one of many stops during the day or coming from work |
| None really. However, a nice wider bike lane on Andresen going down to Evergreen Blvd and along Evergreen down to Wintler Park would be most excellent, but you all asked about the Heights. |
| Enhanced C-Tran service would be beneficial. |
| Evergreen highway |
| Crossing Mill Plain is a terrifying experience. I have had waaaaay too many close calls with cars. They don't stop, or driving badly/high/aggressively. |
| My biggest concern is for pedestrian safety. Bicycles, strollers, children, people with mobility challenges should all feel welcome and safe. Preserving the tree canopy. |
| It would be nice to have a light at Andresen & MacArthur... that intersection is scary dangerous... |
| We live in the Evergreen Highway Neighborhood, so Hwy 14 is a barrier for us. But we would happily drive a few minutes to be able to park our car and spend time visiting shops and restaurants |
| The map wouldn't work, but the lack of sidewalks throughout the neighborhoods are a concern. A real light at the intersection of Andresen and MacArthur is long overdue. |
| Whenever those median curbs are not well marked with yellow paint, they are subject to being hit and damaging vehicles. For instance, the median curb on Andresen southbound as you approach Kansas is |
| What can be done to slow traffic down? I realize Mill Plain is a main arterial and most people are traveling through to East Vancouver to avoid SR 14. How to make it safer for pedestrian foot traffic |
| The lack of connectivity between homes on the east side of the area and the cemetery, schools along MacArthur Boulevard, and the businesses and the bus stops on Mill Plain Boulevard. |
| Too many entrances into the Mill Plain Safeway mall, |

# APPENDIX I: PROPERTY OWNERSHIP AND VALUE




| # | Land Value | Bldg. Value | Prop. Value | Lot Size (SF) |
|---|---|---|---|---|
| 1 | $450,500 | $2,297,700 | $2,748,200 | 230,868 |
| 2 | $127,000 | $253,100 | $380,100 | 65,064 |
| 3 | $77,480 | $0 | $77,480 | 10,908 |
| 4 | $85,582 | $0 | $85,582 | 10,257 |
| 5 | $85,560 | $186,409 | $271,969 | 10,241 |
| 6 | $86,498 | $177,828 | $264,326 | 10,920 |
| 7 | $182,100 | $862,800 | $1,044,900 | 93,344 |
| 8 | $73,140 | $0 | $73,140 | 11,025 |
| 9 | $72,300 | $0 | $72,300 | 10,415 |
| 10 | $71,998 | $0 | $71,998 | 10,196 |
| 11 | $694,700 | $869,100 | $1,563,800 | 83,635 |
| 12 | $171,300 | $110,000 | $281,300 | 20,037 |
| 13 | $226,500 | $201,700 | $428,200 | 28,314 |
| 14 | $146,400 | $144,100 | $290,500 | 18,295 |
| 15 | $3,664,000 | $5,825,500 | $9,489,500 | 515,314 |
| 16 | $4,683,600 | $80,100 | $4,763,700 | 531,000 (est) |
| 17 | $262,800 | $1,333,400 | $1,596,200 | 67,082 |
| 18 | $75,500 | $386,900 | $462,400 | 8,712 |
| 19 | $50,400 | $395,700 | $446,100 | 6,098 |
| 20 | $440,000 | $0 | $440,000 | 97,574 |
| 21 | $420,100 | $0 | $420,100 | 82,328 |
| 22 | $350,600 | $4,453,000 | $4,803,600 | 50,094 |
| 23 | $131,700 | $76,300 | $208,000 | 20,908 |
| 24 | $155,500 | $399,100 | $554,600 | 22,215 |
| 25 | $54,900 | $0 | $54,900 | 7,840 |
| 26 | $182,900 | $0 | $182,900 | 26,136 |
| 27 | $113,000 | $568,400 | $681,400 | 16,117 |
| 28 | $24,400 | $0 | $24,400 | 3,484 |
| 29 | $91,500 | $0 | $91,500 | 13,068 |
| 30 | $32,000 | $83,000 | $115,000 | 6,098 |

*Figure 54: Parcel Size and Value Table*

APPENDIX B

# SUMMARY OF SCOPING COMMENTS

CITY OF Vancouver WASHINGTON

BergerABAM

210 East 13th Street, Suite 300, Vancouver, Washington 98660-3231
360/823-6100 • 360/823-6101 Fax • www.abam.com

# Memorandum

Date: 11 February 2019

Subject: Heights District Plan – Scoping Memorandum
(BergerABAM Project Number A18.0209)

From: Brian Carrico

To: Rebecca Kennedy, City of Vancouver

Route to: File, Project Team

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## INTRODUCTION

The City of Vancouver proposes to adopt a subarea plan for the Heights District (the Heights District Plan). The Heights District consists of existing residential neighborhoods, parks, schools, open space and recreation areas, commercial businesses, nonprofits, and organizations. The subarea plan will include recommendations for future housing, office, and amenities in the district; transportation improvements to address safety and increase connectivity; and community development needs and a redevelopment plan for the 63-acre Tower Mall Redevelopment Site, located within the Heights District.

The City of Vancouver, as the State Environmental Policy Act (SEPA) lead agency, has determined this proposal is likely to have a significant adverse impact on the environment. An EIS is required under RCW 43.21C.030 (2)(c) and will be prepared. The City intends to designate the Heights District Plan as a planned action as defined under WAC 197-11-164 and will prepare a Planned Action EIS. Future projects developing under the Planned Action will not require individual environmental review at the time of permit application if they are consistent with the range of alternatives and mitigation studied in the EIS.

Per the requirements of WAC 197-11-360, the City published and issued a Determination of Significance (DS) and scoping notice on 1 October 2018. The scoping notice preliminarily identified the following elements of the environment for discussion in the EIS.

- Land Use
- Transportation
- Public Services and Utilities
- Air
- Groundwater
- Plants and Animals

During the scoping period, scoping comments were received at the second project open house on 6 October 2018, and via mail and electronic mail following the open house. The scoping comment period expired on 9 November 2018. This memorandum provides a summary of comments received and a recommendation on the scope of the EIS based on scoping comments.

## SCOPING COMMENTS

The scoping period ran from 1 October 2018 until 9 November 2018. During the scoping period, 19 comments were received, which focused on a variety of concerns related to transportation, land use, including historic and cultural resources, public services, air, water, and plants and animals. One comment identified a potential hazardous material site within the study area. Comments are summarized below by category and a comment and response log is included as Attachment A.

### Transportation

Eleven transportation related comments were submitted. In general, comments focused on concerns related to parking and potential traffic increases associated with additional development, specifically the ability of the existing transportation network to accommodate additional traffic and concerns related to traffic speed, as well as the need to accommodate multimodal and pedestrian facilities. Specific streets and intersections suggested for additional study and suggested improvements are listed below.

- Consider signals at MacArthur and Lieser and Middle Way and Lieser Road. Lieser Road is currently difficult to enter from side streets.
- Multimodal and pedestrian improvements are needed on MacArthur.
- Traffic calming is needed on Buena Vista. There is a blind curve on Andresen to Buena Vista.
- Concerns related to traffic on MacArthur, Dubois, and Mill Plain.
- Traffic calming and/or more posted speed limit signs on Blandford. Concerns related to high speeds and conflicts between cars, pedestrians, cyclists, and wildlife.

### Public Services

Two comments were received related to public services. One comment was related to public services such as the Vancouver Police Department, Fire Department, and local schools having the needed staff and facilities to handle increased population. The other comment was related to the adequacy of the existing sewer treatment capacity to accommodate additional development.

### Land Use

Four commenters expressed concerns related to density and building height, the need for senior and affordable housing, and a desire for future developments to include a variety of land uses and open space to support walkability and a complete community. In addition to the general land use comments, two comments were received from the Washington Department of Archaeology and Historic Preservation (DAHP). One comment indicated the potential presence

of archaeological resources in the study area and DAHP's interest in reviewing plans related to ground disturbing activities, specifically at the Tower Mall Redevelopment Site. The second comment from DAHP was related to the Park Hill Cemetery. DAHP indicated any future development within the cemetery boundary would require compliance with the Removal of Dedication procedure as outlined in RCW 68.24.090.

### Water

Three comments were received related to potential ground water contamination and water quality. One commenter indicated the EIS should consider the long-term effects of development on groundwater recharge. The Washington Department of Ecology commented on the erosion control requirements and water quality standards that will affect future projects developing under a Planned Action. The City of Vancouver Water Engineering Program Manager commented on potential impacts to Water Station 4 if groundwater contamination occurs in the study area and indicated the EIS should consider impacts to water and groundwater that could result from stormwater runoff.

### Air

One commenter indicated a need to study air quality impacts that may result from increased traffic.

### Plants and Animals

Three commenters indicated the EIS should consider impacts to plants and animals. One commenter specifically mentioned conflicts with wildlife along Blandford Road.

### Hazardous Materials

One commenter indicated a former dry cleaner on the Tower Mall site could have resulted in contamination in the study area. The City's Water Engineering Program Manager indicated contaminates were found at Water Station 4 in the 1980s, which resulted from the dry cleaning facility. The City has been treating the contamination since the early 1990s and the site was removed as a Superfund Site on 6 February 2018.

## RECOMMENDATION

As outlined above, the scoping comments received during the EIS scoping period are consistent with the areas preliminarily identified for study in the DS and scoping notice. No additional analysis is recommended based on scoping comments.

| | Comment | Date | Category | Method | Contact | Response |
|---|---|---|---|---|---|---|
| 1 | How do we safely move more people on existing roadways? Is VPD [Vancouver Police Department] ready to accommodate the increase in numbers? Is the fire department prepared? Apartments bring in families. I have been in the local schools, sure don't see how they are ready for this increase. First step: transportation, 2nd step: emergency services; 3rd step: schools; then develop the heights. | 10/6/2018 | Transportation/Public Services | Scoping Meeting | Anonymous | |
| 2 | Air Quality with more traffic; plants and animals; please put in plenty of green space. | 10/6/2018 | Air/Plants and Animals/Transportation | Scoping Meeting | Anonymous | |
| 3 | Please change MacArther so everyone can walk, bike, drive safely | 10/6/2018 | Transportation | Scoping Meeting | Anonymous | |
| 4 | Please support places to walk and to meet our neighbors: parks, coffee shops, restaurants, exercise studios, etc. | 10/6/2018 | Land Use | Scoping Meeting | Anonymous | |
| 5 | There was a dry cleaner on Tower Mall property before it would have required to dispose of chemicals safely | 10/6/2018 | Hazardous Materials | Scoping Meeting | Anonymous | |
| 6 | Drinking water; sewer treament capacity - no overflow!; traffic concerns; bike, scooter, skate-skateboard transportation among car and pedestrian; definitely wht you've listed above [land use, transportation, public services and utilities, air, groundwater, plants and animals]; density problems | 10/6/2018 | Land Use/Transportation/ Public Services and Utilities | Scoping Meeting | Anonymous | |
| 7 | Traffic flow should be studied. The projected 3000 new residents will significantly increase vehicular traffic. The most direct roads to SR-14 east and I-205 will be MacArthur and Lieser. It is currently difficult to enter Lieser Road from side streets since 92nd Avenue was extended north. Further increases in traffic would call for traffic signals at MacArthur and Lieser, and Middle Way and Lieser (commuters disregard the 25 mph speed limit on Lieser). Traffic may also increase on Evergreen Hwy, which has limited shoulders and is used by cyclists. | 10/6/2018 | Transportation | Scoping Meeting | Anonymous | |
| 8 | Buena Vista - need traffic abatement. In 1988, was a drive-thru to Safeway in Tower Mall. Now effectively 1-lane by visitors parking on road. Blind curve on Andresen to Buena Vista (left hand turn). This corner cannot handle additional traffic. Frequent accidents. Lots of kids (and adults) walking on streets, and neighborhood not designed for heavy traffic or pedestrians. Speed bumps along Buena Vista would help. | 10/6/2018 | Transportation | Scoping Meeting | Anonymous | |
| 9 | I am concerned about maximum structure height - not too tall 4-story max. Hopefully sidwalk upgrades in surrounding area of this plan will be part of the final project. | 10/6/2018 | Land Use/Transportation | Scoping Meeting | Anonymous | |
| 10 | Parking - Transportation | 10/6/2018 | Transportation | Scoping Meeting | Anonymous | |
| 11 | It is [DAHP's] professional opinion that the project area has the potential to contain archaeological resources. As this project progresses the DAHP would like the opportunity to review plans for ground disturbing work within the The Heights area. The entire area has been determined to be of high or very high risk of containing archaeological resources according to the DAHP predictive model. Although some areas of The Heights have been previously surveyed, others have not. In particular the DAHP would like an opportunity to comment on future work on the Tower Mall Redevelopment Site. | 10/16/2018 | Historic/archaeological resources | Letter | Stephanie Jolivette<br>Local Governments Archaeologist<br>(360) 586-3088<br>Stephanie.Jolivette@dahp.wa.gov | |
| 12 | The plans for the Tower Mall Redevelopment Site as drawn on The Heights District Plan map include portions of the Park Hill Cemetery. According to our records the cemetery boundary currently abuts the edge of N Devine Road. As this proposed development falls within a cemetery boundary, any development of this parcel would require a Removal of Dedication for this portion of the cemetery. The Removal of Dedication procedure is outlined in RCW 68.24.090. Although this process is not initiated through the DAHP, questions about the process can be forwarded to Dr. Guy Tasa, State Physical Anthropologist, (360) 586-3034, Guy.Tasa@dahp.wa.gov . | 10/16/2018 | Historic/archaeological resources | Letter | Stephanie Jolivette<br>Local Governments Archaeologist<br>(360) 586-3088<br>Stephanie.Jolivette@dahp.wa.gov | |
| 13 | Thank you for the opportunity to comment on the determination of significance/scoping (DS/Scoping) for The Heights District Plan. The Department of Ecology (Ecology) reviewed the environmental checklist and has the following comment(s):<br><br>WATER QUALITY: Chris Montague-Breakwell (360) 407-6364<br><br>For future projects developing under the Planned Action:<br><br>Erosion control measures must be in place prior to any clearing, grading, or construction. These control measures must be effective to prevent stormwater runoff from carrying soil and other pollutants into surface water or stormdrains that lead to waters of the state. Sand, silt, clay particles, and soil will damage aquatic habitat and are considered to be pollutants.<br><br>Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48 RCW, Water Pollution Control, and WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action.<br><br>The following construction activities require coverage under the Construction Stormwater General Permit:<br><br>1. Clearing, grading and/or excavation that results in the disturbance of one or more acres and discharges stormwater to surface waters of the State; and<br><br>2. Clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.<br>a) This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the disturbance of one or more acres, and discharge to surface waters of the State; and | 10/22/2018 | Water quality | Letter | Chris Montague-Breakwell<br>(360)407-6364 | |

| | Comment | Date | Category | Method | Contact | Response |
|---|---|---|---|---|---|---|
| | 3. Any size construction activity discharging stormwater to waters of the State that Ecology<br>a) Determines to be a significant contributor of pollutants to waters of the State of Washington.<br>b) Reasonably expects to cause a violation of any water quality standard.<br><br>If there are known soil/ground water contaminants present on-site, additional information (including, but not limited to: temporary erosion and sediment control plans; stormwater pollution prevention plan; list of known contaminants with concentrations and depths found; a site map depicting the sample location(s); and additional studies/reports regarding contaminant(s)) will be required to be submitted.<br><br>You may apply online or obtain an application from Ecology's website at:<br>http://www.ecy.wa.gov/programs/wq/stormwater/construction/ - Application. Construction site operators must apply for a permit at least 60 days prior to discharging stormwater from construction activities and must submit it on or before the date of the first public notice.<br><br>Ecology's comments are based upon information provided by the lead agency. As such, they may not constitute an exhaustive list of the various authorizations that must be obtained or legal requirements that must be fulfilled in order to carry out the proposed action. | | | | | |
| 14 | I am a resident of the Heights area. I would like to see an area of landscaping that is planted with only native vegetation, including some trees. I would like to see an area of at least 50 feet by 50 feet, or up to 100 feet by 100 feet if possible. | 11/9/2018 | Plants and animals/Land use | Email | Eric Trued<br>evtrued@yahoo.com | Thanks for your email and your comment. This is something that has come up in many discussions with the public as well as our Urban Forestry and Stormwater Management staff. Many people want to see more vegetation, better maintenance of vegetation, and less concrete within the redevelopment site. This also aligns with City goals to increase the urban canopy, and with stormwater management goals to increase stormwater retention and infiltration on site, in order to enhance water quality citywide. I believe you'll see this reflected in the draft preferred redevelopment concept, which will be available for public review in late winter/early spring.<br><br>I have included your comments in the list of public comment received for the EIS/SEPA Scoping process, and in the project record. Please don't hesitate to get in touch anytime with additional comments or questions. |
| 15 | The [City of Vancouver] water utility is always concerned with potential impacts to water resources. The Heights area is in fact upgradient of what we call Water Station 4, which is a major wellfield for our water supply system. Contaminants were found at Water Station 4 in the late 1980s. These contaminants were dumped on the ground by a dry cleaner in the area of the Height redevelopment and slowly found their way to our wellfield. We have been treating to remove this contaminant since the early 90s and the site was just delisted as a superfund site last year. So, yes, what goes into the ground in the area of the development can impact our water quality at Water Station 4.<br><br>We are absolutely concerned with what takes place at the Heights, but Stormwater regulations are more stringent now. State and local regulations do a good job of ensuring our groundwater supply remains safe and we are confident that these regulations will ensure that what goes in the ground at the Heights will not contaminate our supply.<br><br>I agree that it should at least be mentioned in the EIS as the site can have a major impact on our water supply at Water Station 4, but I am not overly concerned that something will take place at the site that will negatively impact our supply given the current Stormwater regulations. | 11/9/2018 | Groundwater | Email | Tyler Clary<br>Water Engineering Program Manager<br>City of Vancouver<br>tyler.clary@cityofvancouver.us | |
| 16 | I just wanted to mention my concern about including consideration of potential effects of the development plan on groundwater recharge. It has been my experience that planning considerations generally focus too narrowly on effects of plans being developed and not enough on the cumulative effects of large scale developments over time. I know it is difficult to anticipate long-term changes, however, most planning only considers the focus of "the current planning horizon", and fails to anticipate the long-term impacts to local resources. Groundwater is a resource that Vancouver will be depending on for a long time to come. Since the Heights District is upslope of an extremely important well field at the lower end of Blandford Drive, I thought it very important to include consideration on groundwater impacts in your EIS and SEPA review of the Heights District redevelopment plan. | 11/9/2018 | Groundwater | Email | Paul Pedone<br>geotale@yahoo.com | Thanks for your email. I enjoyed meeting you and learning more about your experience working in Vancouver as both a professional and a volunteer over the last few decades. On behalf of someone relatively new to the City (I've been with the City just under 5 years), thank you for your engagement and commitment over the course of many years.<br><br>Thanks also for your thoughtful comment. It's a great question/comment for the EIS Scoping process, and I've forwarded it on to the consultant that is managing the EIS process, including scoping. I've also forwarded it on to our Water Team.<br><br>Please feel free to get in touch any time with additional questions/comments. I look forward to seeing you at a future South Cliff meeting to provide another update on the Heights project early next year. |

| | Comment | Date | Category | Method | Contact | Response |
|---|---|---|---|---|---|---|
| 17 | I wanted to let you know of my concern regarding the density of proposed housing in our area. I see no indication of parking for visitors at this new housing development proposal and I am am concerned about where those cars would be parking. I understand there is a plan for the owners of the units but its a given that those owners will be having visitors. It was also said that the 1800 is an estimate. It could be 650 or it could be 3500.<br><br>Our neighborhood (DuBois Park) has only two roads for entrance and exit from our neighborhood. With an additional 1800 housing units I am concerned about the traffic on MacArthur, Dubois and Mill Plain.<br><br>I have felt this is a very safe neighborhood we live in and I am also concerned that with the advent with the low income housing comes the additional problems of drugs and drug items on the property. There are now three schools and one day care center nearby. That does't seem like a good mix in my way of thinking.<br><br>When I mentioned the concern of the potential traffic problem at the neighborhood meeting on Wednesday night to the speaker Andrea Pastor, she indicated that by the time the project is completed people will probably no longer be using cars. That she believes her 13 year old daughter will probably no longer want or need a car by the time she reaches driving age and she will use Uber or public transportation. That makes about as much sense as your boards showing the 3 different proposals that states the only impact to the surrounding communities will be during construction.<br><br>I have felt we live in a very safe community, as verified by our neighborhood policeman at our meeting. I am worried with the influx of all the low income problems it no longer will remain so.<br><br>My husband Dick Vigal and I were hoping that the proposed area would be used for things that would make the existing neighborhoods have more access to facilities. Please reconsider your proposal. | 10/26/2018 | Transportation, crime/safety | Email | Gwen Lakey<br>201 N. Santa Fe Dr.<br>Vancouver, WA 98661 | Thank you for your email, and apologies about the delay in following up with you. I was out of the office for a couple weeks and it has taken me equally that long to get caught up. I appreciate your comments and concerns and want to respond to each individually, so I'll go in the same order as your email.<br><br>In terms of parking, each example that Andrea reviewed with the Neighborhood Association, which were all presented at both an in person and online open house during the month of October, have sufficient parking on site to accommodate the proposed uses and the density of development. This includes surface parking for retail and office buildings, tuck under parking for town homes, and a shared, structured parking garage that will serve the entire development. I agree that there will be a need for visitor parking; in fact, we want there to be a need for visitor parking, as one goal for this development is to attract people from around the City, including folks who live in new housing on-site, people from adjacent neighborhoods, and visitors from across the region.<br><br>In terms of parking impacts on the adjacent neighborhoods, we don't believe on-street parking in adjacent neighborhoods will support the redevelopment, as it is just too far away and disconnected to be a viable option for visitor parking, and thus have been intentional about ensuring that we have enough parking within the redevelopment site to support the various uses that will be located there.<br><br>In terms of the density of development, we are seeking to balance a number of factors. One is the need for this development to be economically feasible and attract developers who will ultimately build and finance much of the project. The second is to accommodate a growing population in areas that aren't already developed as single family neighborhoods. The third is to support the active retail environment and mix of amenities that the community has said they want. A mix of people and a significant number of rooftops on site is crucial to this success. As we know from the example of tower mall, the current residential density is not sufficient to support successful commercial development.<br><br>We will do a full traffic analysis as part of the environmental impact statement for the project. This will include modeling the number of trips that each use within the redevelopment area will generate, looking at existing roadway capacity, and how we can accommodate growth in a way that improves roadway safety and doesn't significantly increase congestion. We are lucky that the three major roadways around the redevelopment site - Andresen, Mill Plain, and MacArthur, have significant right-of-way to work with and currently are underutilized for the amount of space they have compared to the number of cars they carry daily. I completely understand your concerns about impacts to neighborhood streets, and we will be looking at potential improvements that can be made to address these, including adding traffic calming and other strategies for disincentivize cut through traffic.<br><br>In terms of your concerns about affordable housing, we are not planning to concentrate very low income housing in the Heights. Instead, and in alignment with national best practices, we are looking at a range of income types, from very high end condominiums, to market rate apartments and townhomes, to workforce housing that is affordable to someone making 60-80% of median family housing. Affordable housing is defined as housing that is restricted to individuals or families with incomes below a certain threshold, and rent is capped at 30% of monthly income. So, for example, take a unit that is affordable to someone making up to 80% of median family income, which amounts the $45,600 for a one person household and $65,100 for a four person household. The rent on that unit would be approximately $1,140 a month for household of one or $1,627 a month for a household of four. This is not to say there won't be some housing affordable at lower income levels, which is important because many seniors in the area living on social security earn much less than this, but is intended to illustrate the range of housing we're looking at as part of this project.<br><br>Lastly, examples from across the country illustrate that mixed-income neighborhoods, rich in amenities, with active public spaces that are used all day by residents, employees and visitors are the least likely to suffer from crime, drugs, or safety issues. Our intent is not to concentrate poverty or very low income housing in the area; rather, it is to activate a very underutilized commercial area, and to replace less positive uses that are already happening on site (camping, for instance).<br><br>I hope this responds to your questions and concerns. Please feel free to get in touch any time with additional questions or comments, and thank you for your participation in your neighborhood association and this project. |
| 18 | As a homeowner whose property line is next to Blandford Road, my concern is what is planned for Blandford Road?. I've seen 2 deer this year one of which stopped traffic. People already speed down the hill, what about speed bumps, and more posted 25 mph signs, police presence. I can only see this becoming a nightmare with more people condensed in a small area adjacent to a hiking trail.<br><br>Also what is planned for traffic getting on and off of MacArthur for the existing residential areas? | 10/28/2018 | Transportation/Plants and animals | Email | Cinda Embree<br>embreekc@comcast.net | Thanks for your email and apologies for the delay in response- I was out of town for a couple weeks on vacation, and it has taken me nearly that long to catch up.<br><br>You're observations on Blandford are spot on, and reflect what we've found through our preliminary traffic analysis (a full analysis will be done as part of the forthcoming Environmental Impact Statement process and will be made available to the public in draft form in late Winter/early Spring next year). Like you, we have observed high speeds on the roadway, and incidents of near conflict between folks walking/cycling and drivers. I had not heard about wildlife, so I appreciate the informaiton. Its a very constrained roadway, due to narrow widths, curves, steep slopes, and environmental/stormwater issues. As part of this project, we'll be analyzing Blandford for potential improvements that will improve safety for all users, including potential traffic calming (speed cushions). Does your house backup onto the roadway? I'm curious about your driveway access, and would appreciate any additional observations you have about accessing the road from your house as well. If you have time, any additional information that you can provide would be very helpful.<br><br>We'll also be looking at ways to mitigate traffic impacts on adjacent neighborhoods. The good news is that there are relatively few through connections from each neighborhood to arterial streets (Mill Plain, MacArthur, Andresen) adjacent to the redevelopment area, which will mitigate impacts. That being said, we will continue to look for ways to reduce potential cut through traffic and manage speeds, including traffic calming, given increased traffic from the new development. On MacArthur, we're looking at how we can improve intersections to provide better access for people coming from adjacent neighborhood streets.<br><br>These are all very relevant questions and concerns, and we'll be addressing them as part of the planning process. I think its worth noting that we currently have two parallel processes underway simultaneously- a redevelopment plan for the 63-acre Tower Mall area, and comprehensive district plan for the 205-acre Heights District. We've been focused on the redevelopment plan as it is the area that will change most significantly in the coming years, but now that we've put three concepts out for public review and gotten feedback, we'll switch gears to working on the full district plan, which will include a detailed analysis and recommendations related to land use, transportation, and environmental conditions. Most of your questions related to district-wide traffic and Blandford will be addressed through the district-wide planning process, which we plan to bring to the public for review and feedback in late Winter/early Spring of next year. The timeframe for implementation of both plans in approximately 20-years.<br><br>I hope this answers some of your questions and provides additional context for the planning process currently underway. I have added your email to the project email list, so that you will receive regular updates and information as it becomes available. Please feel free to reach out anytime with additional questions/concerns. I'm happy to set up a time to talk in more detail if that would be helpful. Thanks for your engagement on this project. |

| | Comment | Date | Category | Method | Contact | Response |
|---|---|---|---|---|---|---|
| 19 | 1- Incorporate the Park Hill Cemetery into the plan on a recreational way meaning redo the streets in the cemetery and light them so that the neighbors can safely include this area for walking/biking recreation with many links to our neighborhood. More access means more use and more use leads to better security (cameras and drive throughs from enforcement officers).<br>2- Ten story single use buildings would be fine. A high rise retirement center with elevators would be fine. The 65+ population could have restaurants and a small scale grocery store within the overall development. Public transportation would take them to doctor's appointments and other community services. Maybe a shuttle service with limited schedule.<br>3- Affordable housing for seniors. No townhouses for them because they are staying away from stairs in their homes. Also, affordable housing (government subsidized housing) for lower income families.<br>4- As much "open space" area as can reasonably be integrated into the overall plan. A park that happens to have nearby development as opposed to a new development that happens to have a park put into it.<br><br>Looking forward to the process and the future development. | 10/28/2018 | Land Use/Transportation | Email | Bruce Davis<br>brucedavis13@gmail.com | Thank you for your email and your feedback on the proposal thus far. I have submitted your comments into the project record. Most of your comments, including the intentional integration of open space and affordable housing for a variety of different demographic groups, are considerations that have been integrated into the planning process from early on. This is the first time I have received a comment related to improvements to the roadway internal to the cemetery, including lighting. While we are unable to widen the roadway in the cemetery due to the close proximity of existing gravesites to the road, we can definitely explore the idea of providing lighting and other safety improvements/connections that would make this a more comfortable place to recreate, especially at night. I will explore this possibility and let you know what we find in terms of feasibility. |

APPENDIX C

# DEVELOPMENT TOTALS METHODOLOGY AND ASSUMPTIONS

CITY OF Vancouver WASHINGTON

# Development Totals - Heights District Methodologies and Assumptions

The following table provides a summary of recently submitted pre-applications in commercial zones. This information was provided by the City of Vancouver planning staff to serve as the basis for developing the residential densities used to inform the No Action Alternative assumptions. These projects were selected as they are similar to development that would be expected in the Heights District without the adoption of a subarea plan.

**Table 1. Recent Development Proposals in Commercial Zones**

| Zone/Location | Lot size | Residential Units/ Density[1] | Commercial (SF) | Total Development (SF) |
|---|---|---|---|---|
| CC – 25th and Broadway | Lot Size: 26,521 SF | 46 units (40,765 SF) (97%)<br>Density: 75 units/ac | 1,127 (retail) (3%) | 41892 |
| CC (Fourth Plain Corridor Overlay) – 7401 NE 18th St. | Lot Size: 115,434 SF | 101 units (80,400 SF) (96%)<br>Density: 38 units/ac | 3,700 (no data on retail vs. office) (4%) | 84,100 |
| CC – 6603 NE 137th Ave. | Lot Size: 19,166 SF | 18 units (11,962 SF) (92%)<br>Density: 45 units/ac | 1088[2] (office) (8%) | 13,050 |
| CG – NE 65th Ave. and Fourth Plain | Lot Size: 47,480 SF | 90 units (68,625 SF)[3] (100%)<br>Density: 83 units/ac | 0 | 68,625 |
| CC – SE 120th Ave. and SE 5th St.[4] | Lot Size: 152,460 SF | 220 units (approx. 222,500 SF)[5] (100%)<br>Density: 63 units/ac | 0 | 222,500 |

[1]Density was not provided in the pre-application materials. It was calculated using the lot size and unit count.

[2]Application notes 6 units as "live/work". Commercial square footage was calculated as 25 percent of unit size.

[3]Application notes 13,725 square feet per floor for 4 to 5 stories. Residential square footage assumes 5 stories.

[4]Affordable/senior housing complex.

[5]Application provides a square footage range for two buildings: 130,000 – 175,000 gross square feet (gsf) for one building and 60,000 – 80,000 gsf for the second building. Approximate square footage is based on the sum of the mid-point of the range for each building.

The recent residential/commercial mix for developments in commercial zones indicates primarily residential uses are being proposed in commercial zones with an average density of 61 dwelling units per acre. **Based on these recent developments, the No Action Alternative assumes 95 percent residential and 5 percent commercial.**

## Existing Development within the Heights District Plan Area

- The Heights District Plan area currently includes 232 residential units and 445,500 SF of commercial space[1] (inclusive of approximately 146,000 SF of commercial (including office) on the Tower Mall parcel). The Plan area currently includes 658 jobs.[2]

## No Action Base Scenario Assumptions

- Existing residential units and commercial square footage within the District will remain.
- No redevelopment of existing developed areas within the District will occur
- Only vacant land as identified in the County Vacant Buildable Lands Model (VBLM) will be developed. County VBLM identifies 4.13 acres of commercial vacant land. Remainder of the site is classified as "built". VBLM classifies "underutilized" land, but none of the land within the District is included in that category.
- The "Developable Area" included in Table 2 assumes a 20 percent reduction for mixed use sites to account for infrastructure (per the VBLM).

[1] Existing residential units and commercial space identified in Final Report, page 18.

[2] Existing jobs include 223 jobs in the three schools in the subarea and 435 jobs in commercial sectors. School jobs data was provided by the Vancouver School District. Other jobs data provided by the City of Vancouver and sourced from Longitudinal Employment Household Dynamics Survey. U.S. Census Bureau.

- The mix of residential and commercial uses is based on recently submitted projects in commercial zones (95 percent residential) as noted above.
- Unit count based on average density in recently submitted projects (61 units/acre), calculated for developable area.
- Job count assumes 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones. Jobs per square foot for retail and office is based on jobs analysis by EcoNorthwest (Appendix C to Heights District Plan Final Report)[3].

**Table 2. Development under Base Scenario (without existing development added)**

| VBLM Vacant Land | Developable Area | Residential Units (95%) | Commercial (5%) |
|---|---|---|---|
| 179,903 SF | 143,922 SF | 136,726 SF<br>192 units | 3,598 SF Retail = 6 jobs<br>3,598 SF Office = 13 jobs<br>7,196 SF Total = 19 jobs |

## No Action High Scenario Assumptions

- Existing residential units remain within the District and the existing commercial space is reduced by 146,000 SF given the likelihood that the Tower Mall property would be included in the portion of the site that is assumed to redevelop.
- Vacant land identified in the County VBLM will be developed.
- Redevelopment of 50% of the proposed Redevelopment Area will occur at the same residential commercial mix identified for the base scenario (based on recently submitted projects).
- Developable area assumes a 20% reduction for mixed use sites to account for infrastructure (per the VBLM).
- Mix of residential and commercial uses based on recently submitted projects in commercial zones.
- Unit count based on average density in recently submitted projects (61 units/acre), calculated for developable area.
- Job count assumes 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones. Jobs per square foot for retail and office is based on jobs analysis by EcoNorthwest (Appendix C to Final Report).

**Table 3. Development under High Scenario (without existing development added)**

| Land Area | Developable Area | Residential (95%) | Commercial (5%) |
|---|---|---|---|
| 1,552,043 SF[1] | 1,241,634 SF | 1,179,552 SF<br>1,652 units | 31,040.5 SF Retail = 53 jobs<br>31,040.5 SF Office = 108 jobs<br>62,081 SF = 161 jobs |

[1]The total land area for the Redevelopment Area is 63 acres (2,744,280 SF). The high scenario for the No Action Alternative assumes 50% will redevelop plus the 179,903 SF of vacant land included in the No Action Base scenario will develop.

## No Action Alternative Totals

Based on the assumptions described above the No Action Alternative would result in the following total residential units and commercial square footage/jobs.

**Table 4. No Action Totals**

| Scenario | Residential Units | Commercial SF/Jobs |
|---|---|---|
| Existing (Base)[1] | 232 units | 445,500 SF = 658 jobs |
| Base Scenario | 192 units | 7,196 SF = 19 jobs |
| **Base Scenario Total** | **424 units** | **452,696 SF = 677 jobs** |
| Existing (High)[2] | 232 units | 299,500 SF = 576 jobs |
| High Scenario | 1652 units | 62,081 SF = 161 jobs |
| **High Scenario Total** | **1884 units** | **361,581 SF = 737 jobs** |

[3] EcoNorthwest jobs analysis assumes 1 job per 588 square foot of retail development and 1 job per 288 square foot of office development.

[1]Assumes the existing residential units and the existing commercial square footage remain.

[2]Assumes the existing residential units remain and the existing commercial space is reduced by 146,000 SF given the likelihood that the Tower Mall property would be included in the portion of the site that is assumed to redevelop. In this scenario existing jobs are reduced by 82, which is 50 percent of jobs currently included in the Redevelopment Area per the jobs analysis by EcoNorthwest (Appendix C to the Final Report).

## Alternatives Comparison

Based on the No Action assumptions presented above, the following table provides a comparison of each alternative to be included in the EIS.

**Table 5. Heights District Plan Alternatives**

| | No Action (Base) | No Action (High) | Project Alternative |
|---|---|---|---|
| Residential Units | 424 units | 1884 units | 2032 units[1] |
| Population[2] | 1056 people | 4691 people | 5060 |
| Commercial Square Footage (retail, office) | 440,700 SF | 361,581 SF | 308,000 SF |
| Hospitality | 0 | 0 | 83,000 SF (156 keys) |
| Jobs | 677 jobs | 737 jobs | 984 to 1004 jobs[3] |
| Institutional (churches, schools, community centers, and government services) | 583,000 SF[4] | 549,000 SF[5] | 482,000[6] |
| Parks and Open Space | Approximately 43 acres (Park Hill Cemetery) | Approximately 43 acres (Park Hill Cemetery) | Approximately 46.5 acres[7] |

[1]Project Alternative includes 1800 new residential units and retains the existing 232 units.

[2]Population assumes 2.49 persons per household per the Heights District Plan Interim Report.

[3]Includes 410 new jobs in Redevelopment Area, 271 existing jobs outside Redevelopment Area, 223 existing jobs in three schools in the subarea, and either 100 jobs if mixed-use areas redevelop with retail or 80 jobs if mixed-use areas redevelop with office.

[4]Based on building use analysis provided on page 45 of Interim Report. Approximately 5,200 SF removed to account for relocation of existing Fire Station 3, which the Vancouver Fire Department has planned to remove.

[5]Assumes the same square footage included in the No Action Base with the existing church (approximately 34,000 SF) in Tower Mall removed with redevelopment.

[6]Within Redevelopment Area, Institutional category includes: 20,000 SF of new church/multipurpose space, 16,000 SF of new civic space, and existing City-owned property associated with the existing water facility. Outside the Redevelopment Area, Institutional category includes existing schools and community centers identified within the areas assumed to have limited or no likelihood to redevelop. The existing churches and community spaces within areas identified as higher or low likelihood to redevelop are removed from the total, as it is assumed they will redevelop into multifamily over time.

[7]Includes 6.1 acres in Redevelopment Area and 40.4 acres (Park Hill Cemetery minus 2.6 acres in northwest corner adjacent to Mill Plain Blvd identified for redevelopment) retained outside Redevelopment Area.

APPENDIX D

# HEIGHTS DISTRICT URBAN DESIGN FRAMEWORK

CITY OF Vancouver WASHINGTON

# URBAN DESIGN FRAMEWORK

CITY OF Vancouver WASHINGTON

# THE HEIGHTS DISTRICT PLAN

Community and Economic Development Department
City Of Vancouver, Washington

2020

VIA

# Urban Design Framework

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# A

# INTRODUCTION

# 1.0 Context

The Heights District (The District) represents an opportunity to create a vibrant mixed-use urban neighborhood destination that is strategically located in the heart of Vancouver. The 205-acre District is surrounded by stable yet growing neighborhoods, trails and recreation areas and parks and open spaces. The hallmark of The District may be its quiet character, where people have lived for many generations and are exceptionally welcoming and friendly.

Promoting health, equity and wellness, the Heights District Plan envisions a diverse, balanced neighborhood that includes residential, retail and commercial uses, supportive social services, healthcare, schools and places of worship. Key to The Plan is the future Mill Plain Bus Rapid Transit (BRT) line that will connect The District and points beyond, providing easy and safe access to the new neighborhood as a unique place to live and work.


Figure 1: Regional Context


Figure 2: The Heights District

# 2.0 The Heights District Vision & Design Guidance

## 2.1 Vision

*"The Heights District is a vibrant, connected neighborhood center. The center seeks to promote community health, wellness and a shared identity. This identity reflects the value placed on the past and current community with an eye toward welcoming future generations in an inclusive, respectful and equitable manner."*

— The Heights District Plan


Figure 3: The Heights Tower Mall Redevelopment Area

## 2.2 Universal Design Principles

The Heights District Plan is founded on a number of Universal Design Principles that help shape the character, urban form and public spaces of The District. The success of The District will rely on an understanding and application of the following elements:

- Neighborhood context, history and culture
- Proximity to the future Mill Plain BRT
- Sustainable design best practices
- Design character and compatibility
- Community health, well-being and equity

The following Design Drivers were established as part of The Heights District Plan process:

### OVERARCHING DRIVER

**MIXED INCOME HOUSING**

A fundamental driver of The Heights District is the integration of a variety of housing types and sizes that are available to diverse community members, including; affordable, attainable and market rate housing.

## PRIMARY DRIVERS

A series of Primary and Secondary Design Drivers have been established for The District to help inform high-quality design outcomes. The Primary and Secondary Drivers are as follows:

**CONNECTIVITY**

To strengthen multi-modal connections and improve accessibility throughout The District and within the 20-minute walkshed.

**COMMUNITY HEALTH, WELLNESS AND EQUITY**

To embrace and promote healthy living, universal design principles and social equity as core values of The District.

**SUSTAINABILITY**

To reflect responsible social, economic and environmentally-friendly best practices.

## SECONDARY DRIVERS

### PUBLIC REALM

To create a variety of vibrant community spaces that elevates the quality of life for all residents and visitors.

### ARTS / CULTURE

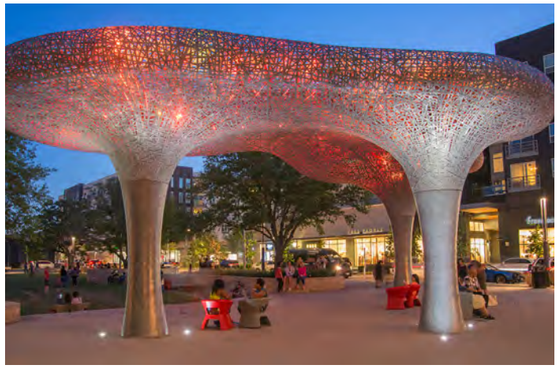
To promote arts and culture in The District.

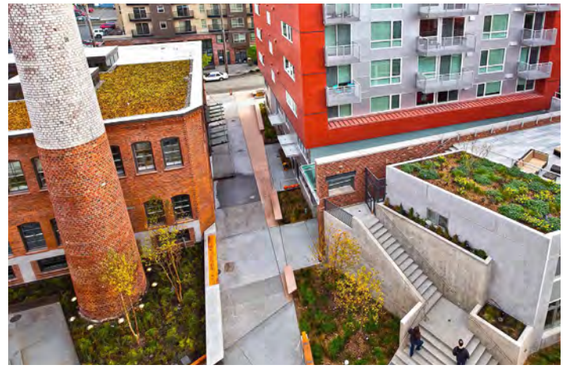
### ECONOMIC DEVELOPMENT

To attract private investment and deliver equitable public benefit.

### URBAN FORM / CHARACTER

To promote good urban form that invites high-quality design and enriches safe places to enjoy.



## 2.3 Purpose

The Urban Design Framework (Framework) provides an organizational structure to guide high-quality, sustainable development in The Heights District over time. The Framework addresses key aspects of development — such as urban character, public realm, architecture, sustainability and other infrastructure considerations — that are deemed essential to creating a dynamic, safe and enjoyable neighborhood. Each element is informed by the project's Design Principles and contributes to advancing the vision for The District.

Design Guidelines, intended to accompany development standards and provide options for meeting design requirements articulated in the code, will be provided for reference in both the Design Review and Heights Plan District sections. The Development Standards and Design Guidelines will define prescriptive development standards, as well as discretionary design guidelines that will be applied as part of the project review and approval process for individual projects in The District.

Once adopted, the Heights District Development Standards and Design Guidelines will be codified within the City of Vancouver Municipal Code (VMC) Title 20: Land Use and Development Code and will serve as the principal regulating tool for the  City to review and approve projects in The District.

These tools will be developed as part of the next phase of the project and will include provisions in the current Commerical and Mixed Use District (20.430) and Design Review (20.265) section of the VMC. In addition, a new Heights Plan District section wil be added to the Plan District (20.600) section of the code. This section will provide detailed Development Standards for future development at The Heights. Design Guidelines, intended to accompany development standards and provide options for meeting design requirements articulated in the code, will be provided for reference in both the Design Review and Heights Plan District sections.

## 2.4 Site Development Standards

The Heights District Site Development Standards will ensure the health and safety of residents and visitors of The District. The Standards will support the project's vision to create a walkable, mixed-use neighborhood form of development and will emphasize universal design best practices to promote equitable, safe, accessible and sustainable development measures throughout The District.

**Site Development Standards** will address the following:

- **Land Use and Zoning Regulations:** Development standards for The District will be established as part of a new HX Zone classification, and will be supported by complementary Design Guidelines and a design review process for development.
- **Street Standards:** Unless noted otherwise, new proposed streets developed in the Tower Mall Redevelopment Area will be city rights-of-way. A limited number of private access and thoroughfares may be considered in The District.
- **Infrastructure Systems:** New public rights-of-way (streets and alleyways) will include paved streets and sidewalks, underground utilities, stormwater infrastructure, streetscape amenities, landscaping, wayfinding and signage.
- **Public Parks / Amenities:** A key public infrastructure feature for the Tower Mall Redevelopment Area is the proposed Loop - a landmark feature that connects a series of public park spaces within the Tower Mall Redevelopment Area. Access to The Loop and its amenities are purposefully connected by a series of pedestrian pathways, alleyways and plazas. Ground level retail, live/work and residential stops all serve to activate The Loop throughout The District.

## 2.5 Urban Design Guidelines

The Heights District Urban Design Guidelines will establish the foundation for the built urban form and public realm design and development in The Heights District. The Guidelines will serve as a tool for the city (or its designated review authority), property owners, developers and designers who are interested in developing in The Heights.

The **Urban Design Guidelines** will apply to all development in The District. Key considerations include:

- Built structures on private parcels shall be administratively reviewed and approved through the City of Vancouver administrative design review process on a case-by-case basis.
- The implementation of The District will evolve over time. Active participation of a variety of property owners, developers and designers will be required to fulfil the vision of The District.
- Individual building projects will respond to the overall design theme established for The District.
- The mixed-use buildings in the Activity Center include a vertically integrated mix of uses wherever feasible such as ground-level retail and customer services with residential or office uses above. The combination of uses will promote vitality and diversity within The District.
- A contemporary composition of buildings will reflect an architectural character that enhances the urban neighborhood, streetscapes and pedestrian experience emphasizing a variety of materials textures, forms, colors, and transparencies.
- Varying building typologies will help create a diversity of building forms and urban spaces and serve as a unifying feature for the Tower Mall Redevelopment Area.

Artist Rendering of a Pocket Park

# B

# DESIGN PRINCIPLES

# 1.0 Character Zones

The District organizational structure is defined by a series of character zones that provide a unique set of design prerequisites. Each character zone addresses unique neighborhood attributes and uses as well as massing and scale that are contextual to adjacent uses. The following Character Zones are established for The District:

- **District Gateways**
- **Activity Center**
- **Residential Neighborhood**
- **Innovation Hub**


Figure 4: Map of The Heights District Tower Mall Redevelopment Area

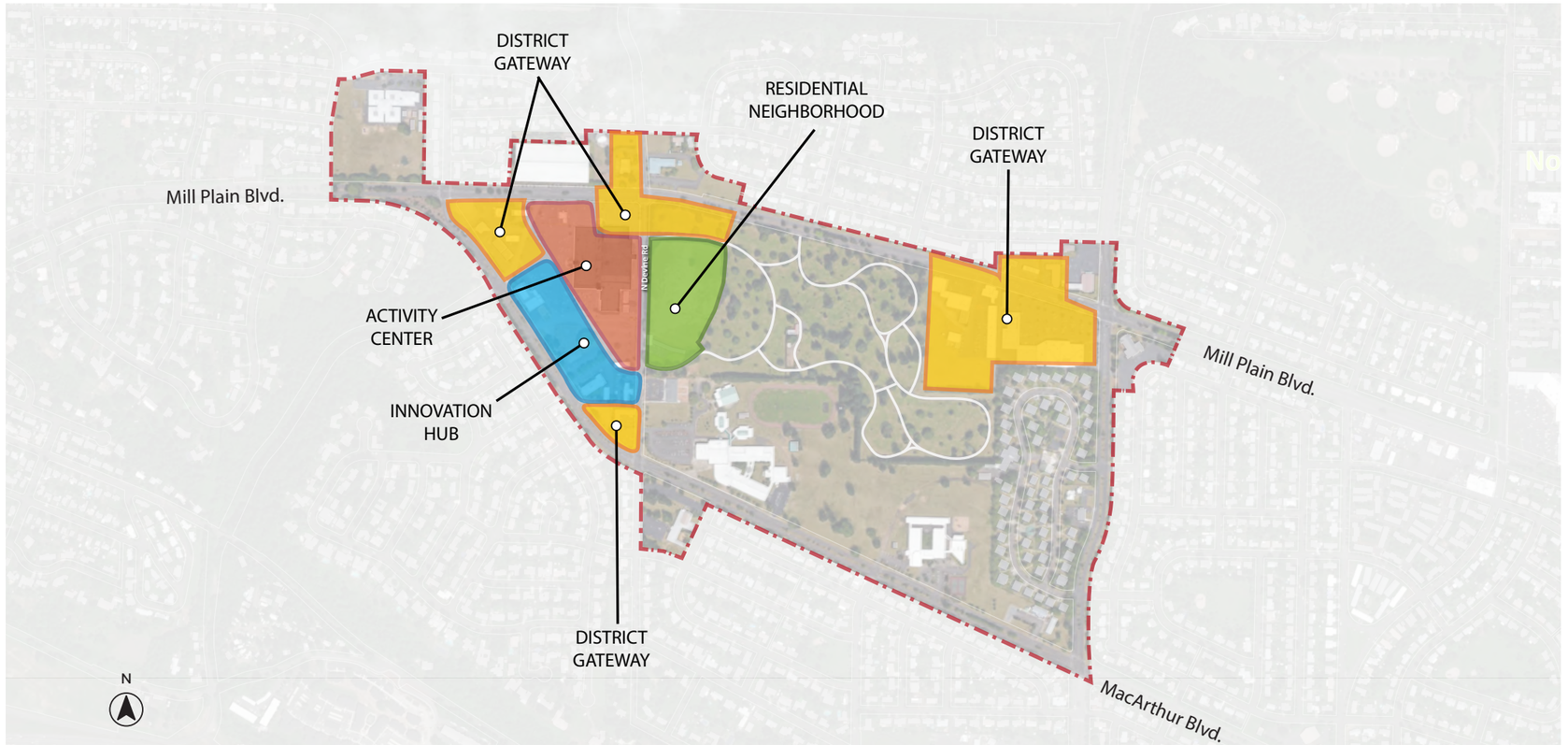



Figure 5: Map of The Heights District Character Zones

## DISTRICT GATEWAYS

**DISTRICT GATEWAYS** serve as entries to The District and are delineated with varying architectural scales that respond to both The District and surrounding residential neighborhoods. The urban form at these Gateways should celebrate the physical corner sites while respecting the scale and context of adjacent uses.

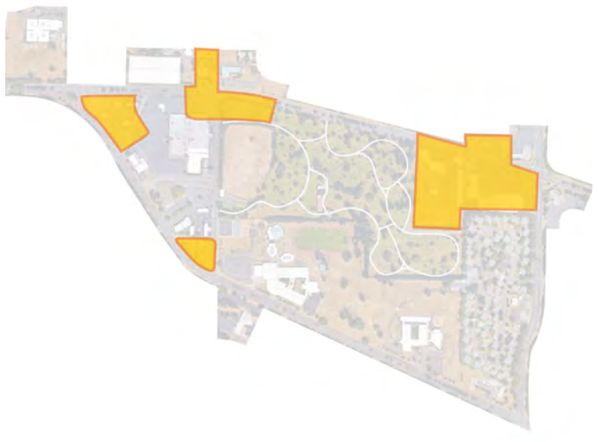


Figure 6: Key Map Showing District Gateways in The District

## ACTIVITY CENTER

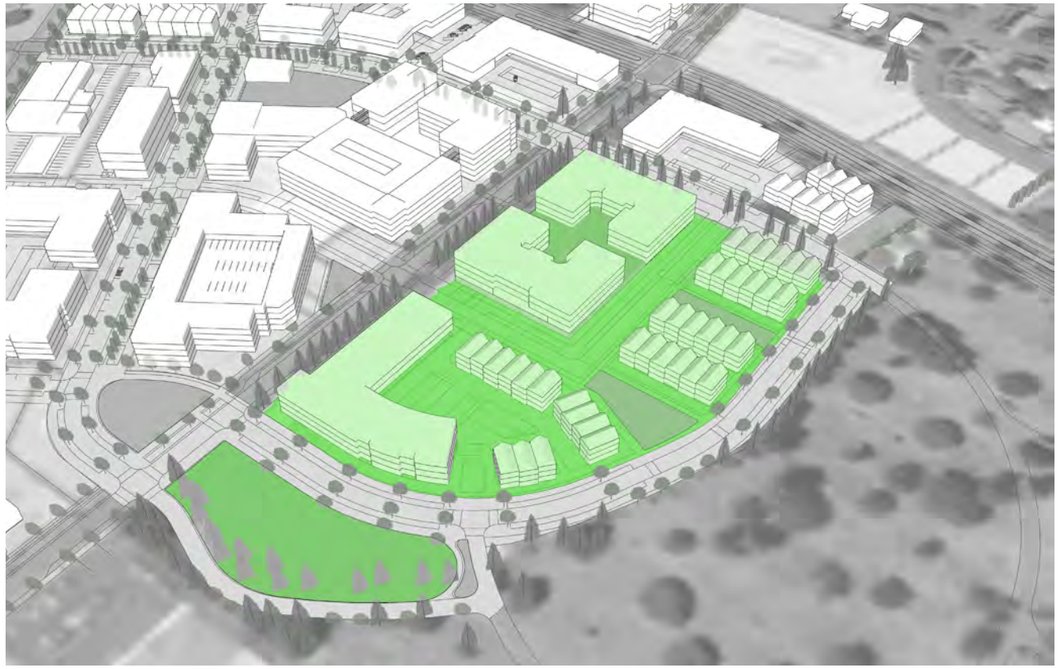
**ACTIVITY CENTER** is the 'Heart' of The District and includes a diversity of uses with taller, higher-density buildings, active streets, and quality of materiality and amenities..

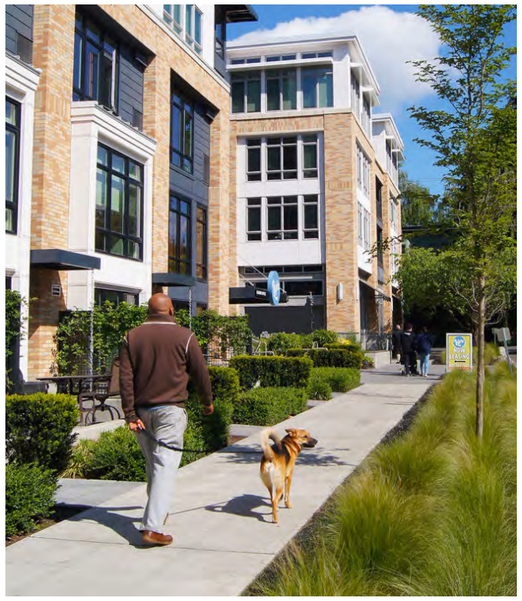
Figure 7: Key Map Showing Activity Center in The District

## RESIDENTIAL NEIGHBORHOOD

**RESIDENTIAL NEIGHBORHOOD** includes lower scale townhomes, office, family housing, quiet streets and street end parks, with informal walking paths and views to open space and the Park Hill Cemetery.

Figure 8: Key Map Showing Residential Neighborhood in The District

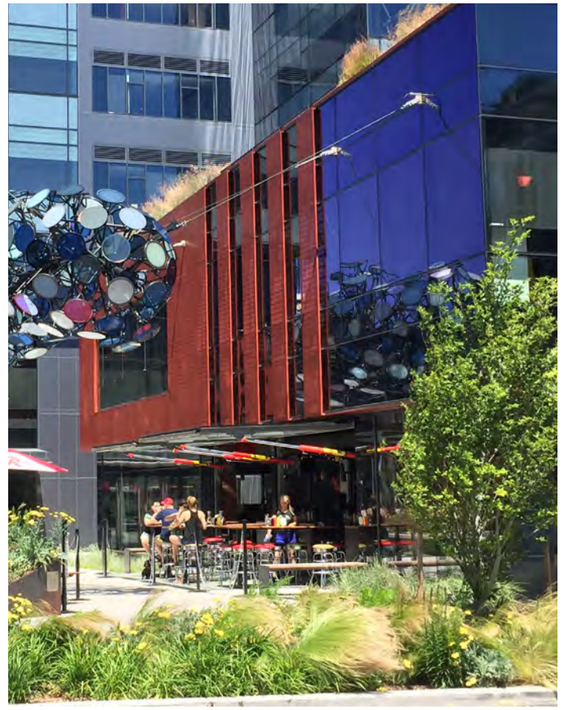




## INNOVATION HUB

**INNOVATION HUB** is likely to be built in the later phases of development and incorporates an eclectic mix of uses and new innovative building types that support flexible makers spaces, breweries, health supportive services, office/employment and residential uses. The scale of development is moderate and compliments adjacent uses and the proposed tree-lined MacArthur Boulevard Greenbelt.

Figure 9: Key Map Showing Innovation Hub in The District



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# 2.0 Public Realm

## 2.1 Streets & Blocks

**01. Principle Street System**

Emphasize a safe, well-connected multi-modal and pedestrian-oriented environment on all designated principle streets throughout The District.

**02. Internal Streets**

Design internal streets within the Redevelopment Area to provide a safe, multi-modal function consistent with the character and context of adjacent uses. (refer to Figure 11: Internal Street Diagram).

**03. Blocks**

Establish a maximum block length throughout the Redevelopment Area to encourage a compact,walkable and safe environment.

Public Safety of Streets with Traffic Calming

**04. Streetscapes**

Provide a comprehensively designed, safe, accessible, and enjoyable pedestrian environment that integrates materials and art forms that are well-designed and references cultural and historic uses where possible. Encourage the inclusion of sustainable features such as; rain gardens and bioswales, and provide urban amenities that promote public use and create engaging and visually interesting streetscapes, such as seating, planter boxes, vegetation, lighting, and public art.

**05. Sidewalks**

Provide a safe, well-connected and pedestrian-oriented environment that includes sidewalks and pathways throughout The District.

**06. Traffic Calming**

Create a safe, comfortable neighborhood that balances the needs of pedestrians, bicyclists, and vehicles alike.

Figure 10: Artist Rendering The Loop: Redevelopment Area Activity Center

Activated Streets with Retails

Streetscape Amenities - Seating, Vegetations, etc.

## INTERNAL STREETS

A series of internal street types are identified for the Redevelopment Area. Each street is designed to provide a safe, multi-modal function consistent with the character, scale and context of adjacent uses. Activating features such as outdoor restaurant seating, patios, storefronts, entrances to residential buildings and publicly accessible plazas are key to the internal street network. All street types are intended to support on-street parking and shared bicycle facilities with sharrow pavement markings as needed.

Figure 11: Internal Street Diagram identifies individual street types. Additional information on street type cross-sections are provided in The Heights District Plan.

- The Loop Retail Street
- The Loop Residential Street
- The Loop Festival Street
- Standard Street
- Internal Street With Angled Parking


Figure 11: Internal Street Diagram

## THE LOOP

**01. Design Integration**

Establish a unique and accessible environment that embraces walkability, health and well-being, active uses and engaging streets and buildings. The ¾-mile Loop features a consistent design quality with variation in scale and form to represent the unique qualities of each character zone: District Gateways, Activity Center, Residential Neighborhood and Innovation Hub.

**02. Quality Finish Materials**

Utilize design and finish materials that exemplify high quality design, pedestrian safety and comfort, and universal design best practices.

**03. Connections**

Serve as a unifying design element aimed at linking individual character zones and blocks within the Redevelopment Area. The Loop shall serve as a pedestrian corridor, but will be designed to accommodate vehicle and emergency vehicle access.

**04. Access**

Accommodate varying design features such as; seating, public art, bicycle parking and landscaping to accommodate adjacent uses and support the character zone and scale. Residential buildings fronting The Loop may include elevated stoops and entry plantings with building frontage facing the sidewalk.

**05. Amenities**

Concentrate The Loop Retail Street in the Activity Center to support retail uses, wider sidewalks, outdoor café seating, festival lighting, special paving, street trees and interpretive art.

Example of The Loop amenities


Figure 12: The Loop - Redevelopment Area Plan

## 2.2 Parks & Open Spaces

**01. Diversity**

Design public spaces to be welcoming to all of Vancouver's diverse population. Designs shall not reflect the specific interests or serve the specific needs of a limited demographic.

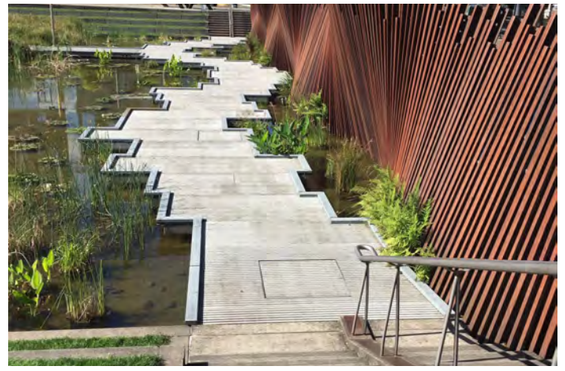
**02. Privatization**

Design public spaces, particularly plazas and connections through blocks, to reflect their intended public use and accessibility. Avoid designs, configurations, and layouts that project an image of privatization.

**03. Playful Design & Active Uses**

Encourage whimsical and fun elements that are welcoming to users of all ages and demographics. Public spaces, including parks, plazas, and portions of primary active alleyways shall be framed by active uses such as markets and retail or commercial activity.


Figure 10: Public Realm and Open Space Diagram



Connection of Open Space

Placemaking Context

**04. Design Integration**

Design public spaces, supporting amenities, and artwork to pursue civic forms within the Activity Center and natural, organic and fluid forms within the Residential Neighborhood Zones.

**05. Context Design**

Frame public spaces, parks, and open spaces with activating adjacent uses and functions such as building facades and entries, commercial retail activities and transition areas.

**06. Amenities**

Incorporate art, lighting, and unique seating features to create dynamic and diverse public spaces. The design shall be high quality and complementary to the surrounding areas.

**07. Public Life**

Create a variety of formal public spaces including plazas, passageways and courtyard spaces. Each space shall integrate appropriate materials to accommodate people and various activities. Plazas shall be designed to create opportunities for seating and gathering with benches, turf lawns, shade trees, and be flexible in design to accommodate multiple purposes.

**08. Property Owner Engagement**

Coordinate with property owners to create dynamic and memorable park spaces that will include amenities, public art, programming for activation and event activity (farmer's market and weekend events).

**09. Food Vendors**

Encourage vendor carts, food trucks, or kiosks within the public civic park area. The design shall be high quality and complementary to the surrounding areas. Vendor cart and kiosk design, hours of operation and associated storage facilities are subject to review and approval.

**10. Durability**

Encourage quality, durable paving materials and features that apply colors and textures to distinguish different functional uses.

**11. Park / Open Space Area**

Parks and open space are intended to be public spaces accessible to the general public. Additional pocket park spaces may be developed as part of private development opportunities.

## CIVIC PARK

**01. Civic Park Location**

Establish and reinforce a healthy and active civic park space at the center of the neighborhood that supports a range of activities and events where the greatest mix of uses occurs.

**02. Programming**

Surround civic park with ground-level activated spaces and uses including  gathering areas, interactive play/water features, outdoor seating and public art elements.

**03. Accessibility**

Create the civic park to be a major character-defining element of the neighborhood that is accessible by streets and pedestrian pathways connecting to the Mill Plain BRT, MacArthur Greenbelt and other uses.

**04. Scale & Form**

Design the civic park to be appropriately scaled and contextual to relate to the center of the neighborhood.

Figure 11: Plan of Civic Park


Activation of Park


Playful Area

## NEIGHBORHOOD / POCKET PARKS

**01. Neighborhood / Pocket Park Locations**

Fully integrate a variety of smaller-scale neighborhood and pocket parks to serve as local amenity spaces and support The District's focus on health and well-being.

**02. Programming**

Program neighborhood and pocket parks to accommodate age-appropriate play areas, outdoor seating, landscaping and public art elements.

**03. Incentive**

Consider incentives to locate neighborhood and pocket parks within private development blocks to provide developers greater flexibility. Incentives may have low-to-moderate direct impact on the general public while creating a positive amenity in the form of parks and plaza spaces.

**04. Scale & Context**

Design neighborhood and pocket parks to be appropriately scaled and contextual to relate to adjacent uses.

**05. Safety & Security**

Design parks and plazas that are accessible to all and are well-lit to meet Crime Prevention Through Environmental Design (CPTED) standards.


Figure 12: Plan of Neighborhood Park

Figure 13: Location of Pocket Parks

Scale of Pocket/Neighborhood Park

Pocket Park

## 2.3 Public & Private Transitions

**01. Public-Private Transitions**

Include elements that provide transitional space between the public and private realms at residential ground floor entrances, such as; landscaped spaces, low walls, stoops, porches, or recessed entries.

**02. Side Yard Setback**

Provide a sensitive interface with adjacent properties to minimize overlook and, where appropriate, create a private connection from the front to rear of the property for residential uses.

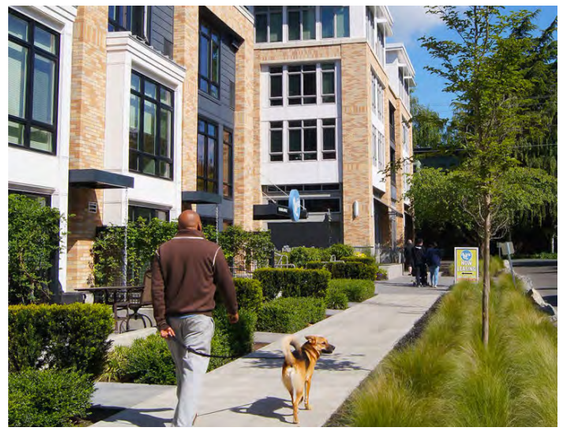
**03. Security**

Encourage ground level residential uses to locate private terrace, garden or patio spaces in the ground level setback zone and adjacent to the public sidewalk to ensure adequate separation from the ground floor unit and the pedestrian way.

**04. Proportionality & Circulation**

Design public sidewalk areas to represent proportional space for landscape and circulation areas and public-private transitions.

Semi-private space of residential area



Semi-private space of residential area

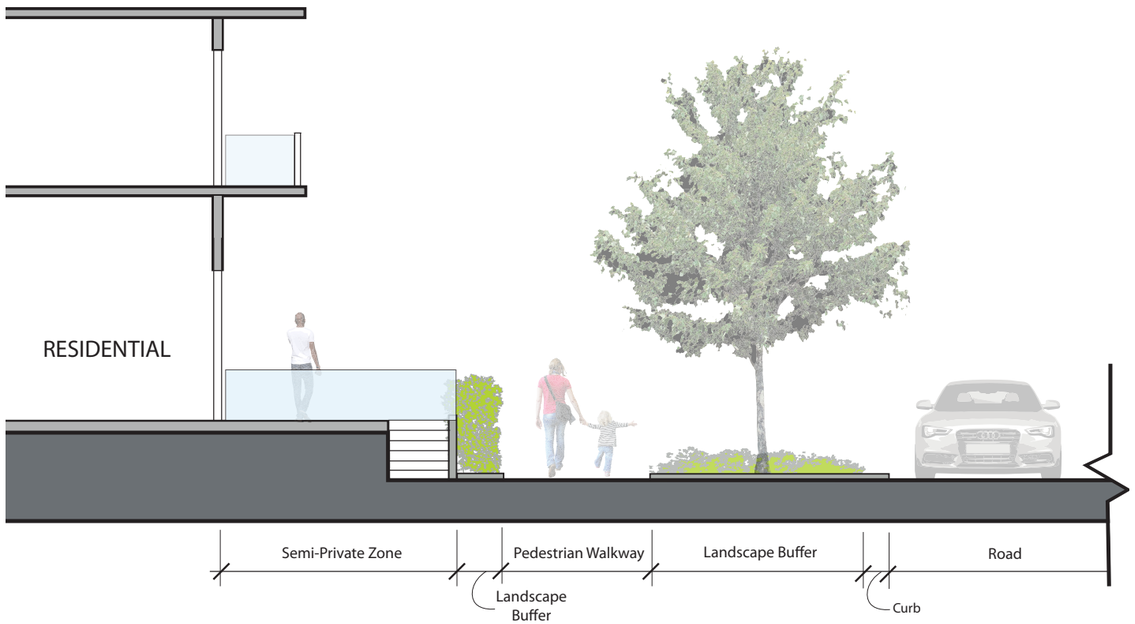



Figure 14: Ground and Upper Levels Setback Diagram - Residential Building

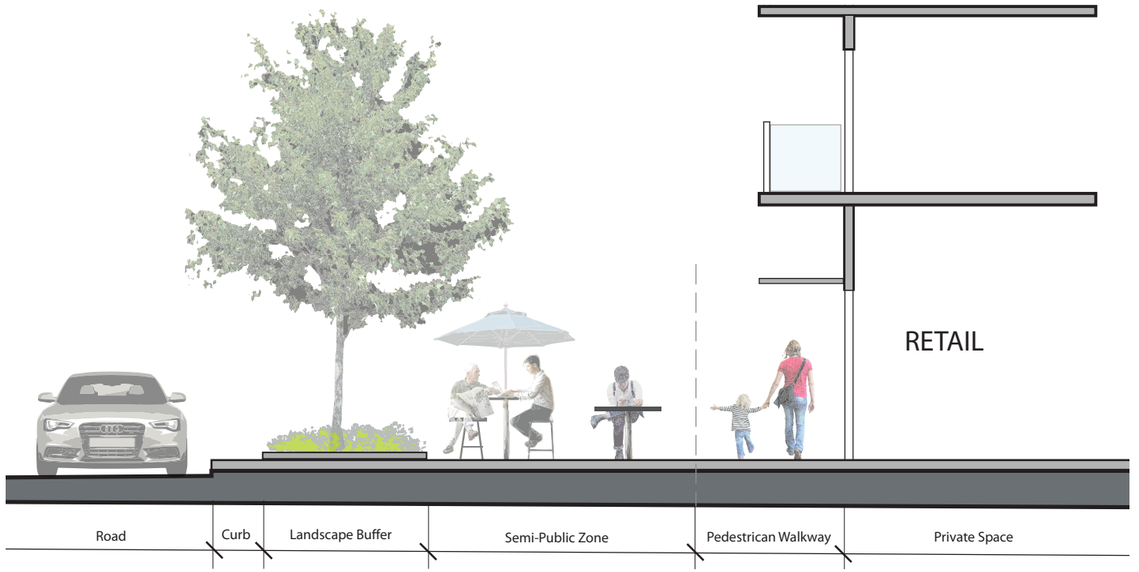



Figure 15: The Loop Retail Street  Diagram

## 2.4 Landscape Design

**01. Outdoor Experience**

Define and enhance the outdoor experience and environment through landscape materials and design. Landscape design incorporates low-impact development strategies, such as vegetated roofs, permeable pavement, and bioretention cells (rain gardens), where feasible. Outdoor seating areas are encouraged to be oriented toward the south and west and to optimize views.

**02. Planting**

Apply preferred native and/or adaptive plant species as a primary resource for all at-grade planting areas. Landscape planting design shall meet project intent while responding to The District's proximity to surrounding natural areas. Development shall comply with the City's Tree, Vegetation, and Soil Conservation ordinance (VMC 20.770), including the protection and preservation of heritage trees consistent with VMC 20.770.12. In all public spaces, plants listed on the City's noxious and invasive plant list are not allowed.

**03. Tree Canopy Achievement Program**

Establish minimum standards for The District to be consistent with the City of Vancouver Tree Canopy Achievement Program (TreeCAP).

**04. Green Infrastructure**

Ensure green Infrastructure elements, such as rain gardens, cisterns, permeable pavements and bioretention, are visible to the public when possible. These facilities shall encourage educational opportunities and provide an understanding and awareness of environmental systems.

Water Retention Landscape Design

**05. Quality Materials**

Incorporate high quality, pedestrian scale materials at the ground plane and in site amenities to define the pedestrian realm destinations, changes in use, and circulation patterns. Site furniture and materials shall fit into the architectural character of the surrounding landscapes. Corner parcel developments shall consider creating public spaces that blend with the right-of-way space and encourage pedestrian flow and social interaction.

**06. Crime Prevention**

Incorporate Crime Prevention Through Environmental Design (CPTED) best practices in landscape design and location planting with respect to views, prospect-refuge, and access points in all public open spaces.

**07. Vegetative Roofs**

Encourage vegetative roofs aimed to mitigate stormwater run-off and create roof top amenity spaces.

**08. Street Trees**

Utilize open planting beds designed for street trees and stormwater conveyance where possible. Street tree grates shall be provided where high pedestrian activity and/or on-street parking is present; otherwise, under-canopy planting is encouraged. Street plantings shall be designed and maintained to enhance view corridors and provide a level of safety and security for pedestrians.

Vegetative Stormwater System

Stepped-back Planter

# 3.0 Architecture

## 3.1 Building Typologies

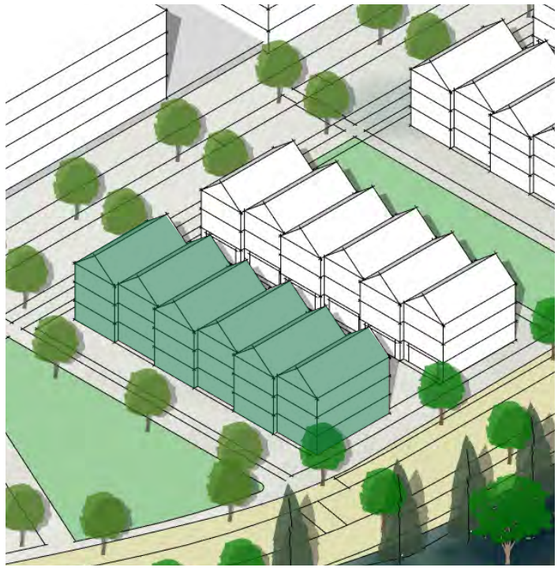
The District represents a diverse range of building types that contribute to the overall character, placemaking and experience of users. Each typology reflects unique design elements to express individual building types.

### CIVIC, INSTITUTIONAL, RELIGIOUS

- Civic or institutional uses on predominant floors
- Wide variety of architectural styles
- Building frontage responds to public access and public realm
- Building expresses a singular and cohesive architectural concept

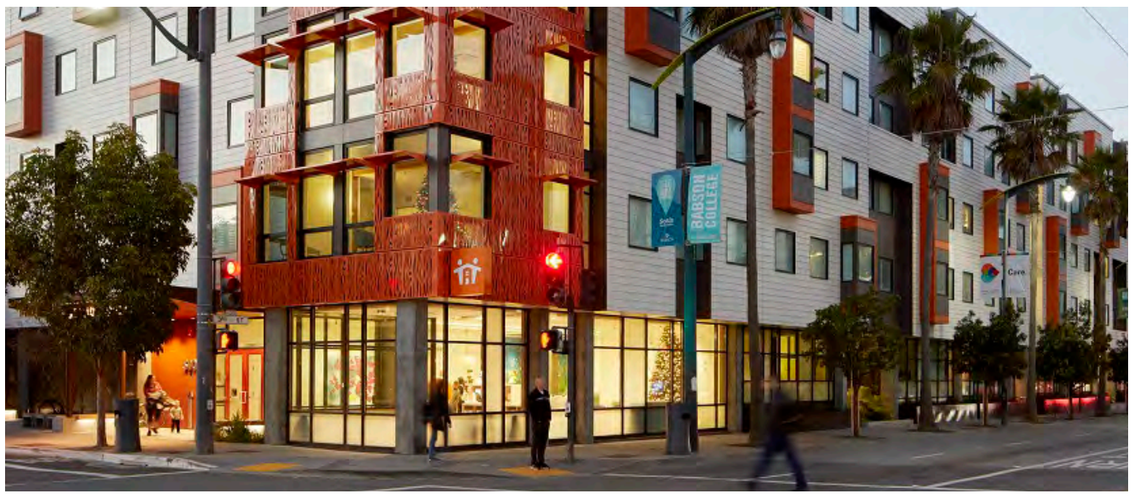
## MULTI-FAMILY TOWNHOUSE

- Residential uses on each floor
- Diversity of architectural styles
- Variation in ground floor facades
- Alleyway garage or tuck-under parking
- Durable, high quality materials



## MIXED-USE RESIDENTIAL

- Active ground plane with semi-private terrace, garden, stoop or entry
- Residential uses on each floor above ground floor
- Building frontage responds to public access areas and public realm
- Diversity of architectural styles




## MIXED-USE COMMERCIAL

- Predominantly commercial uses on upper floors
- Active ground plane with retail, entry lobbies, civic, institutional or other public uses
- Building frontage responds to public access areas and public realm. Commercial uses are expressed on façade
- Primary entries are legible and facing principle streets


## 3.2 Architectural Design Elements

**01. Massing & Scales**

Provide for an appropriate building massing and scale consistent with the vision and in context with existing neighborhoods and uses in the area. A variety of building volumes to break down the visual appearance of taller structures and building mass. For example, taller buildings with perceived greater massing shall be located in the core Activity Center. Buildings shall step down in scale and height from the core area to the perimeter of the Redevelopment Area.

**02. Modulation & Facade Articulations**

Promote a balance of interest and functional design through building facades and architectural concepts that are human-scale and appropriately responds to the street and building context. Expression of different uses (retail, office and residential) within the building may provide opportunities to break up potentially monolithic building form.

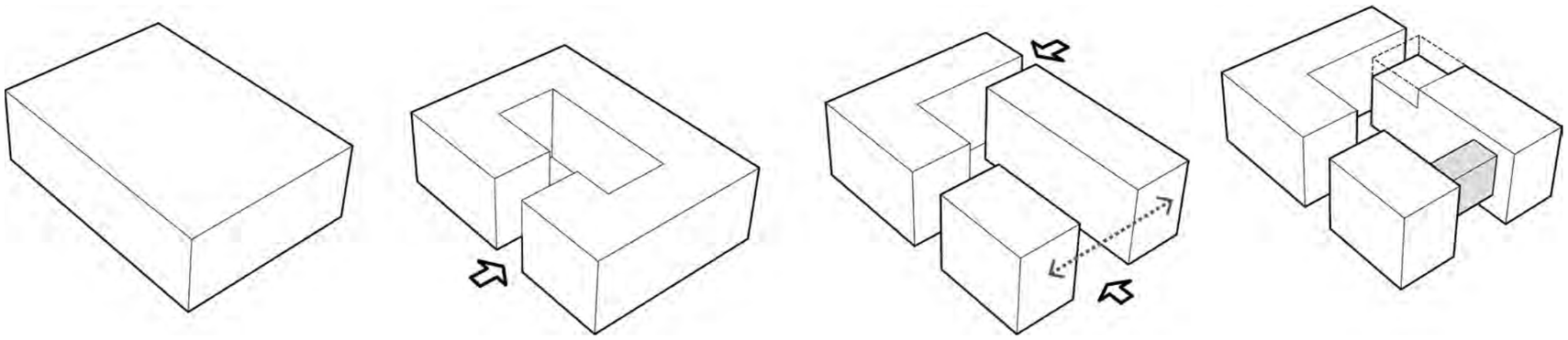


Figure 16: Building Massing Typology

**03. Setbacks**

Reduce the perceived mass of a building through ground level and upper level setbacks to create consistency in buildings across the block face.

**04. Roof forms**

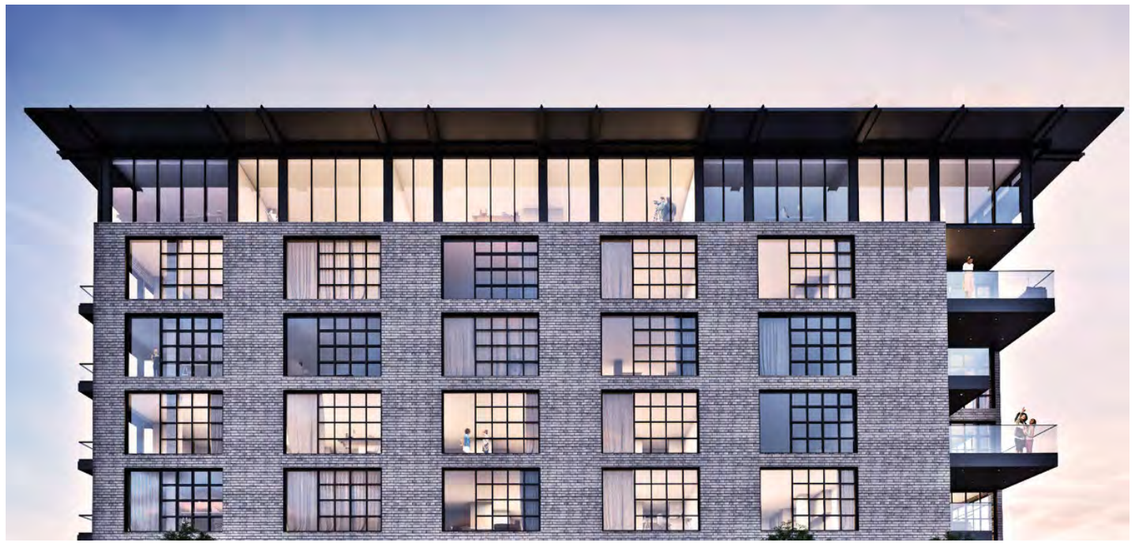
Encourage a variety of roof forms to achieve a diversity of architectural expression. Green roofs are encouraged when the roofscape will be visible to nearby buildings.

**05. Building Facade Materials**

Encourage building material and details such as material transitions, soffits, overhangs, exterior architectural features, ventilation systems, solar shades, awnings connections and material that articulate quality construction techniques and longevity. Stipulate the use of high quality, durable, urban materials and integrated design details, particularly in the pedestrian environment.

**06. Transparency**

Encourage ground level facade transparency on buildings along retail-oriented streets. Main entrances shall be easily identifiable through the use of building articulation and modulation.



Flat Roof with Deep Overhang

## 3.3 Building Material & Color

**01. Use of Color**

Provide guidance for a range of color choices to be applied on architectural facades in order to create visibly pleasing and cohesive expressions in the built environment.

**02. Prohibited Materials**

Prohibit the following exterior building materials: plastic laminates, glossy or large expanses of acrylic or Plexiglas, pegboard, mirror, highly polished or plated metals (except as trim), mirrored glass, fabric or paper wall coverings, plywood or particle board, sheet or modular vinyl, shingles, shakes and horizontal lap siding.

**03. Ground Level Facades**

Incorporate a deeper, finer grain, and high quality range of materials as part of ground level facades. Quality materials shall be considered equally for all building elevations

**04. Window Details**

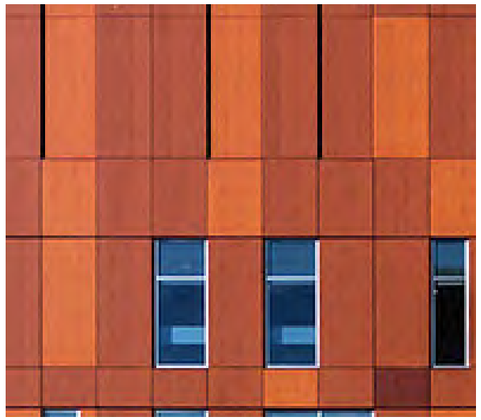
Encourage high-quality windows designed to maximize energy efficiencies and daylighting into the buildings, with consideration of either dark color or non-vinyl window systems in residential applications.

**05. Harmony**

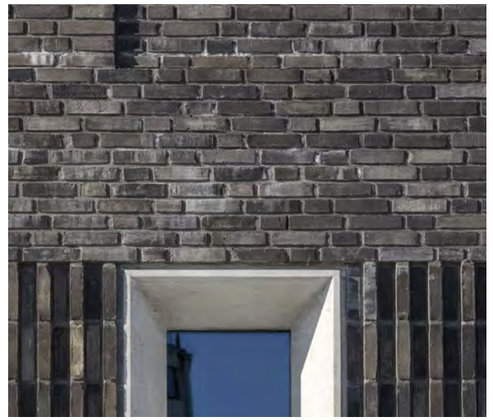
Provide guidance for a range of color choices to be applied on architectural facades in order to create visibly pleasing and cohesive expressions in the built environment. A harmonious range of color shall be used as part of the building exterior. Neon or bright colors, having the effect of unreasonably setting the building apart from others on the street, shall not be used.

**06. Accent Colors**

Encouraged accent colors to avoid overly bland or homogeneous building color palettes. Color may be used to accentuate and create contrast in the architectural massing and modulation. Bright colors shall generally only be used for trim or accent building features. Bright colors may be approved if the use is consistent with the building design intent or other design requirements.

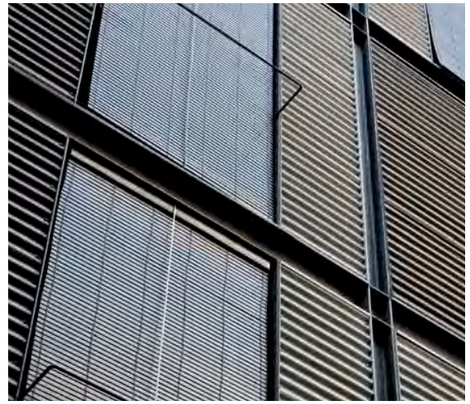


Corten Steel



Color of Brick

Steel and Glass/Curtain Wall Combination



Corrugated Metal

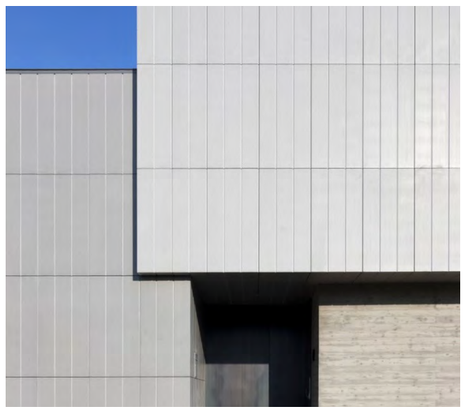
Concrete

Stone

Random Pattern of Corrugated Metal

Combination of Diverse Materials

Combination of Diverse Materials



Combination of Diverse Materials

# 4.0 SUSTAINABILITY

## 4.1 Overview

### SUSTAINABLE TRANSPORT

The District is well suited to become a hub of sustainable transportation. The proposed expansion of the Mill Plain BRT, coupled with a new street grid with local streets, alleys with addresses, festival streets and pedestrian paths encourages walkability in a neighborhood historically dominated by cars. The vision for Mill Plain Blvd. as a grand boulevard with pedestrian-friendly sidewalks and bike lanes, as well as the BRT will encourage people moving through and within The District to choose walking and biking over driving.

### HABITAT RESTORATION

The District vision recognizes the value of natural habitat corridors in the area as assets and encourages the preservation, restoration and enhancement of these corridors for future generations.

### GREEN INFRASTRUCTURE

As streets and infrastructures are redesigned and development occurs in line with The Heights District Vision and Design Principles, significant strides will be made towards expansion of green infrastructure systems throughout the neighborhood. The urban canopy will grow as trees are planted both in the public rights-of-way planting zones, in public parks and plazas and in private developments. In addition to trees in the planting zones, bioswales for stormwater management will be provided to support The Loop and the MacArthur Blvd. Greenbelt. Other mitigation strategies will be considered along new local and low-capacity streets.

## 4.2 Enhanced Stormwater Management Systems

**01. Integrated Stormwater Management Systems**

Incorporate stormwater conveyance systems as a design element in order to manage and direct stormwater runoff while creating an opportunity to integrate public space amenities as part of the sustainable site management approach.

**02. System Design**

Design stormwater infrastructure as a complete system connecting buildings, sites, parcels and blocks as an interconnected system. The Loop feature is a key stormwater management infrastructure that shall be connected to the MacArthur Blvd. Greenbelt.

**03. Sustainable Plant Materials**

Select plant materials conducive to periods of high-water levels, as well as prolonged periods of drought shall be utilized to mitigate varying seasonal conditions.

**04. The Loop**

Incorporate park-like amenities including but not limited to low-impact stormwater systems, bioswales and vegetation (trees and understory plantings) appropriate for stormwater systems.

**05. Natural Areas**

Consider maintenance and restoration of natural areas and open spaces as part of the overall stormwater management approach.

**06. Building Systems**

Consider stormwater management strategies in building design, such as roof top gardens and cisterns, to help mitigate and slow down water run-off during storm events.

Integrated Stormwater Management Systems

Stormwater Management in the Sidewalk

## 4.3 Sustainable Site and Development Design

**01. Sustainable Design & Environmental Design**

Incorporate sustainable design concepts as integral components to the site, and integrate ecological landscape elements in site designs. Building orientation shall take advantage of solar exposure and natural ventilation when possible. Maximize daylight for interior and exterior spaces while controlling solar heat gain.

**02. Sustainability Policy Framework**

Adopt a sustainability policy framework for The Heights District that may include, among other strategies, that all new public use structures in the Redevelopment Area shall achieve LEED Certification or similar equivalent standard.

**03. Fitwel Certification Pilot Program**

Establish appropriate strategies and targets for The Heights District as a national Fitwel pilot project.

**04. Low Impact Development**

Incorporate low-impact development strategies, such as vegetated roofs, permeable pavement and rain gardens, where feasible.

**05. EV / App-Based Infrastructure**

Include Electric Vehicle (EV) Infrastructure within parking lots and parking structures and provide for drop-off and delivery zones as required.

**06. Lighting Design Approach**

Provide an energy optimized District-wide and site lighting system designed based on user safety and energy efficiencies. Pedestrian scale poles, bollards, pathway lights and architecturally integrated fixtures such as catenary supported fixtures or wall sconces shall meet acceptable energy efficiency standards.

# 5.0 ADDITIONAL CONSIDERATIONS

## 5.1 Parking

**01. Parking Strategy**

Provide a dispersed, shared parking strategy through a combination of surface, at-grade, podium and above-grade mixed-use parking structures that meet the demand of residents, visitors, and employees.

**02. Parking Structures**

Prohibit standalone parking structures. All structured parking shall be accessory to and integrated into a block and building envelop and will support multiple permitted uses in The District.

**03. Change of Use**

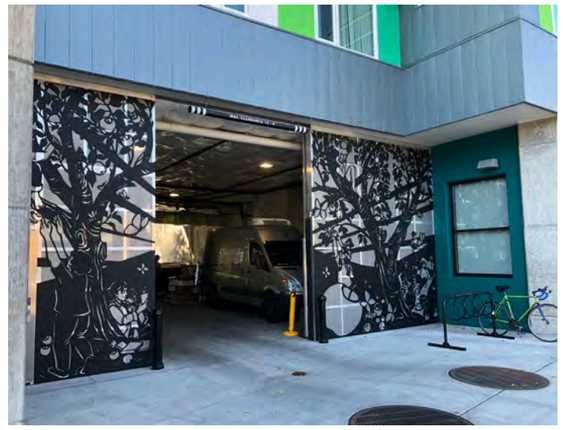
Retain existing surface parking lots until they are replaced by development of the parcels. New surface parking lots shall meet City development standards as required.

**04. Parking Access**

Provide access to structured parking only from alleys or side streets. Access to structured parking is anticipated to be from designated secondary streets consistent with the City of Vancouver standards or approved road modifications.

Bicycle Parking Structures

Bicycle Parking Structures



Decorative Screening of Garage Facade

**05. Parking Screening**

Screen any above grade parking from public view and leverage screening to enhance building design through the use of art, green walls and innovative building materials. Semi subterranean parking shall be screened along all sides with the exception of entrances and exits. Separate openings for ventilation shall be screened with landscape planting and /or metal mesh screens.

**06. Bicycle Parking**

Provide for long and short-term bicycle parking that meets the demand of residents, visitors and employees and encourages use of bicycles to access The District. Long-term bicycle parking shall be provided in an accessible and safe location that is convenient to building occupants. Signage shall be provided where the location is not clearly evident from public ways providing access to the building. Short-term bicycle parking shall be positioned in visible areas with appropriate lighting. Bicycle parking shall be provided consistent with the City of Vancouver Bicycle Parking Standards and Guidelines.

**07. Integration of Public Art**

Implement creative bike parking solutions that balance form and function, while providing opportunities to integrate public art.

## 5.2 Utilities and Screening

**01. Utility Locations**

Screen utilities away from highly visible areas and incorporate these elements into the building architecture. Utilities shall be located away from primary streets and pedestrian sidewalks and located on alleys or from secondary streets where ever possible. Utilities shall be located below grade in vaults or inside buildings where possible.

**02. Mechanical Systems**

Locate utilities below grade in vaults or inside buildings where possible. Utilities may be incorporated into landscape areas for screening while allowing clearance from any trees or large shrubs.

**03. Venting System**

Ensure venting of air exhaust and mechanical building systems is away from primary streets and main pedestrian areas, and incorporated architecturally into buildings.

**04. Wall-Mounted Utilities**

Design street and sidewalk fixtures to limit upward light and light pollution. Utilities mounted on building walls shall not intrude on the public right of way space adjacent to a pedestrian path of travel, shall be setback, or have a landscape zone for a buffer.

**05. Rooftop Mechanical Systems**

Screen rooftop mechanical equipment to mitigate views from adjacent buildings and ground level views from public spaces (streets and parks).


Building Screening

Utility Locations

## 5.3 Lighting & Public Art

**01. Lighting Safety**

Create a safe and comfortable night-time environment for The Heights District by providing street and urban path lighting consistent with the street lighting standards established for the City of Vancouver.

**02. Lighting Scale**

Incorporate light poles and fixtures for public streets that respond to the scale of the street right of way. Collector street lighting has different output requirements than for local streets and alleys. Major gateways shall have appropriately designed lighting to illuminate features during evening hours. Street light pole types and fixtures shall be consistent for the entire length of the street. All building mounted or façade lighting (in-grade, mounted, and entry lighting) shall be selected for scale, finish, light output, efficiency and architectural compatibility.

**03. Value of Public Art**

Create a vibrant neighborhood through the integration of art and involvement of artists throughout the built environment as an expression of the cultural, historic, social, and environmental values of The District.

**04. Artist Diversity**

Encourage a diversity of local, regional and national artists to engage in the implementation of artwork. Engage the school district and youth in defining the vision for art in The Heights.

Public Art & Lighting

Public Art - Design Festival

## 5.4 Wayfinding & Signage

**01. Legibility**

Provide a cohesive and intuitive system of signage, wayfinding, and branding. Clear and identifiable wayfinding shall be incorporated into urban design, streetscapes, and public space designs. All wayfinding shall be accessible to people of all abilities.

**02. Code Compliance**

Ensure all signage complies with the provisions of **Title 20 Land Use and Development Code** for sign location and size restrictions. Free-standing sidewalk signs and monument signs intended to advertise uses within the development are prohibited. Kiosk, wayfinding, and interpretive signage intended to promote a comprehensive District placemaking strategy shall be allowed upon review from the City.

**03. Master Sign Programs**

Develop a comprehensive District Wayfinding and Signage Program or Master Development Signage Program (MSP) to address the design of temporary and permanent signage for The District and individual buildings.

**04. Durability**

Incorporate signage that is constructed of high quality, durable materials and follow the design aesthetic as outlined by The District Wayfinding Program. Reclaimed materials shall be prominently used throughout the signage program.


Wayfinding on Trail


Building Entry Signage

APPENDIX E

# ARCHAEOLOGICAL AND HISTORIC RESOURCES REPORT

CITY OF Vancouver WASHINGTON

Archaeological and Historic Resources Report
*Document available upon request*

APPENDIX F

# TRAFFIC IMPACT ANALYSIS

CITY OF Vancouver WASHINGTON

# Memo

| | |
|---|---|
| Date: | Friday, August 30, 2019 |
| Project: | The Heights District Plan |
| To: | Keith Walzak, VIA and Mark Sindell, GGLO |
| From: | Jeremy Jackson and Tom Shook, HDR |
| Subject: | Traffic Impact Analysis Memorandum |

## Introduction

The purpose of this memo is to summarize the existing and future traffic analysis performed within The Heights District Plan area. The traffic impact analysis for the Redevelopment area will support the multi-modal transportation analysis, alternatives development, Draft Environmental Impact Statement, and inform transportation needs for the District Plan.

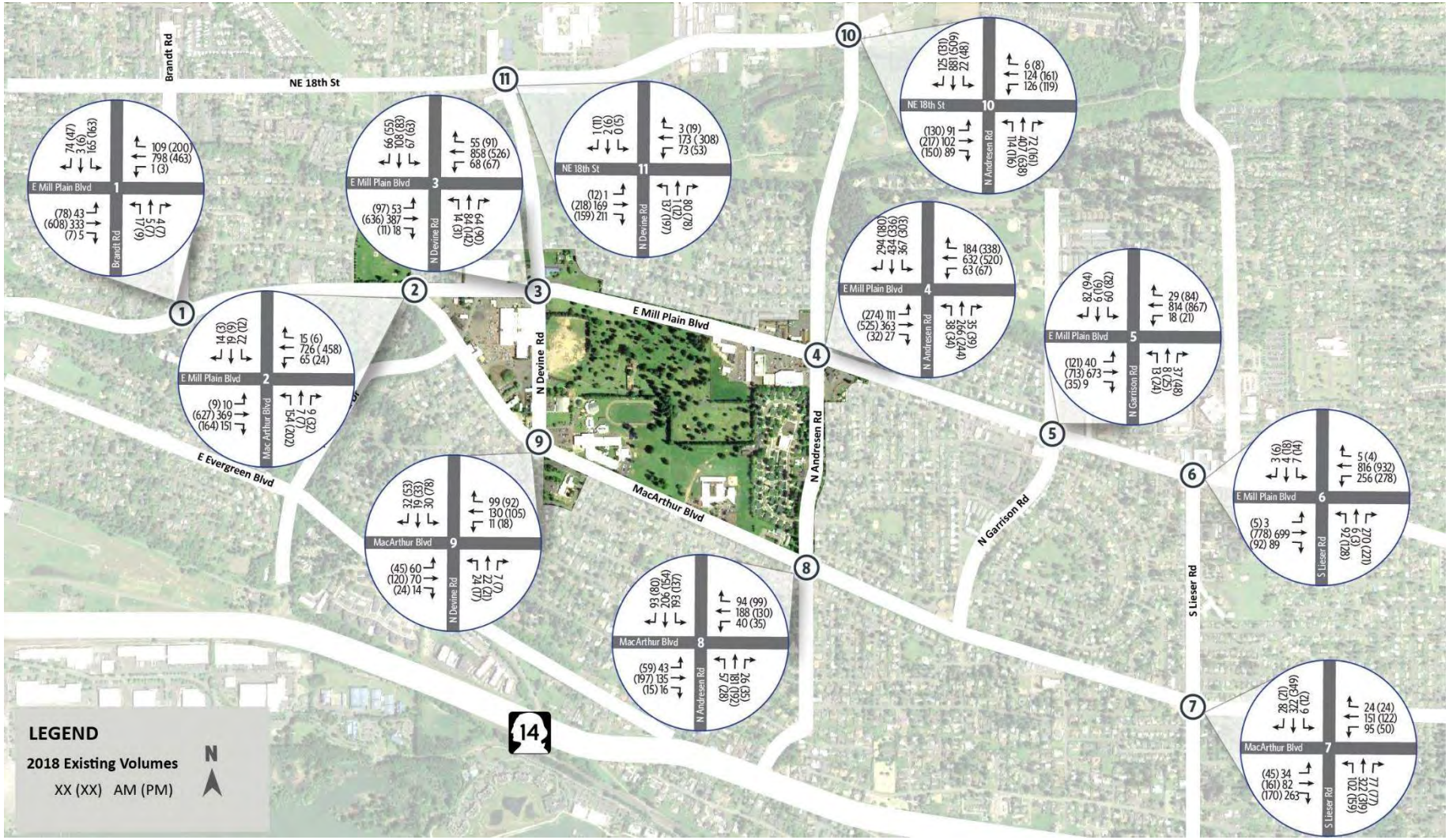
## Traffic Data Collection

Weekday, 3-hour AM (7:00 AM to 10:00 AM) and 4-hour PM (2:00 PM to 6:00 PM) peak period turning movement counts were collected in early June 2018 at the following intersections:

1. E Mill Plain Boulevard at Brandt Road/Rhododendron Drive
2. E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue
3. E Mill Plain Boulevard at N Devine Road
4. E Mill Plain Boulevard at N Andresen Road
5. E Mill Plain Boulevard at Garrison Road
6. E Mill Plain Boulevard at N Lieser Road
7. MacArthur Boulevard at N Lieser Road & St Helens Avenue
8. MacArthur Boulevard at N Andresen Road
9. MacArthur Boulevard at N Devine Road
10. N Andresen Road at NE 18th Street
11. N Devine Road at E 18th Street

Turning movement counts were collected before area schools were out for the season and included a 15-minute breakdown of pedestrians, bicyclists, passenger vehicles, and heavy vehicles. Data collection also consisted of obtaining existing signal timing from the City. The existing AM and PM peak hour volumes used for analysis are shown below in Figure 1.

**Figure 1. Existing 2018 Peak Hour Volumes**



# Peak Hour Determination

The existing AM peak for most of the study area intersections was determined to be 7:45 AM to 8:45 AM. During the PM period, however, the peak hour varied significantly. As noted in the data collection, traffic volumes were collected between 2:00 PM and 6:00 PM to account for traffic near the local area schools. Because multiple intersections were heavily influenced by school traffic, it was determined that the individual PM peak hour for each intersection would be used. The peak hours used for analysis at each intersection are show below in Table 1.

**Table 1. Intersection Peak Hours**

| Intersection | AM Peak | PM Peak |
|---|---|---|
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 7:45 – 8:45 | 3:00 – 4:00 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 7:45 – 8:45 | 3:00 – 4:00 |
| E Mill Plain Boulevard at N Devine Road | 7:45 – 8:45 | 3:30 – 4:30 |
| E Mill Plain Boulevard at N Andresen Road | 7:45 – 8:45 | 4:30 – 5:30 |
| E Mill Plain Boulevard at Garrison Road | 7:45 – 8:45 | 4:45 – 5:45 |
| E Mill Plain Boulevard at N Lieser Road | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue | 7:45 – 8:45 | 4:45 – 5:45 |
| MacArthur Boulevard at N Andresen Road | 7:45 – 8:45 | 2:45 – 3:45 |
| MacArthur Boulevard at N Devine Road | 7:45 – 8:45 | 3:30 – 4:30 |
| N Andresen Road at NE 18th Street | 7:45 – 8:45 | 4:30 – 5:30 |
| N Devine Road at E 18th Street | 7:45 – 8:45 | 4:00 – 5:00 |

# Existing Conditions Analysis

An existing conditions traffic operations analysis for the project area intersections was performed using Synchro (version 10). The analysis results are based on the Synchro *Intersection: Lanes, Volumes, Timings* reports except for the unsignalized intersections on MacArthur Boulevard at N Lieser Road, N Andresen Road, and Devine Road. For the unsignalized intersections, the Highway Capacity Manual 6th Edition (HCM 6) all-way-stop-control (AWSC) reports were used. A summary of the AM and PM peak hour intersection delay and level-of-service (LOS) is provided in Table 2 and Table 3. A summary of the AM and PM peak hour intersection volume-to-capacity (v/c) ratios is provided in Table 4. Detailed Synchro, HCM, and Queue reports for existing conditions are provided in Attachment A.

As shown below, most project area intersections are operating at LOS D or better except for the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which is operating at LOS F in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E. Multiple intersections are operating over-capacity, with v/c ratios that exceed 1.0; including E Mill Plain Boulevard and N Andresen Road in the AM peak hour and the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection in both the AM and PM peak hours. The E Mill Plain Boulevard and N Lieser Road intersection is operating close to capacity (v/c of 0.96) in the PM peak hour. The E Mill Plain and Garrison Road intersection is also operating at a v/c of 0.99 in the PM peak hour, but this is due to the low volume side street approach.

**Table 2. 2018 Existing Intersection Delay and Level of Service – AM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.4 | A | 9.2 | A | 23.2 | C | 56.0 | E | 16.8 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 6.2 | A | 8.0 | A | 22.8 | C | 12.4 | B | 9.7 | A |
| E Mill Plain Boulevard at N Devine Road | 15.5 | B | 21.1 | C | 36.5 | D | 32.9 | C | 23.1 | C |
| E Mill Plain Boulevard at N Andresen Road | 30.1 | C | 27.0 | C | 36.2 | D | 73.0 | E | 46.7 | D |
| E Mill Plain Boulevard at Garrison Road | 15.3 | B | 9.6 | A | 24.4 | C | 32.5 | C | 14.6 | B |
| E Mill Plain Boulevard at N Lieser Road | 15.1 | B | 20.0 | B | 26.5 | C | 31.1 | C | 19.7 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 109.2 | F | 83.5 | F | 134.4 | F | 106.4 | F | 111.7 | F |
| MacArthur Boulevard at N Andresen Road** | 18.8 | C | 18.8 | C | 16.2 | C | 21.3 | C | 19.3 | C |
| MacArthur Boulevard at N Devine Road** | 10.1 | B | 9.5 | A | 10.2 | B | 10.3 | B | 9.9 | A |
| N Andresen Road at NE 18th Street | 59.5 | E | 67.5 | E | 25.4 | C | 26.5 | C | 35.6 | D |
| N Devine Road at E 18th Street | 10.3 | B | 10.9 | B | 21.1 | C | 20.0 | B | 13.6 | B |

***Unsignalized intersection; intersection results based on HCM 6 AWSC report.*
*Red = Approach or intersection operating at LOS F.*

**Table 3. 2018 Existing Intersection Delay and Level of Service – PM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.2 | A | 4.0 | A | 12.0 | B | 32.4 | C | 10.0 | A |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 12.6 | B | 8.4 | A | 29.1 | C | 12.7 | B | 14.5 | B |
| E Mill Plain Boulevard at N Devine Road | 27.5 | C | 29.8 | C | 29.6 | C | 18.4 | B | 27.7 | C |
| E Mill Plain Boulevard at N Andresen Road | 34.2 | C | 35.1 | D | 61.5 | E | 44.4 | D | 40.3 | D |
| E Mill Plain Boulevard at Garrison Road | 18.5 | B | 10.8 | B | 75.6 | E | 69.0 | E | 23.1 | C |
| E Mill Plain Boulevard at N Lieser Road | 20.7 | C | 28.1 | C | 38.2 | D | 38.8 | D | 27.2 | C |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 43.4 | E | 30.0 | D | 81.5 | F | 57.2 | F | 59.1 | F |
| MacArthur Boulevard at N Andresen Road** | 18.2 | C | 14.0 | B | 14.9 | B | 15.4 | C | 15.7 | C |
| MacArthur Boulevard at N Devine Road** | 11.6 | B | 9.9 | A | 10.4 | B | 13.7 | B | 11.6 | B |
| N Andresen Road at NE 18th Street | 55.1 | E | 83.2 | F | 40.3 | D | 27.1 | C | 45.7 | D |
| N Devine Road at E 18th Street | 14.7 | B | 16.3 | B | 22.9 | C | 21.4 | C | 17.6 | B |

***Unsignalized intersection; intersection results based on HCM 6 AWSC report.*
*Red = Approach or intersection operating at LOS F.*

**Table 4. 2018 Existing Intersection V/C Ratios**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.24 | 0.32 | 0.49 | 0.38 | 0.13 | 0.14 | 0.86 | 0.77 | 0.86 | 0.77 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.18 | 0.33 | 0.43 | 0.28 | 0.62 | 0.77 | 0.23 | 0.11 | 0.62 | 0.77 |
| E Mill Plain Boulevard at N Devine Road | 0.28 | 0.66 | 0.72 | 0.72 | 0.61 | 0.67 | 0.61 | 0.26 | 0.72 | 0.72 |
| E Mill Plain Boulevard at N Andresen Road | 0.59 | 0.77 | 0.68 | 0.60 | 0.51 | 0.75 | 1.20 | 0.78 | 1.20 | 0.78 |
| E Mill Plain Boulevard at Garrison Road | 0.49 | 0.74 | 0.40 | 0.47 | 0.42 | 0.84 | 0.57 | 0.99 | 0.57 | 0.99 |
| E Mill Plain Boulevard at N Lieser Road | 0.48 | 0.54 | 0.86 | 0.96 | 0.75 | 0.81 | 0.11 | 0.23 | 0.86 | 0.96 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 1.21 | 0.89 | 1.10 | 0.68 | 1.32 | 1.09 | 1.18 | 0.96 | 1.32 | 1.09 |
| MacArthur Boulevard at N Andresen Road** | 0.51 | 0.55 | 0.55 | 0.33 | 0.37 | 0.36 | 0.57 | 0.40 | 0.57 | 0.55 |
| MacArthur Boulevard at N Devine Road** | 0.18 | 0.32 | 0.26 | 0.21 | 0.16 | 0.12 | 0.22 | 0.45 | 0.26 | 0.45 |
| N Andresen Road at NE 18th Street | 0.81 | 0.85 | 0.76 | 0.92 | 0.73 | 0.78 | 0.64 | 0.53 | 0.81 | 0.92 |
| N Devine Road at E 18th Street | 0.48 | 0.49 | 0.22 | 0.35 | 0.62 | 0.62 | 0.03 | 0.19 | 0.62 | 0.62 |

***Unsignalized intersection; worst stop-controlled movement used for each approach and overall intersection v/c ratio.*
*Red = Approach or intersection v/c ratio exceeds 1.0*

# Future Year Volume Development

Baseline traffic volume forecasts for the future year 2038 No-Build condition were developed for the project area in coordination with City and Southwest Washington Regional Transportation Council (RTC) staff. Future No-Build volumes were post-processed using the most current existing (2010) and future (2035) RTC travel demand models. The RTC regional travel demand models include population and employment data, as well as current and proposed transportation networks for both existing conditions and the forecast year. The RTC models include background growth but do not include the proposed redevelopment in the Heights District Plan area. PM peak hour volume plots from the RTC models were used to determine annual growth rates for all PM peak hour turning movements at the study area intersections. Growth rates for the AM peak hour were developed using the reciprocal movement method; e.g. the growth rate for the northbound left-turn movement in the PM peak was used for the eastbound right-turn movement in the AM peak. If no growth was reported, or the future RTC model volume was zero, the existing volumes collected in the field were used. The future 2038 No-Build AM and PM peak hour volumes are provided in Figure 2.

# No-Build Alternative Analysis

The No-Build alternative represents future conditions with no redevelopment and only Regional Transportation Plan (RTP) identified improvements. The only improvement assumed for the No-Build alternative is an additional westbound left-turn lane at the E Mill Plain Boulevard and N Lieser Road intersection. The No-Build alternative also includes signal timing optimization along the E Mill Plain Boulevard corridor and at the N Andresen Road at NE 18th Street intersection. Signal timing optimization included utilizing a 110 second cycle length for the AM peak and a 120 second cycle length for the PM peak (or half cycle lengths), as well as adjustments to splits, offsets, and lead/lag phasing for protected left turns. The No-Build alternative traffic operations analysis for the project area intersections was performed using Synchro (version 10). A summary of the AM and PM peak hour intersection delay and LOS is provided in Table 5 and Table 6. A summary of the AM and PM peak hour intersection v/c ratios is provided in Table 7. Detailed Synchro, HCM, and Queue reports for the No-Build condition are provided in Attachment B.

As shown below, most project area intersections are operating at LOS D or better except for the unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which is operating at LOS F in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E or F, including the northbound approach of Garrison Road at E Mill Plain Boulevard in the PM peak hour. The unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection is operating over-capacity (v/c ratio > 1.2) in both the AM and PM peak hours. The E Mill Plain Boulevard and Garrison Road intersection is operating over capacity (v/c ratio of 1.06) in the PM peak, but this is due to the low volume side street approach. The N Andresen Road and NE 18th Street intersection is also operating over capacity in the AM peak (v/c ratio of 1.05) due to the northbound left-turn movement. The E Mill Plain Boulevard and N Andresen Road intersection had a v/c ratio of 1.20 in the existing AM peak hour but has been reduced to 0.90 in the No-Build alternative due to signal timing adjustments.

**Figure 2. No-Build 2038 Peak Hour Volumes**

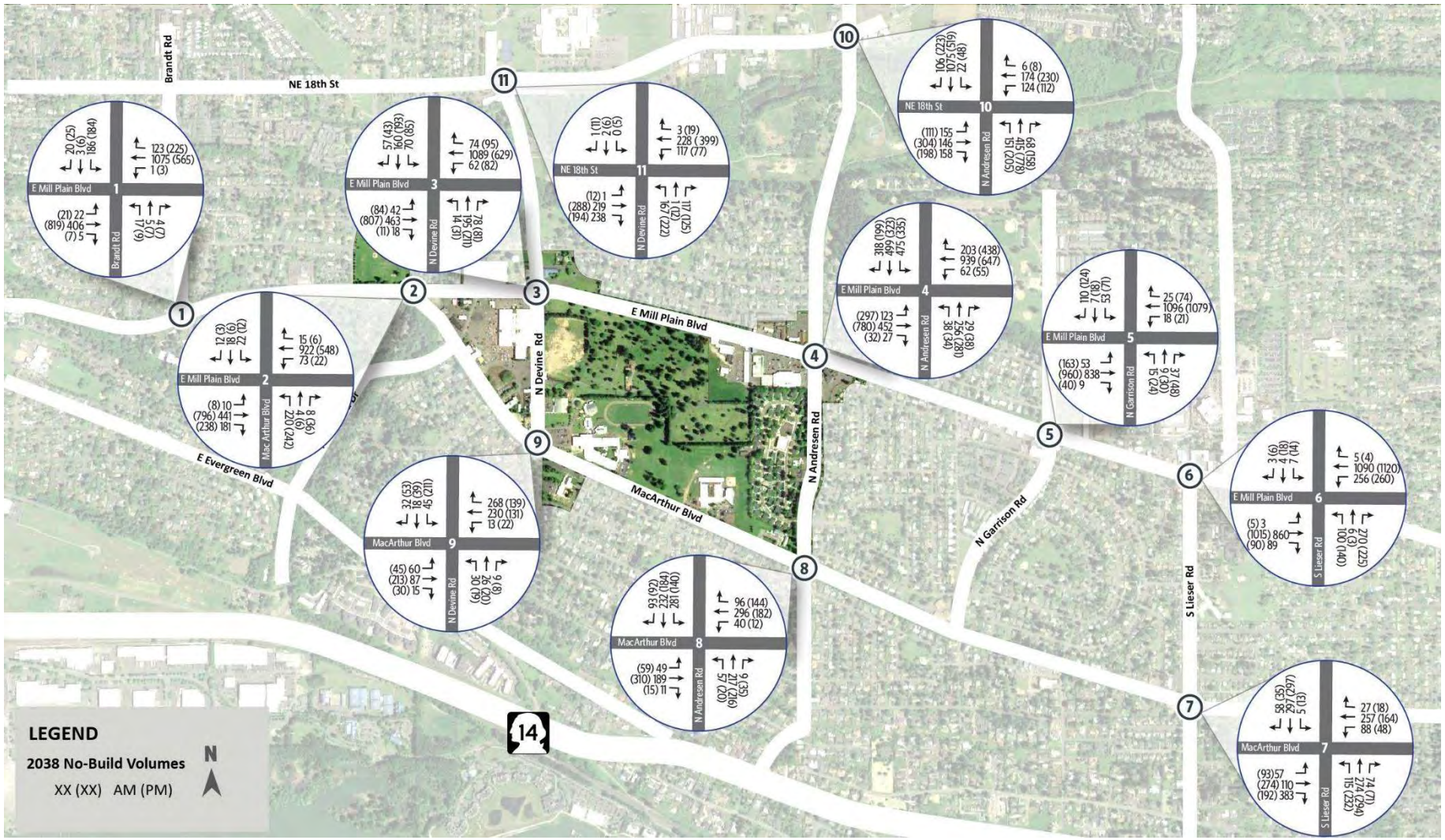


**Table 5. No-Build Intersection Delay and Level of Service – AM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 6.8 | A | 4.1 | A | 28.4 | C | 64.8 | E | 11.8 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 6.9 | A | 10.5 | B | 28.1 | C | 11.9 | B | 12.0 | B |
| E Mill Plain Boulevard at N Devine Road | 12.1 | B | 6.6 | A | 58.9 | E | 39.2 | D | 18.3 | B |
| E Mill Plain Boulevard at N Andresen Road | 24.5 | C | 36.4 | D | 57.3 | E | 16.9 | B | 28.9 | C |
| E Mill Plain Boulevard at Garrison Road | 6.2 | A | 5.2 | A | 45.3 | D | 35.4 | D | 9.0 | A |
| E Mill Plain Boulevard at N Lieser Road | 6.2 | A | 15.9 | B | 29.3 | C | 35.1 | D | 14.6 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 191.6 | F | 130.1 | F | 69.2 | F | 92.2 | F | 125.5 | F |
| MacArthur Boulevard at N Andresen Road** | 20.7 | C | 31.0 | D | 16.7 | C | 26.1 | D | 24.9 | C |
| MacArthur Boulevard at N Devine Road** | 10.4 | B | 10.7 | B | 10.4 | B | 10.5 | B | 10.6 | B |
| N Andresen Road at NE 18th Street | 48.4 | D | 58.9 | E | 34.1 | C | 33.1 | C | 39.1 | D |
| N Devine Road at E 18th Street | 11.4 | B | 11.7 | B | 21.1 | C | 24.3 | C | 14.1 | B |

***Unsignalized intersection; intersection results based on HCM 6 AWSC report.*
*Red = Approach or intersection operating at LOS F.*

**Table 6. No-Build Intersection Delay and Level of Service – PM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.6 | A | 5.4 | A | 25.8 | C | 66.7 | E | 14.2 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 7.3 | A | 9.7 | A | 28.4 | C | 12.7 | B | 11.9 | B |
| E Mill Plain Boulevard at N Devine Road | 12.6 | B | 14.6 | B | 61.2 | E | 42.6 | D | 24.1 | C |
| E Mill Plain Boulevard at N Andresen Road | 23.2 | C | 19.4 | B | 62.3 | E | 44.8 | D | 31.2 | C |
| E Mill Plain Boulevard at Garrison Road | 12.8 | B | 9.5 | A | 138.6 | F | 56.2 | E | 19.8 | B |
| E Mill Plain Boulevard at N Lieser Road | 6.6 | A | 18.3 | B | 32.3 | C | 37.9 | D | 15.8 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 123.8 | F | 32.7 | D | 51.3 | F | 48.7 | E | 71.9 | F |
| MacArthur Boulevard at N Andresen Road** | 30.6 | D | 16.6 | C | 15.7 | C | 15.8 | C | 20.0 | C |
| MacArthur Boulevard at N Devine Road** | 15.2 | C | 11.0 | B | 11.0 | B | 19.6 | C | 15.1 | C |
| N Andresen Road at NE 18th Street | 52.3 | D | 66.5 | E | 27.8 | C | 33.6 | C | 39.3 | D |
| N Devine Road at E 18th Street | 18.0 | B | 15.6 | B | 23.9 | C | 24.0 | C | 18.8 | B |

***Unsignalized intersection; intersection results based on HCM 6 AWSC report.*
*Red = Approach or intersection operating at LOS F.*

**Table 7. No-Build Intersection V/C Ratios**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.18 | 0.36 | 0.54 | 0.36 | 0.09 | 0.08 | 0.83 | 0.83 | 0.83 | 0.83 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.24 | 0.42 | 0.53 | 0.31 | 0.70 | 0.74 | 0.14 | 0.05 | 0.70 | 0.74 |
| E Mill Plain Boulevard at N Devine Road | 0.27 | 0.48 | 0.64 | 0.42 | 0.85 | 0.86 | 0.58 | 0.59 | 0.85 | 0.86 |
| E Mill Plain Boulevard at N Andresen Road | 0.49 | 0.71 | 0.90 | 0.72 | 0.74 | 0.77 | 0.78 | 0.93 | 0.90 | 0.93 |
| E Mill Plain Boulevard at Garrison Road | 0.45 | 0.78 | 0.48 | 0.53 | 0.59 | 1.06 | 0.57 | 0.92 | 0.59 | 1.06 |
| E Mill Plain Boulevard at N Lieser Road | 0.45 | 0.56 | 0.73 | 0.74 | 0.74 | 0.73 | 0.08 | 0.17 | 0.74 | 0.74 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue** | 1.43 | 1.21 | 1.27 | 0.71 | 1.12 | 1.01 | 1.15 | 0.91 | 1.43 | 1.21 |
| MacArthur Boulevard at N Andresen Road** | 0.54 | 0.78 | 0.80 | 0.46 | 0.41 | 0.38 | 0.77 | 0.37 | 0.80 | 0.78 |
| MacArthur Boulevard at N Devine Road** | 0.19 | 0.50 | 0.38 | 0.26 | 0.13 | 0.11 | 0.18 | 0.61 | 0.38 | 0.61 |
| N Andresen Road at NE 18th Street | 0.77 | 0.87 | 0.77 | 0.77 | 1.05 | 0.85 | 0.81 | 0.59 | 1.05 | 0.87 |
| N Devine Road at E 18th Street | 0.53 | 0.58 | 0.29 | 0.35 | 0.62 | 0.64 | 0.01 | 0.11 | 0.62 | 0.64 |

***Unsignalized intersection; worst stop-controlled movement used for each approach and overall intersection v/c ratio.*
*Red = Approach or intersection v/c ratio exceeds 1.0*

# Trip Generation

The Heights District Plan area is bounded generally by MacArthur Boulevard, E Mill Plain Boulevard, and N Andresen Road, and contains 205 acres of non-residential area. The proposed redevelopment area, shown below in Figure 3, is 63 acres of mixed-use development. For the traffic impact analysis, the Heights District Plan area is assumed to include 1,893 new residential units in a mix of low-rise (townhomes and single family) and mid-rise (apartments and condominiums) development. The proposed redevelopment area includes 1,336 of these new residential units, with the remainder in the northeast corner of the Heights District Plan area near the intersection of E Mill Plain Boulevard and N Andresen Road. Unlike the residential development, the net commercial leasable space within the redevelopment area will effectively remain unchanged. Vacant and underutilized space within the existing Tower Mall will be removed and displaced tenants will have the opportunity to integrate into the redevelopment. There is approximately 258,000 square feet of existing commercial space and the proposed redevelopment only includes 204,000 square feet. For analysis purposes, it is assumed that no new trips will be generated by commercial redevelopment. The existing commercial trips within the study area are already being accounted for, and any new trips are likely to be pass-by trips that are included in the future baseline volumes or the new residential trips.

Trip generation for the Heights District Plan area was developed using the 10th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. The ITE Trip Generation Manual provides average weekday vehicle trip rates and entering and exiting percentages for the AM and PM peak periods based on different land use codes (LUC). For the traffic impact analysis, the study area was divided into four zones based on their geographic location. The four zones are shown in Figure 3 and include three zones in the redevelopment area and one zone outside of the redevelopment area. The number of low-rise and mid-rise residential units in each zone of the redevelopment area is based on the proposed 20-year development program. In zone 4, outside of the redevelopment area, the total number of residential units was provided and was broken out into low-rise and mid-rise units based on the relative percentage of each unit type within the redevelopment area. The AM and PM peak hour trips for the proposed residential developments are provided in Table 8 and Table 9. During the AM peak hour, 699 new vehicle trips are estimated, with 180 entering trips and 519 exiting trips. During the PM peak hour, 853 new vehicle trips are estimated, with 523 entering trips and 330 exiting trips.

# Trip Distribution

Trip distribution for the new residential trips was developed using the relative turning movement percentages at each study area intersection in the No-Build alternative. The new trips were distributed onto the existing roadway network based on the geographic location of each zone. All entering trips were assumed to originate outside of the study area and terminate within each zone. All exiting trips were assumed to originate within each zone and depart the area via the external study area intersections. It is important to note that the traffic impact analysis did not include an assessment of internal circulation within the redevelopment area. The analysis focused on the existing study area intersections to determine potential impacts and mitigation resulting from the new development. Given the planned bus rapid transit (BRT) stations and bike/pedestrian facilities within the redevelopment area, the trip generation provided in Table 8 and Table 9 was reduced by six percent to account for multimodal trips. The reduced trips were added to the future year No-Build volumes to develop the future year Build volumes (see Figure 4).

**Figure 3. The Heights District and Redevelopment Area**

**Table 8. Trip Generation – AM Peak Hour**

| Zone | Residential Type | ITE LUC* | Units | Avg. Rate | Total Trips | Entering % | Entering Trips | Exiting % | Exiting Trips |
|---|---|---|---|---|---|---|---|---|---|
| Zone 1 | Low-Rise | 220 | 14 | 0.46 | 6 | 23% | 1 | 77% | 5 |
| Zone 1 | Mid-Rise | 221 | 137 | 0.36 | 49 | 26% | 13 | 74% | 36 |
| **Zone 1 Total Trips** | | | | | **55** | | **14** | | **41** |
| Zone 2 | Low-Rise | 220 | 46 | 0.46 | 21 | 23% | 5 | 77% | 16 |
| Zone 2 | Mid-Rise | 221 | 305 | 0.36 | 110 | 26% | 29 | 74% | 81 |
| **Zone 2 Total Trips** | | | | | **131** | | **34** | | **97** |
| Zone 3 | Low-Rise | 220 | 58 | 0.46 | 27 | 23% | 6 | 77% | 21 |
| Zone 3 | Mid-Rise | 221 | 777 | 0.36 | 280 | 26% | 73 | 74% | 207 |
| **Zone 3 Total Trips** | | | | | **307** | | **79** | | **228** |
| Zone 4 | Low-Rise | 220 | 49 | 0.46 | 23 | 23% | 5 | 77% | 18 |
| Zone 4 | Mid-Rise | 221 | 508 | 0.36 | 183 | 26% | 48 | 74% | 135 |
| **Zone 4 Total Trips** | | | | | **206** | | **53** | | **153** |
| **Total Increase in New Trips** | | | | | **699** | | **180** | | **519** |

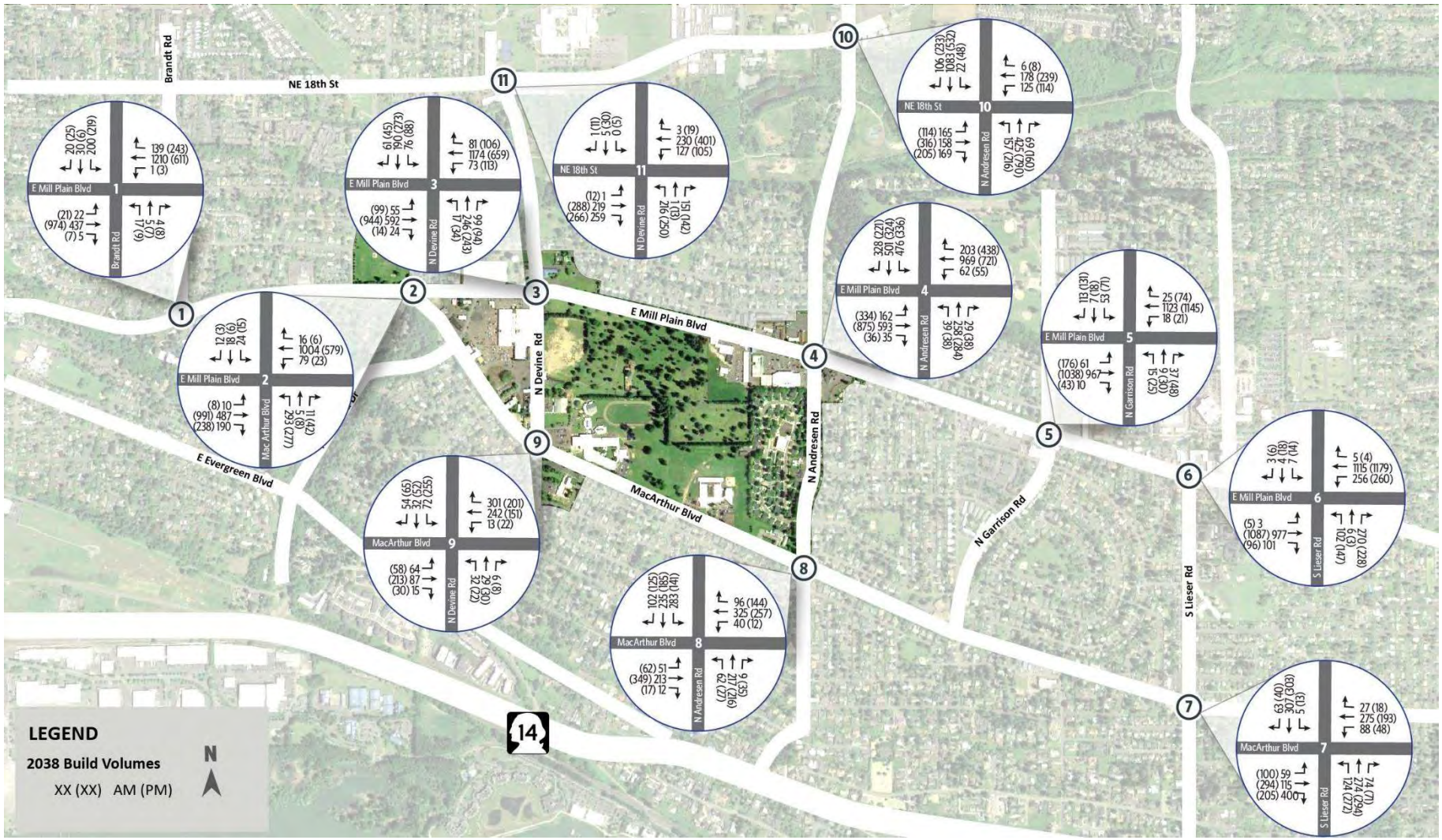
**Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, Volume 2: Data - Residential*

**Table 9. Trip Generation – PM Peak Hour**

| Zone | Residential Type | ITE LUC* | Units | Avg. Rate | Total Trips | Entering % | Entering Trips | Exiting % | Exiting Trips |
|---|---|---|---|---|---|---|---|---|---|
| Zone 1 | Low-Rise | 220 | 14 | 0.56 | 8 | 63% | 5 | 37% | 3 |
| Zone 1 | Mid-Rise | 221 | 137 | 0.44 | 60 | 61% | 37 | 39% | 23 |
| **Zone 1 Total Trips** | | | | | **68** | | **42** | | **26** |
| Zone 2 | Low-Rise | 220 | 46 | 0.56 | 26 | 63% | 16 | 37% | 10 |
| Zone 2 | Mid-Rise | 221 | 305 | 0.44 | 134 | 61% | 82 | 39% | 52 |
| **Zone 2 Total Trips** | | | | | **160** | | **98** | | **62** |
| Zone 3 | Low-Rise | 220 | 58 | 0.56 | 32 | 63% | 20 | 37% | 12 |
| Zone 3 | Mid-Rise | 221 | 777 | 0.44 | 342 | 61% | 209 | 39% | 133 |
| **Zone 3 Total Trips** | | | | | **374** | | **229** | | **145** |
| Zone 4 | Low-Rise | 220 | 49 | 0.56 | 27 | 63% | 17 | 37% | 10 |
| Zone 4 | Mid-Rise | 221 | 508 | 0.44 | 224 | 61% | 137 | 39% | 87 |
| **Zone 4 Total Trips** | | | | | **251** | | **154** | | **97** |
| **Total Increase in New Trips** | | | | | **853** | | **523** | | **330** |

**Institute of Transportation Engineers, Trip Generation Manual, 10th Edition, Volume 2: Data - Residential*

**Figure 4. Build 2038 Peak Hour Volumes**



# Build Alternative Analysis

The Build alternative represents future conditions with RTP identified improvements and the proposed redevelopment. The RTP improvement includes an additional westbound left-turn lane at the E Mill Plain Boulevard and N Lieser Road intersection. As part of the proposed redevelopment, the existing stop-controlled intersections on MacArthur Boulevard at N Andresen Road and N Devine Road have been converted to single lane roundabouts. N Andresen Road currently has two lanes in each direction but will be reduced to one travel lane in each direction with protected bike facilities. N Andresen Road will transition back to two lanes in each direction south of the E Mill Plain Boulevard intersection. The MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection is assumed to be signalized under the Build alternative. The Build alternative also includes signal timing optimization along the E Mill Plain Boulevard corridor and at the N Andresen Road at NE 18th Street intersection. Signal timing optimization included utilizing a 110 second cycle length for the AM peak and a 120 second cycle length for the PM peak (or half cycle lengths), as well as adjustments to splits, offsets, and lead/lag phasing for protected left turns.

The Build alternative traffic operations analysis for the project area intersections was performed using Synchro (version 10). A summary of the AM and PM peak hour intersection delay and LOS is provided in Table 10 and Table 11. A summary of the AM and PM peak hour intersection v/c ratios is provided in Table 12. Detailed Synchro, HCM, and Queue reports for the Build condition are provided in Attachment C. As shown below, all project area intersections are operating at LOS D or better in both the AM and PM peak hours. Several intersections also have approaches that are operating at LOS E, and the northbound approach of Garrison Road at E Mill Plain Boulevard is operating at LOS F in the PM peak, similar to the No-Build alternative. The unsignalized MacArthur Boulevard and N Lieser Road/Saint Helens Avenue intersection, which was operating at LOS F in the No-Build alternative, is operating at LOS C or better in the Build alternative with a traffic signal.

The E Mill Plain Boulevard and N Andresen Road intersection is operating near capacity, with a v/c ratio of 0.95 in the AM peak hour and a v/c ratio of 0.93 in the PM peak hour. The E Mill Plain Boulevard and Garrison Road intersection is operating over capacity (v/c ratio of 1.14) in the PM peak, but this is due to the low volume side street approach. The N Andresen Road and NE 18th Street intersection is also operating over capacity in the AM peak (v/c ratio of 1.10) due to the northbound left-turn movement. The unsignalized MacArthur Boulevard and N Lieser Road/St Helens Avenue intersection, which was operating significantly over-capacity (v/c ratio > 1.2) in both the AM and PM peak hours in the No-Build alternative, is operating at a v/c ratio of 0.83 in both the AM and PM peak hours with the proposed traffic signal.

**Table 10. 2038 Build Intersection Delay and Level of Service – AM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 8.5 | A | 8.3 | A | 25.5 | C | 63.1 | E | 15.1 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 10.0 | A | 13.0 | B | 30.0 | C | 10.1 | B | 14.8 | B |
| E Mill Plain Boulevard at N Devine Road | 15.1 | B | 7.6 | A | 61.8 | E | 37.5 | D | 20.4 | C |
| E Mill Plain Boulevard at N Andresen Road | 28.7 | C | 42.2 | D | 57.2 | E | 15.5 | B | 31.1 | C |
| E Mill Plain Boulevard at Garrison Road | 7.2 | A | 5.2 | A | 47.0 | D | 35.1 | D | 9.3 | A |
| E Mill Plain Boulevard at N Lieser Road | 6.9 | A | 15.9 | B | 29.5 | C | 35.0 | C | 14.5 | B |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue | 22.3 | C | 29.2 | C | 14.7 | B | 25.1 | C | 22.4 | C |
| MacArthur Boulevard at N Andresen Road** | 11.1 | B | 11.5 | B | 11.7 | B | 28.1 | D | 17.7 | C |
| MacArthur Boulevard at N Devine Road** | 4.6 | A | 9.4 | A | 4.1 | A | 5.7 | A | 7.5 | A |
| N Andresen Road at NE 18th Street | 47.9 | D | 58.8 | E | 36.3 | D | 34.8 | C | 40.4 | D |
| N Devine Road at E 18th Street | 11.8 | B | 13.2 | B | 19.3 | B | 26.0 | C | 14.5 | B |

***Roundabout intersection; intersection results based on HCM 6 Roundabout report.*
*Red = Approach or intersection operating at LOS F.*

**Table 11. 2038 Build Intersection Delay and Level of Service – PM Peak**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 11.3 | B | 5.9 | A | 22.6 | C | 64.0 | E | 15.5 | B |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 9.1 | A | 11.9 | B | 30.7 | C | 12.3 | B | 13.8 | B |
| E Mill Plain Boulevard at N Devine Road | 16.8 | B | 13.5 | B | 61.2 | E | 45.6 | D | 26.2 | C |
| E Mill Plain Boulevard at N Andresen Road | 26.7 | C | 23.8 | C | 58.8 | E | 47.6 | D | 33.8 | C |
| E Mill Plain Boulevard at Garrison Road | 11.1 | B | 11.5 | B | 167.6 | F | 55.3 | E | 20.5 | C |
| E Mill Plain Boulevard at N Lieser Road | 13.6 | B | 18.6 | B | 32.5 | C | 37.1 | D | 18.6 | B |
| MacArthur Boulevard at N Lieser Road and S. Helens Avenue | 33.0 | C | 24.7 | C | 17.2 | B | 38.4 | D | 27.3 | C |
| MacArthur Boulevard at N Andresen Road** | 11.3 | B | 9.7 | A | 11.2 | B | 11.4 | B | 10.9 | B |
| MacArthur Boulevard at N Devine Road** | 8.0 | A | 7.0 | A | 6.4 | A | 7.5 | A | 7.4 | A |
| N Andresen Road at NE 18th Street | 52.9 | D | 65.5 | E | 33.9 | C | 37.6 | D | 42.8 | D |
| N Devine Road at E 18th Street | 20.9 | C | 18.2 | B | 23.3 | C | 27.3 | C | 20.8 | C |

***Roundabout intersection; intersection results based on HCM 6 Roundabout report.*
*Red = Approach or intersection operating at LOS F.*

**Table 12. 2038 Build Intersection V/C Ratios**

| Intersection | Intersection Approach | | | | | | | | Overall Intersection | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Eastbound | | Westbound | | Northbound | | Southbound | | | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| E Mill Plain Boulevard at Brandt Road/Rhododendron Drive | 0.21 | 0.45 | 0.64 | 0.41 | 0.08 | 0.07 | 0.86 | 0.85 | 0.86 | 0.85 |
| E Mill Plain Boulevard at MacArthur Boulevard/Ogden Avenue | 0.29 | 0.55 | 0.63 | 0.33 | 0.79 | 0.80 | 0.12 | 0.06 | 0.79 | 0.80 |
| E Mill Plain Boulevard at N Devine Road | 0.37 | 0.60 | 0.74 | 0.48 | 0.90 | 0.88 | 0.58 | 0.71 | 0.90 | 0.88 |
| E Mill Plain Boulevard at N Andresen Road | 0.64 | 0.72 | 0.95 | 0.81 | 0.74 | 0.74 | 0.77 | 0.93 | 0.95 | 0.93 |
| E Mill Plain Boulevard at Garrison Road | 0.50 | 0.79 | 0.49 | 0.56 | 0.61 | 1.14 | 0.57 | 0.92 | 0.61 | 1.14 |
| E Mill Plain Boulevard at N Lieser Road | 0.51 | 0.60 | 0.73 | 0.76 | 0.74 | 0.74 | 0.08 | 0.17 | 0.74 | 0.76 |
| MacArthur Boulevard at N Lieser Road and St Helens Avenue | 0.83 | 0.83 | 0.77 | 0.50 | 0.46 | 0.59 | 0.67 | 0.75 | 0.83 | 0.83 |
| MacArthur Boulevard at N Andresen Road** | 0.43 | 0.53 | 0.55 | 0.48 | 0.45 | 0.43 | 0.85 | 0.55 | 0.85 | 0.55 |
| MacArthur Boulevard at N Devine Road** | 0.16 | 0.36 | 0.53 | 0.37 | 0.07 | 0.10 | 0.19 | 0.39 | 0.53 | 0.39 |
| N Andresen Road at NE 18th Street | 0.78 | 0.88 | 0.78 | 0.76 | 1.10 | 0.73 | 0.83 | 0.67 | 1.10 | 0.88 |
| N Devine Road at E 18th Street | 0.55 | 0.67 | 0.35 | 0.39 | 0.59 | 0.67 | 0.02 | 0.26 | 0.59 | 0.67 |

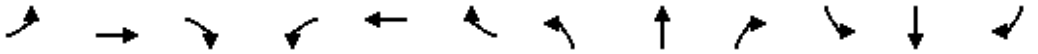
***Roundabout intersection; intersection results based on HCM 6 Roundabout report.*
*Red = Approach or intersection v/c ratio exceeds 1.0*

# Conclusion

The Heights District Plan and proposed redevelopment includes an estimated 1,900 new residential units that will generate approximately 700 to 850 new vehicle trips during the AM and PM peak hours. With the proposed BRT stations and bike/pedestrian facilities within the redevelopment area, the trip generation was reduced by six percent to account for multimodal trips. The new development will bring increased traffic volumes to the study area intersections, but the existing infrastructure and proposed roundabouts along MacArthur Boulevard will provide acceptable traffic operations, with all study area intersections operating at an overall LOS D or better. Several intersection approaches are operating over-capacity, but the results are similar between the No-Build and Build alternatives.

Traffic operations could be further improved by providing protected/permitted left turns (flashing yellow arrow) at the E Mill Plain Boulevard and Garrison Road and N Andresen Road and NE 18th Street intersections. If site conditions permit the use of protected/permitted left turns, the v/c ratio at the N Andresen Road and NE 18th Street intersection in the Build alternative could be reduced from 1.10 to 0.67 in the AM peak hour.

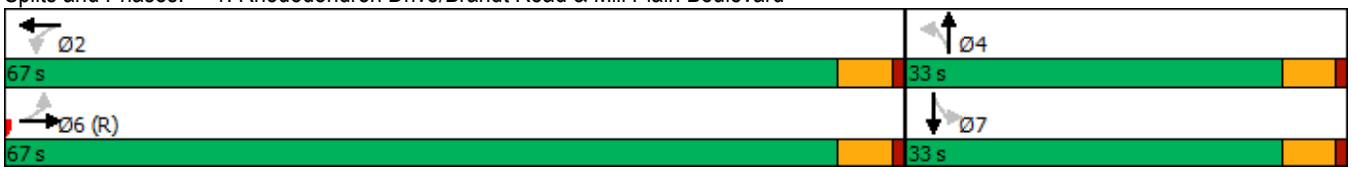
## Attachment A. Existing Analysis Reports

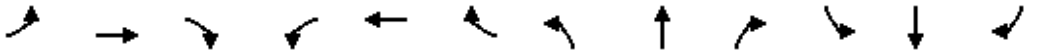


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 43 | 333 | 5 | 1 | 798 | 109 | 17 | 5 | 4 | 165 | 3 | 74 |
| Future Volume (vph) | 43 | 333 | 5 | 1 | 798 | 109 | 17 | 5 | 4 | 165 | 3 | 74 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 75 | | | 85 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.995 | | | 0.983 | | | 0.975 | | | 0.960 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.969 | | | 0.967 | |
| Satd. Flow (prot) | 1719 | 3426 | 0 | 1805 | 3397 | 0 | 0 | 1732 | 0 | 0 | 1662 | 0 |
| Flt Permitted | 0.215 | | | 0.534 | | | | 0.777 | | | 0.771 | |
| Satd. Flow (perm) | 389 | 3426 | 0 | 1015 | 3397 | 0 | 0 | 1389 | 0 | 0 | 1325 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 26 | | | 8 | | | 21 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.72 | 0.94 | 0.42 | 0.25 | 0.82 | 0.88 | 0.61 | 0.63 | 0.50 | 0.83 | 0.38 | 0.84 |
| Heavy Vehicles (%) | 5% | 5% | 0% | 0% | 4% | 8% | 0% | 20% | 0% | 6% | 33% | 4% |
| Adj. Flow (vph) | 60 | 354 | 12 | 4 | 973 | 124 | 28 | 8 | 8 | 199 | 8 | 88 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 60 | 366 | 0 | 4 | 1097 | 0 | 0 | 44 | 0 | 0 | 295 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 67.0 | 67.0 | | 67.0 | 67.0 | | 33.0 | 33.0 | | 33.0 | 33.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 65.3 | 65.3 | | 65.3 | 65.3 | | | 24.7 | | | 24.7 | |
| Actuated g/C Ratio | 0.65 | 0.65 | | 0.65 | 0.65 | | | 0.25 | | | 0.25 | |
| v/c Ratio | 0.24 | 0.16 | | 0.01 | 0.49 | | | 0.13 | | | 0.86 | |
| Control Delay | 12.3 | 7.8 | | 8.0 | 9.2 | | | 23.2 | | | 56.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 12.3 | 7.8 | | 8.0 | 9.2 | | | 23.2 | | | 56.0 | |
| LOS | B | A | | A | A | | | C | | | E | |
| Approach Delay | | 8.4 | | | 9.2 | | | 23.2 | | | 56.0 | |
| Approach LOS | | A | | | A | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 100 | | | |
| Offset: 15 (15%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.86 | | | |
| Intersection Signal Delay: 16.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 60.5% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

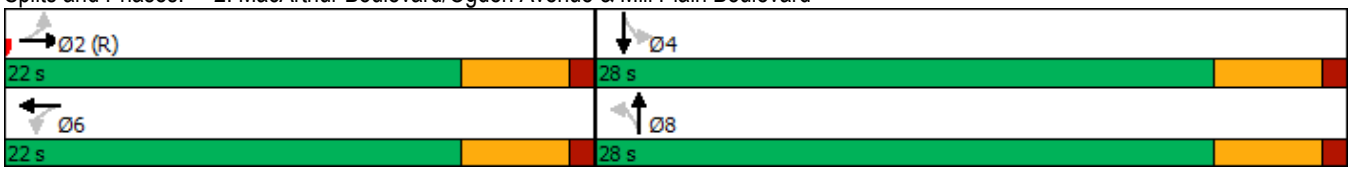




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 10 | 369 | 0 | 65 | 726 | 15 | 154 | 7 | 9 | 22 | 19 | 14 |
| Future Volume (vph) | 10 | 369 | 0 | 65 | 726 | 15 | 154 | 7 | 9 | 22 | 19 | 14 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 75 | | | 65 | | | 120 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.996 | | | 0.900 | | | 0.969 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.978 | |
| Satd. Flow (prot) | 1805 | 3438 | 0 | 1752 | 3455 | 0 | 1736 | 1634 | 0 | 0 | 1663 | 0 |
| Flt Permitted | 0.278 | | | 0.522 | | | 0.700 | | | | 0.856 | |
| Satd. Flow (perm) | 528 | 3438 | 0 | 963 | 3455 | 0 | 1279 | 1634 | 0 | 0 | 1456 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 6 | | | 16 | | | 20 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.63 | 0.95 | 0.88 | 0.60 | 0.80 | 0.63 | 0.77 | 0.88 | 0.56 | 0.55 | 0.68 | 0.70 |
| Heavy Vehicles (%) | 0% | 5% | 5% | 3% | 4% | 7% | 4% | 14% | 0% | 0% | 21% | 7% |
| Adj. Flow (vph) | 16 | 388 | 0 | 108 | 908 | 24 | 200 | 8 | 16 | 40 | 28 | 20 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 16 | 388 | 0 | 108 | 932 | 0 | 200 | 24 | 0 | 0 | 88 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 22.0 | 22.0 | | 22.0 | 22.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 31.3 | 31.3 | | 31.3 | 31.3 | | 12.7 | 12.7 | | | 12.7 | |
| Actuated g/C Ratio | 0.63 | 0.63 | | 0.63 | 0.63 | | 0.25 | 0.25 | | | 0.25 | |
| v/c Ratio | 0.05 | 0.18 | | 0.18 | 0.43 | | 0.62 | 0.06 | | | 0.23 | |
| Control Delay | 7.4 | 6.2 | | 8.2 | 8.0 | | 24.6 | 8.1 | | | 12.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 7.4 | 6.2 | | 8.2 | 8.0 | | 24.6 | 8.1 | | | 12.4 | |
| LOS | A | A | | A | A | | C | A | | | B | |
| Approach Delay | | 6.2 | | | 8.0 | | | 22.8 | | | 12.4 | |
| Approach LOS | | A | | | A | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 50 | | | |
| Actuated Cycle Length: 50 | | | |
| Offset: 28 (56%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.62 | | | |
| Intersection Signal Delay: 9.7 | | Intersection LOS: A | |
| Intersection Capacity Utilization 58.2% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 53 | 387 | 18 | 68 | 858 | 55 | 14 | 84 | 64 | 67 | 108 | 66 |
| Future Volume (vph) | 53 | 387 | 18 | 68 | 858 | 55 | 14 | 84 | 64 | 67 | 108 | 66 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 85 | | | 80 | | | 65 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.993 | | | 0.991 | | | 0.933 | | | 0.955 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1703 | 3453 | 0 | 1787 | 3469 | 0 | 1687 | 1707 | 0 | 1752 | 1701 | 0 |
| Flt Permitted | 0.122 | | | 0.458 | | | 0.501 | | | 0.411 | | |
| Satd. Flow (perm) | 219 | 3453 | 0 | 862 | 3469 | 0 | 890 | 1707 | 0 | 758 | 1701 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 6 | | | 30 | | | 16 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.88 | 0.90 | 0.90 | 0.74 | 0.78 | 0.76 | 0.58 | 0.75 | 0.70 | 0.88 | 0.57 | 0.83 |
| Heavy Vehicles (%) | 6% | 4% | 0% | 1% | 3% | 5% | 7% | 7% | 0% | 3% | 7% | 6% |
| Adj. Flow (vph) | 60 | 430 | 20 | 92 | 1100 | 72 | 24 | 112 | 91 | 76 | 189 | 80 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 60 | 450 | 0 | 92 | 1172 | 0 | 24 | 203 | 0 | 76 | 269 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 24.0 | 50.0 | | 24.0 | 50.0 | | 18.0 | 32.0 | | 18.0 | 32.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 40.6 | 36.5 | | 41.7 | 37.1 | | 18.0 | 14.3 | | 22.5 | 19.8 | |
| Actuated g/C Ratio | 0.51 | 0.46 | | 0.53 | 0.47 | | 0.23 | 0.18 | | 0.28 | 0.25 | |
| v/c Ratio | 0.27 | 0.28 | | 0.17 | 0.72 | | 0.09 | 0.61 | | 0.25 | 0.61 | |
| Control Delay | 12.5 | 15.9 | | 10.2 | 22.0 | | 23.4 | 38.1 | | 24.8 | 35.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 12.5 | 15.9 | | 10.2 | 22.0 | | 23.4 | 38.1 | | 24.8 | 35.1 | |
| LOS | B | B | | B | C | | C | D | | C | D | |
| Approach Delay | | 15.5 | | | 21.1 | | | 36.5 | | | 32.9 | |
| Approach LOS | | B | | | C | | | D | | | C | |

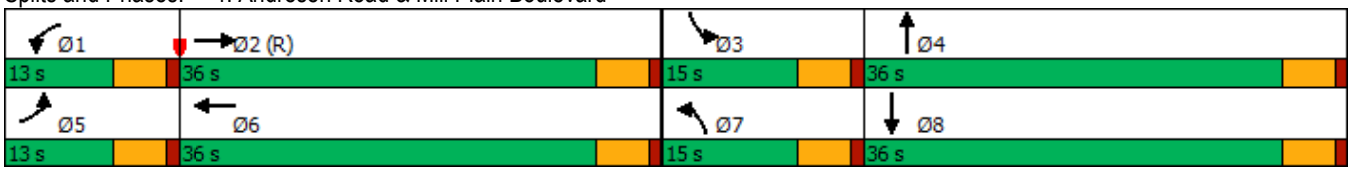
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 124 | | | |
| Actuated Cycle Length: 79.2 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.72 | | | |
| Intersection Signal Delay: 23.1 | | Intersection LOS: C | |
| Intersection Capacity Utilization 60.2% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: Devine Road & Mill Plain Boulevard

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 111 | 363 | 27 | 63 | 632 | 184 | 38 | 266 | 35 | 367 | 434 | 294 |
| Future Volume (vph) | 111 | 363 | 27 | 63 | 632 | 184 | 38 | 266 | 35 | 367 | 434 | 294 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 60 | | | 85 | | | 40 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.989 | | | 0.968 | | | 0.978 | | | 0.940 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3367 | 3446 | 0 | 1703 | 3386 | 0 | 1597 | 3359 | 0 | 3367 | 3269 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3367 | 3446 | 0 | 1703 | 3386 | 0 | 1597 | 3359 | 0 | 3367 | 3269 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 9 | | | 36 | | | 21 | | | 167 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.77 | 0.92 | 0.84 | 0.83 | 0.83 | 0.88 | 0.86 | 0.83 | 0.63 | 0.91 | 0.79 | 0.80 |
| Heavy Vehicles (%) | 4% | 3% | 11% | 6% | 3% | 4% | 13% | 6% | 0% | 4% | 5% | 2% |
| Adj. Flow (vph) | 144 | 395 | 32 | 76 | 761 | 209 | 44 | 320 | 56 | 403 | 549 | 368 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 144 | 427 | 0 | 76 | 970 | 0 | 44 | 376 | 0 | 403 | 917 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 13.0 | 36.0 | | 13.0 | 36.0 | | 15.0 | 36.0 | | 15.0 | 36.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 7.2 | 43.3 | | 7.4 | 41.5 | | 6.6 | 21.3 | | 10.0 | 28.7 | |
| Actuated g/C Ratio | 0.07 | 0.43 | | 0.07 | 0.42 | | 0.07 | 0.21 | | 0.10 | 0.29 | |
| v/c Ratio | 0.59 | 0.29 | | 0.61 | 0.68 | | 0.42 | 0.51 | | 1.20 | 0.87 | |
| Control Delay | 55.1 | 21.7 | | 67.3 | 23.8 | | 56.3 | 33.8 | | 154.9 | 37.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 55.1 | 21.7 | | 67.3 | 23.8 | | 56.3 | 33.8 | | 154.9 | 37.0 | |
| LOS | E | C | | E | C | | E | C | | F | D | |
| Approach Delay | | 30.1 | | | 27.0 | | | 36.2 | | | 73.0 | |
| Approach LOS | | C | | | C | | | D | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 100 | | | |
| Offset: 62 (62%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.20 | | | |
| Intersection Signal Delay: 46.7 | | Intersection LOS: D | |
| Intersection Capacity Utilization 69.8% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

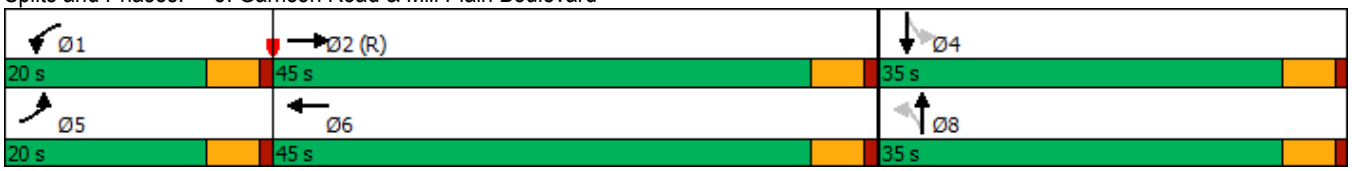
Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

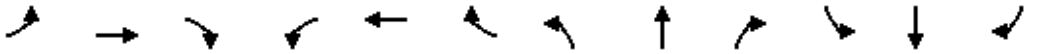


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 40 | 673 | 9 | 18 | 814 | 29 | 13 | 8 | 37 | 60 | 6 | 82 |
| Future Volume (vph) | 40 | 673 | 9 | 18 | 814 | 29 | 13 | 8 | 37 | 60 | 6 | 82 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 25 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.997 | | | 0.993 | | | 0.918 | | | 0.866 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.989 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3488 | 0 | 1703 | 3459 | 0 | 0 | 1657 | 0 | 1752 | 1562 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.904 | | 0.652 | | |
| Satd. Flow (perm) | 1805 | 3488 | 0 | 1703 | 3459 | 0 | 0 | 1515 | 0 | 1203 | 1562 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 3 | | | 6 | | | 56 | | | 100 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.63 | 0.95 | 0.56 | 0.64 | 0.90 | 0.66 | 0.65 | 0.50 | 0.66 | 0.79 | 0.50 | 0.82 |
| Heavy Vehicles (%) | 0% | 3% | 11% | 6% | 3% | 17% | 0% | 13% | 3% | 3% | 0% | 6% |
| Adj. Flow (vph) | 63 | 708 | 16 | 28 | 904 | 44 | 20 | 16 | 56 | 76 | 12 | 100 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 63 | 724 | 0 | 28 | 948 | 0 | 0 | 92 | 0 | 76 | 112 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 20.0 | 45.0 | | 20.0 | 45.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 7.2 | 71.0 | | 7.2 | 68.7 | | | 11.1 | | 11.1 | 11.1 | |
| Actuated g/C Ratio | 0.07 | 0.71 | | 0.07 | 0.69 | | | 0.11 | | 0.11 | 0.11 | |
| v/c Ratio | 0.49 | 0.29 | | 0.23 | 0.40 | | | 0.42 | | 0.57 | 0.43 | |
| Control Delay | 48.0 | 12.4 | | 43.7 | 8.6 | | | 24.4 | | 57.9 | 15.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 48.0 | 12.4 | | 43.7 | 8.6 | | | 24.4 | | 57.9 | 15.2 | |
| LOS | D | B | | D | A | | | C | | E | B | |
| Approach Delay | | 15.3 | | | 9.6 | | | 24.4 | | | 32.5 | |
| Approach LOS | | B | | | A | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 100 | | | |
| Offset: 14 (14%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.57 | | | |
| Intersection Signal Delay: 14.6 | | Intersection LOS: B | |
| Intersection Capacity Utilization 50.2% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 5: Garrison Road & Mill Plain Boulevard

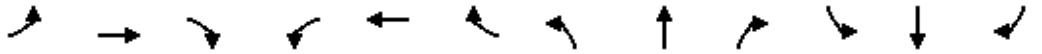




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 3 | 699 | 89 | 256 | 816 | 5 | 92 | 6 | 270 | 7 | 4 | 3 |
| Future Volume (vph) | 3 | 699 | 89 | 256 | 816 | 5 | 92 | 6 | 270 | 7 | 4 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.980 | | | 0.998 | | | | 0.850 | | 0.977 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.958 | | | 0.976 | |
| Satd. Flow (prot) | 1805 | 3442 | 0 | 1736 | 3499 | 0 | 0 | 1743 | 1583 | 0 | 1812 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.733 | | | 0.838 | |
| Satd. Flow (perm) | 1805 | 3442 | 0 | 1736 | 3499 | 0 | 0 | 1334 | 1583 | 0 | 1556 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 20 | | | 2 | | | | 325 | | 4 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.38 | 0.98 | 0.82 | 0.82 | 0.91 | 0.42 | 0.74 | 0.38 | 0.83 | 0.58 | 0.50 | 0.75 |
| Heavy Vehicles (%) | 0% | 2% | 8% | 4% | 3% | 0% | 5% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 8 | 713 | 109 | 312 | 897 | 12 | 124 | 16 | 325 | 12 | 8 | 4 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 8 | 822 | 0 | 312 | 909 | 0 | 0 | 140 | 325 | 0 | 24 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 13.0 | 43.0 | | 29.0 | 59.0 | | 28.0 | 28.0 | 28.0 | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.0 | 49.9 | | 21.0 | 73.9 | | | 14.1 | 14.1 | | 14.1 | |
| Actuated g/C Ratio | 0.05 | 0.50 | | 0.21 | 0.74 | | | 0.14 | 0.14 | | 0.14 | |
| v/c Ratio | 0.09 | 0.48 | | 0.86 | 0.35 | | | 0.75 | 0.65 | | 0.11 | |
| Control Delay | 48.3 | 14.8 | | 59.9 | 6.3 | | | 63.6 | 10.6 | | 31.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 48.3 | 14.8 | | 59.9 | 6.3 | | | 63.6 | 10.6 | | 31.1 | |
| LOS | D | B | | E | A | | | E | B | | C | |
| Approach Delay | | 15.1 | | | 20.0 | | | 26.5 | | | 31.1 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 100 | | | |
| Offset: 30 (30%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.86 | | | |
| Intersection Signal Delay: 19.7 | | Intersection LOS: B | |
| Intersection Capacity Utilization 58.0% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

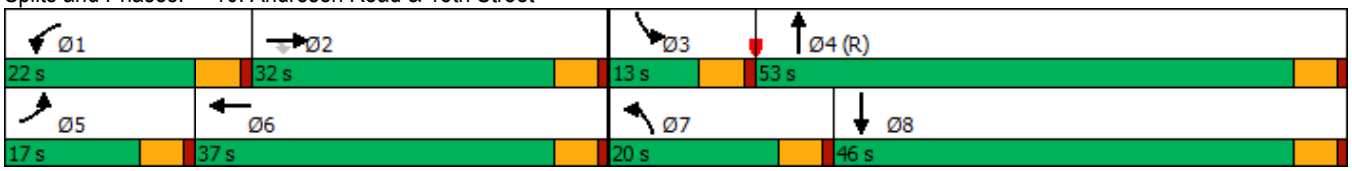
Splits and Phases: 6: Lieser Road & Mill Plain Boulevard

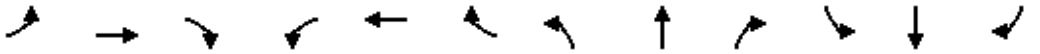


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 91 | 102 | 89 | 126 | 124 | 6 | 114 | 407 | 72 | 22 | 881 | 125 |
| Future Volume (vph) | 91 | 102 | 89 | 126 | 124 | 6 | 114 | 407 | 72 | 22 | 881 | 125 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 45 | | | 55 | | | 75 | | | 50 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.988 | | | 0.976 | | | 0.981 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1641 | 1696 | 1429 | 1770 | 1843 | 0 | 1719 | 3345 | 0 | 1467 | 3404 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1641 | 1696 | 1429 | 1770 | 1843 | 0 | 1719 | 3345 | 0 | 1467 | 3404 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 155 | | 4 | | | 22 | | | 15 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.78 | 0.75 | 0.89 | 0.88 | 0.91 | 0.50 | 0.86 | 0.84 | 0.78 | 0.69 | 0.91 | 0.87 |
| Heavy Vehicles (%) | 10% | 12% | 13% | 2% | 2% | 0% | 5% | 5% | 7% | 23% | 3% | 11% |
| Adj. Flow (vph) | 117 | 136 | 100 | 143 | 136 | 12 | 133 | 485 | 92 | 32 | 968 | 144 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 117 | 136 | 100 | 143 | 148 | 0 | 133 | 577 | 0 | 32 | 1112 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 17.0 | 32.0 | 32.0 | 22.0 | 37.0 | | 20.0 | 53.0 | | 13.0 | 46.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 10.6 | 13.1 | 13.1 | 12.7 | 15.2 | | 12.7 | 71.6 | | 6.9 | 61.5 | |
| Actuated g/C Ratio | 0.09 | 0.11 | 0.11 | 0.11 | 0.13 | | 0.11 | 0.60 | | 0.06 | 0.51 | |
| v/c Ratio | 0.81 | 0.74 | 0.34 | 0.76 | 0.62 | | 0.73 | 0.29 | | 0.38 | 0.64 | |
| Control Delay | 90.0 | 73.6 | 4.4 | 76.5 | 58.7 | | 74.4 | 14.1 | | 67.0 | 25.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 90.0 | 73.6 | 4.4 | 76.5 | 58.7 | | 74.4 | 14.1 | | 67.0 | 25.4 | |
| LOS | F | E | A | E | E | | E | B | | E | C | |
| Approach Delay | | 59.5 | | | 67.5 | | | 25.4 | | | 26.5 | |
| Approach LOS | | E | | | E | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 68 (57%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.81 | | | |
| Intersection Signal Delay: 35.6 | | Intersection LOS: D | |
| Intersection Capacity Utilization 63.7% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 10: Andresen Road & 18th Street

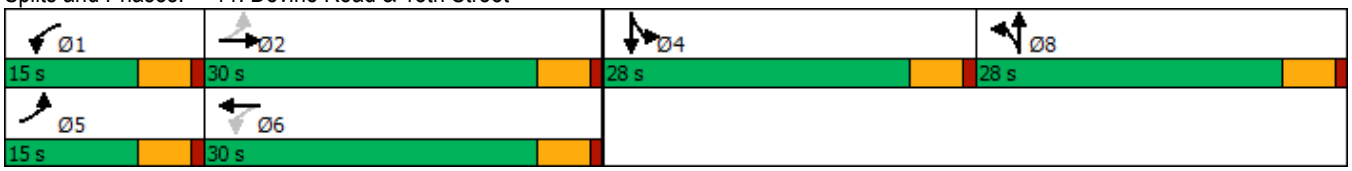




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 169 | 211 | 73 | 173 | 3 | 137 | 1 | 80 | 0 | 2 | 1 |
| Future Volume (vph) | 1 | 169 | 211 | 73 | 173 | 3 | 137 | 1 | 80 | 0 | 2 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 45 | | | 45 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.915 | | | 0.991 | | | 0.955 | | | 0.932 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.968 | | | | |
| Satd. Flow (prot) | 1805 | 3087 | 0 | 1671 | 3448 | 0 | 0 | 1669 | 0 | 0 | 1771 | 0 |
| Flt Permitted | 0.624 | | | 0.361 | | | | 0.968 | | | | |
| Satd. Flow (perm) | 1186 | 3087 | 0 | 635 | 3448 | 0 | 0 | 1669 | 0 | 0 | 1771 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 237 | | | 6 | | | 23 | | | 4 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.25 | 0.94 | 0.89 | 0.70 | 0.90 | 0.25 | 0.73 | 0.25 | 0.83 | 0.92 | 0.50 | 0.25 |
| Heavy Vehicles (%) | 0% | 7% | 7% | 8% | 4% | 0% | 5% | 0% | 6% | 0% | 0% | 0% |
| Adj. Flow (vph) | 4 | 180 | 237 | 104 | 192 | 12 | 188 | 4 | 96 | 0 | 4 | 4 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 4 | 417 | 0 | 104 | 204 | 0 | 0 | 288 | 0 | 0 | 8 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 14.1 | 9.6 | | 18.9 | 17.5 | | | 11.7 | | | 6.9 | |
| Actuated g/C Ratio | 0.32 | 0.22 | | 0.44 | 0.40 | | | 0.27 | | | 0.16 | |
| v/c Ratio | 0.01 | 0.48 | | 0.22 | 0.15 | | | 0.62 | | | 0.03 | |
| Control Delay | 10.0 | 10.3 | | 10.2 | 11.3 | | | 21.1 | | | 20.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 10.0 | 10.3 | | 10.2 | 11.3 | | | 21.1 | | | 20.0 | |
| LOS | A | B | | B | B | | | C | | | B | |
| Approach Delay | | 10.3 | | | 10.9 | | | 21.1 | | | 20.0 | |
| Approach LOS | | B | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 101 | | | |
| Actuated Cycle Length: 43.4 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.62 | | | |
| Intersection Signal Delay: 13.6 | | Intersection LOS: B | |
| Intersection Capacity Utilization 48.2% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 111.7 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 34 | 82 | 263 | 95 | 151 | 24 | 102 | 322 | 77 | 6 | 322 | 28 |
| Future Vol, veh/h | 34 | 82 | 263 | 95 | 151 | 24 | 102 | 322 | 77 | 6 | 322 | 28 |
| Peak Hour Factor | 0.94 | 0.73 | 0.80 | 0.88 | 0.77 | 0.55 | 0.91 | 0.86 | 0.80 | 0.75 | 0.88 | 0.70 |
| Heavy Vehicles, % | 6 | 5 | 6 | 2 | 2 | 0 | 4 | 2 | 0 | 0 | 5 | 11 |
| Mvmt Flow | 36 | 112 | 329 | 108 | 196 | 44 | 112 | 374 | 96 | 8 | 366 | 40 |
| Number of Lanes | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 1 | 2 |
| HCM Control Delay | 109.2 | 83.5 | 134.4 | 106.4 |
| HCM LOS | F | F | F | F |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 35% | 100% | 0% |
| Vol Thru, % | 0% | 81% | 0% | 24% | 56% | 0% | 92% |
| Vol Right, % | 0% | 19% | 0% | 76% | 9% | 0% | 8% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 102 | 399 | 34 | 345 | 270 | 6 | 350 |
| LT Vol | 102 | 0 | 34 | 0 | 95 | 6 | 0 |
| Through Vol | 0 | 322 | 0 | 82 | 151 | 0 | 322 |
| RT Vol | 0 | 77 | 0 | 263 | 24 | 0 | 28 |
| Lane Flow Rate | 112 | 471 | 36 | 441 | 348 | 8 | 406 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 7 | 7 |
| Degree of Util (X) | 0.317 | 1.245 | 0.103 | 1.124 | 0.988 | 0.023 | 1.089 |
| Departure Headway (Hd) | 10.992 | 10.282 | 11.099 | 9.989 | 11.529 | 11.11 | 10.609 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 330 | 358 | 325 | 366 | 316 | 324 | 345 |
| Service Time | 8.692 | 7.982 | 8.799 | 7.689 | 9.529 | 8.81 | 8.309 |
| HCM Lane V/C Ratio | 0.339 | 1.316 | 0.111 | 1.205 | 1.101 | 0.025 | 1.177 |
| HCM Control Delay | 18.7 | 161.9 | 15.1 | 116.9 | 83.5 | 14.1 | 108.2 |
| HCM Lane LOS | C | F | C | F | F | B | F |
| HCM 95th-tile Q | 1.3 | 19.2 | 0.3 | 15.4 | 10.5 | 0.1 | 13.8 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 19.3 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 43 | 135 | 16 | 40 | 188 | 94 | 57 | 181 | 26 | 193 | 206 | 93 |
| Future Vol, veh/h | 43 | 135 | 16 | 40 | 188 | 94 | 57 | 181 | 26 | 193 | 206 | 93 |
| Peak Hour Factor | 0.45 | 0.69 | 0.50 | 0.67 | 0.87 | 0.78 | 0.84 | 0.84 | 0.72 | 0.85 | 0.62 | 0.68 |
| Heavy Vehicles, % | 5 | 2 | 0 | 0 | 3 | 6 | 7 | 5 | 0 | 8 | 3 | 8 |
| Mvmt Flow | 96 | 196 | 32 | 60 | 216 | 121 | 68 | 215 | 36 | 227 | 332 | 137 |
| Number of Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 18.8 | 18.8 | 16.2 | 21.3 |
| HCM LOS | C | C | C | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 70% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 30% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 57 | 121 | 86 | 43 | 135 | 16 | 40 | 188 | 94 | 193 | 137 |
| LT Vol | 57 | 0 | 0 | 43 | 0 | 0 | 40 | 0 | 0 | 193 | 0 |
| Through Vol | 0 | 121 | 60 | 0 | 135 | 0 | 0 | 188 | 0 | 0 | 137 |
| RT Vol | 0 | 0 | 26 | 0 | 0 | 16 | 0 | 0 | 94 | 0 | 0 |
| Lane Flow Rate | 68 | 144 | 108 | 96 | 196 | 32 | 60 | 216 | 121 | 227 | 222 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.186 | 0.373 | 0.272 | 0.261 | 0.505 | 0.076 | 0.159 | 0.548 | 0.284 | 0.569 | 0.519 |
| Departure Headway (Hd) | 9.885 | 9.351 | 9.056 | 9.85 | 9.299 | 8.565 | 9.584 | 9.135 | 8.486 | 9.02 | 8.435 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 363 | 385 | 397 | 365 | 387 | 418 | 374 | 395 | 423 | 400 | 428 |
| Service Time | 7.64 | 7.106 | 6.81 | 7.603 | 7.052 | 6.318 | 7.335 | 6.886 | 6.237 | 6.764 | 6.179 |
| HCM Lane V/C Ratio | 0.187 | 0.374 | 0.272 | 0.263 | 0.506 | 0.077 | 0.16 | 0.547 | 0.286 | 0.568 | 0.519 |
| HCM Control Delay | 14.9 | 17.6 | 15.2 | 16.1 | 21.2 | 12 | 14.1 | 22.5 | 14.6 | 23.1 | 20 |
| HCM Lane LOS | B | C | C | C | C | B | B | C | B | C | C |
| HCM 95th-tile Q | 0.7 | 1.7 | 1.1 | 1 | 2.7 | 0.2 | 0.6 | 3.2 | 1.2 | 3.4 | 2.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 9.9 |
| Intersection LOS | A |

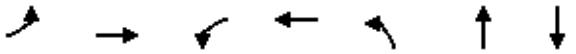
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 60 | 70 | 14 | 11 | 130 | 99 | 24 | 22 | 7 | 30 | 19 | 32 |
| Future Vol, veh/h | 60 | 70 | 14 | 11 | 130 | 99 | 24 | 22 | 7 | 30 | 19 | 32 |
| Peak Hour Factor | 0.68 | 0.83 | 0.58 | 0.69 | 0.76 | 0.88 | 0.60 | 0.61 | 0.44 | 0.75 | 0.48 | 0.57 |
| Heavy Vehicles, % | 2 | 4 | 29 | 27 | 3 | 6 | 8 | 0 | 0 | 3 | 21 | 3 |
| Mvmt Flow | 88 | 84 | 24 | 16 | 171 | 113 | 40 | 36 | 16 | 40 | 40 | 56 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 2 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 2 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 2 |
| HCM Control Delay | 10.1 | 9.5 | 10.2 | 10.3 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 45% | 100% | 0% | 100% | 0% | 0% | 37% |
| Vol Thru, % | 42% | 0% | 83% | 0% | 100% | 0% | 23% |
| Vol Right, % | 13% | 0% | 17% | 0% | 0% | 100% | 40% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 53 | 60 | 84 | 11 | 130 | 99 | 81 |
| LT Vol | 24 | 60 | 0 | 11 | 0 | 0 | 30 |
| Through Vol | 22 | 0 | 70 | 0 | 130 | 0 | 19 |
| RT Vol | 7 | 0 | 14 | 0 | 0 | 99 | 32 |
| Lane Flow Rate | 92 | 88 | 108 | 16 | 171 | 112 | 136 |
| Geometry Grp | 7 | 8 | 8 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.16 | 0.159 | 0.178 | 0.029 | 0.264 | 0.153 | 0.222 |
| Departure Headway (Hd) | 6.272 | 6.486 | 5.896 | 6.479 | 5.562 | 4.906 | 5.894 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 573 | 554 | 610 | 556 | 650 | 736 | 609 |
| Service Time | 4.001 | 4.214 | 3.624 | 4.179 | 3.262 | 2.606 | 3.622 |
| HCM Lane V/C Ratio | 0.161 | 0.159 | 0.177 | 0.029 | 0.263 | 0.152 | 0.223 |
| HCM Control Delay | 10.2 | 10.4 | 9.9 | 9.4 | 10.2 | 8.5 | 10.3 |
| HCM Lane LOS | B | B | A | A | B | A | B |
| HCM 95th-tile Q | 0.6 | 0.6 | 0.6 | 0.1 | 1.1 | 0.5 | 0.8 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 60 | 366 | 4 | 1097 | 44 | 295 |
| v/c Ratio | 0.24 | 0.16 | 0.01 | 0.49 | 0.13 | 0.86 |
| Control Delay | 12.3 | 7.8 | 8.0 | 9.2 | 23.2 | 56.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.3 | 7.8 | 8.0 | 9.2 | 23.2 | 56.0 |
| Queue Length 50th (ft) | 14 | 43 | 0 | 174 | 18 | 167 |
| Queue Length 95th (ft) | 34 | 77 | 2 | 224 | 27 | 75 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 258 | 2279 | 674 | 2267 | 411 | 402 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.16 | 0.01 | 0.48 | 0.11 | 0.73 |

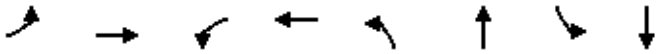
Intersection Summary



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 16 | 388 | 108 | 932 | 200 | 24 | 88 |
| v/c Ratio | 0.05 | 0.18 | 0.18 | 0.43 | 0.62 | 0.06 | 0.23 |
| Control Delay | 7.4 | 6.2 | 8.2 | 8.0 | 24.6 | 8.1 | 12.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.4 | 6.2 | 8.2 | 8.0 | 24.6 | 8.1 | 12.4 |
| Queue Length 50th (ft) | 2 | 30 | 13 | 71 | 54 | 2 | 16 |
| Queue Length 95th (ft) | m8 | 81 | 28 | 126 | 73 | 12 | 26 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 330 | 2153 | 603 | 2166 | 588 | 760 | 680 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.05 | 0.18 | 0.18 | 0.43 | 0.34 | 0.03 | 0.13 |

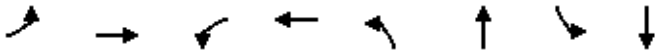
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 60 | 450 | 92 | 1172 | 24 | 203 | 76 | 269 |
| v/c Ratio | 0.27 | 0.28 | 0.17 | 0.72 | 0.09 | 0.61 | 0.25 | 0.61 |
| Control Delay | 12.5 | 15.9 | 10.2 | 22.0 | 23.4 | 38.1 | 24.8 | 35.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.5 | 15.9 | 10.2 | 22.0 | 23.4 | 38.1 | 24.8 | 35.1 |
| Queue Length 50th (ft) | 12 | 73 | 19 | 247 | 9 | 89 | 30 | 113 |
| Queue Length 95th (ft) | 36 | 138 | 42 | 337 | 18 | 137 | 65 | 132 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 527 | 2106 | 738 | 2116 | 428 | 678 | 425 | 666 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.11 | 0.21 | 0.12 | 0.55 | 0.06 | 0.30 | 0.18 | 0.40 |

Intersection Summary

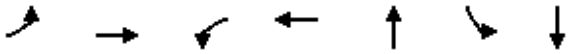


| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 144 | 427 | 76 | 970 | 44 | 376 | 403 | 917 |
| v/c Ratio | 0.59 | 0.29 | 0.61 | 0.68 | 0.42 | 0.51 | 1.20 | 0.87 |
| Control Delay | 55.1 | 21.7 | 67.3 | 23.8 | 56.3 | 33.8 | 154.9 | 37.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 55.1 | 21.7 | 67.3 | 23.8 | 56.3 | 33.8 | 154.9 | 37.0 |
| Queue Length 50th (ft) | 46 | 98 | 35 | 223 | 28 | 100 | ~161 | 244 |
| Queue Length 95th (ft) | 65 | 154 | 76 | 376 | 59 | 120 | #256 | 250 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 274 | 1497 | 141 | 1424 | 159 | 1055 | 336 | 1134 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.53 | 0.29 | 0.54 | 0.68 | 0.28 | 0.36 | 1.20 | 0.81 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

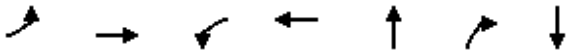
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 63 | 724 | 28 | 948 | 92 | 76 | 112 |
| v/c Ratio | 0.49 | 0.29 | 0.23 | 0.40 | 0.42 | 0.57 | 0.43 |
| Control Delay | 48.0 | 12.4 | 43.7 | 8.6 | 24.4 | 57.9 | 15.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 48.0 | 12.4 | 43.7 | 8.6 | 24.4 | 57.9 | 15.2 |
| Queue Length 50th (ft) | 43 | 107 | 18 | 107 | 21 | 47 | 7 |
| Queue Length 95th (ft) | m50 | m113 | 31 | 215 | 21 | 77 | 4 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 270 | 2477 | 255 | 2378 | 493 | 360 | 538 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.23 | 0.29 | 0.11 | 0.40 | 0.19 | 0.21 | 0.21 |

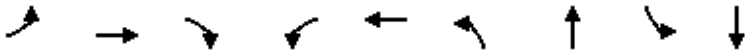
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 8 | 822 | 312 | 909 | 140 | 325 | 24 |
| v/c Ratio | 0.09 | 0.48 | 0.86 | 0.35 | 0.75 | 0.65 | 0.11 |
| Control Delay | 48.3 | 14.8 | 59.9 | 6.3 | 63.6 | 10.6 | 31.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 48.3 | 14.8 | 59.9 | 6.3 | 63.6 | 10.6 | 31.1 |
| Queue Length 50th (ft) | 5 | 186 | 191 | 80 | 87 | 0 | 11 |
| Queue Length 95th (ft) | 9 | 229 | 246 | 204 | 53 | 49 | 17 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 144 | 1728 | 424 | 2585 | 306 | 614 | 360 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.48 | 0.74 | 0.35 | 0.46 | 0.53 | 0.07 |

Intersection Summary



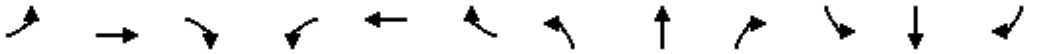
| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 117 | 136 | 100 | 143 | 148 | 133 | 577 | 32 | 1112 |
| v/c Ratio | 0.81 | 0.74 | 0.34 | 0.76 | 0.62 | 0.73 | 0.29 | 0.38 | 0.64 |
| Control Delay | 90.0 | 73.6 | 4.4 | 76.5 | 58.7 | 74.4 | 14.1 | 67.0 | 25.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 90.0 | 73.6 | 4.4 | 76.5 | 58.7 | 74.4 | 14.1 | 67.0 | 25.4 |
| Queue Length 50th (ft) | 89 | 104 | 0 | 109 | 108 | 101 | 112 | 25 | 314 |
| Queue Length 95th (ft) | #134 | 134 | 9 | 170 | 163 | 154 | 173 | 43 | 498 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 164 | 381 | 441 | 250 | 494 | 223 | 2005 | 100 | 1751 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.71 | 0.36 | 0.23 | 0.57 | 0.30 | 0.60 | 0.29 | 0.32 | 0.64 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 4 | 417 | 104 | 204 | 288 | 8 |
| v/c Ratio | 0.01 | 0.48 | 0.22 | 0.15 | 0.62 | 0.03 |
| Control Delay | 10.0 | 10.3 | 10.2 | 11.3 | 21.1 | 20.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.0 | 10.3 | 10.2 | 11.3 | 21.1 | 20.0 |
| Queue Length 50th (ft) | 1 | 18 | 11 | 11 | 54 | 1 |
| Queue Length 95th (ft) | 2 | 73 | 43 | 62 | 32 | 7 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 673 | 2046 | 570 | 2191 | 1010 | 1064 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.01 | 0.20 | 0.18 | 0.09 | 0.29 | 0.01 |

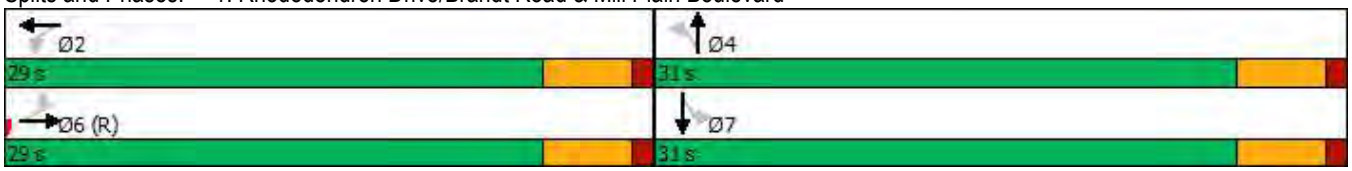
Intersection Summary

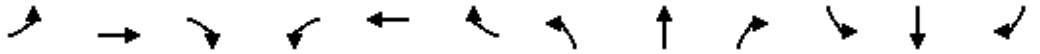


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 78 | 608 | 7 | 3 | 463 | 200 | 9 | 7 | 7 | 163 | 6 | 47 |
| Future Volume (vph) | 78 | 608 | 7 | 3 | 463 | 200 | 9 | 7 | 7 | 163 | 6 | 47 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 75 | | | 85 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.997 | | | 0.949 | | | 0.958 | | | 0.969 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.977 | | | 0.965 | |
| Satd. Flow (prot) | 1805 | 3463 | 0 | 1805 | 3283 | 0 | 0 | 1723 | 0 | 0 | 1658 | 0 |
| Flt Permitted | 0.343 | | | 0.391 | | | | 0.841 | | | 0.753 | |
| Satd. Flow (perm) | 652 | 3463 | 0 | 743 | 3283 | 0 | 0 | 1483 | 0 | 0 | 1294 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 187 | | | 16 | | | 32 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.81 | 0.94 | 0.58 | 0.38 | 0.93 | 0.77 | 0.38 | 0.58 | 0.44 | 0.87 | 0.50 | 0.78 |
| Heavy Vehicles (%) | 0% | 4% | 0% | 0% | 4% | 5% | 0% | 14% | 0% | 8% | 0% | 6% |
| Adj. Flow (vph) | 96 | 647 | 12 | 8 | 498 | 260 | 24 | 12 | 16 | 187 | 12 | 60 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 96 | 659 | 0 | 8 | 758 | 0 | 0 | 52 | 0 | 0 | 259 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 29.0 | 29.0 | | 29.0 | 29.0 | | 31.0 | 31.0 | | 31.0 | 31.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 35.4 | 35.4 | | 35.4 | 35.4 | | | 14.6 | | | 14.6 | |
| Actuated g/C Ratio | 0.59 | 0.59 | | 0.59 | 0.59 | | | 0.24 | | | 0.24 | |
| v/c Ratio | 0.25 | 0.32 | | 0.02 | 0.38 | | | 0.14 | | | 0.77 | |
| Control Delay | 10.5 | 7.9 | | 5.3 | 3.9 | | | 12.0 | | | 32.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 10.5 | 7.9 | | 5.3 | 3.9 | | | 12.0 | | | 32.4 | |
| LOS | B | A | | A | A | | | B | | | C | |
| Approach Delay | | 8.2 | | | 4.0 | | | 12.0 | | | 32.4 | |
| Approach LOS | | A | | | A | | | B | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 60 | | | |
| Actuated Cycle Length: 60 | | | |
| Offset: 16 (27%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.77 | | | |
| Intersection Signal Delay: 10.0 | | Intersection LOS: A | |
| Intersection Capacity Utilization 58.9% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

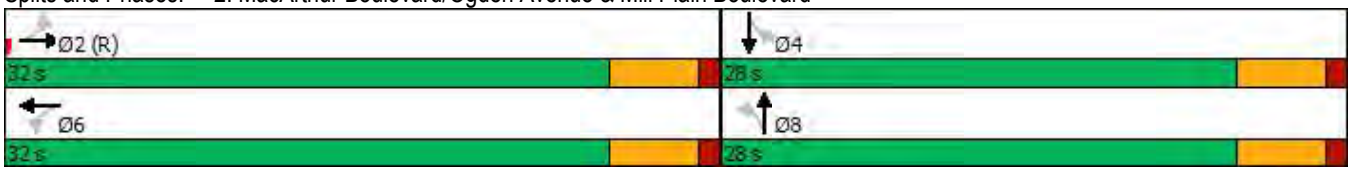




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 9 | 627 | 0 | 24 | 458 | 6 | 202 | 7 | 32 | 12 | 9 | 3 |
| Future Volume (vph) | 9 | 627 | 0 | 24 | 458 | 6 | 202 | 7 | 32 | 12 | 9 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 75 | | | 65 | | | 120 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.997 | | | 0.880 | | | 0.977 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.976 | |
| Satd. Flow (prot) | 1805 | 3471 | 0 | 1805 | 3451 | 0 | 1719 | 1633 | 0 | 0 | 1748 | 0 |
| Flt Permitted | 0.448 | | | 0.393 | | | 0.726 | | | | 0.870 | |
| Satd. Flow (perm) | 851 | 3471 | 0 | 747 | 3451 | 0 | 1314 | 1633 | 0 | 0 | 1558 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 5 | | | 48 | | | 8 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.56 | 0.97 | 0.82 | 0.60 | 0.86 | 0.50 | 0.73 | 0.58 | 0.67 | 0.50 | 0.56 | 0.38 |
| Heavy Vehicles (%) | 0% | 4% | 5% | 0% | 4% | 17% | 5% | 0% | 3% | 0% | 11% | 0% |
| Adj. Flow (vph) | 16 | 646 | 0 | 40 | 533 | 12 | 277 | 12 | 48 | 24 | 16 | 8 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 16 | 646 | 0 | 40 | 545 | 0 | 277 | 60 | 0 | 0 | 48 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 32.0 | 32.0 | | 32.0 | 32.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 33.6 | 33.6 | | 33.6 | 33.6 | | 16.4 | 16.4 | | | 16.4 | |
| Actuated g/C Ratio | 0.56 | 0.56 | | 0.56 | 0.56 | | 0.27 | 0.27 | | | 0.27 | |
| v/c Ratio | 0.03 | 0.33 | | 0.10 | 0.28 | | 0.77 | 0.12 | | | 0.11 | |
| Control Delay | 11.8 | 12.6 | | 9.0 | 8.4 | | 34.0 | 6.4 | | | 12.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 11.8 | 12.6 | | 9.0 | 8.4 | | 34.0 | 6.4 | | | 12.7 | |
| LOS | B | B | | A | A | | C | A | | | B | |
| Approach Delay | | 12.6 | | | 8.4 | | | 29.1 | | | 12.7 | |
| Approach LOS | | B | | | A | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 60 | | | |
| Actuated Cycle Length: 60 | | | |
| Offset: 28 (47%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.77 | | | |
| Intersection Signal Delay: 14.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 46.1% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 97 | 636 | 11 | 67 | 526 | 91 | 31 | 142 | 90 | 63 | 83 | 55 |
| Future Volume (vph) | 97 | 636 | 11 | 67 | 526 | 91 | 31 | 142 | 90 | 63 | 83 | 55 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 85 | | | 80 | | | 65 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.996 | | | 0.976 | | | 0.947 | | | 0.945 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 3527 | 0 | 1805 | 3427 | 0 | 1805 | 1715 | 0 | 1805 | 1717 | 0 |
| Flt Permitted | 0.207 | | | 0.236 | | | 0.646 | | | 0.305 | | |
| Satd. Flow (perm) | 375 | 3527 | 0 | 448 | 3427 | 0 | 1227 | 1715 | 0 | 580 | 1717 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 3 | | | 20 | | | 21 | | | 21 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.84 | 0.90 | 0.55 | 0.88 | 0.94 | 0.84 | 0.70 | 0.55 | 0.63 | 0.88 | 0.74 | 0.86 |
| Heavy Vehicles (%) | 5% | 2% | 0% | 0% | 2% | 7% | 0% | 6% | 3% | 0% | 6% | 2% |
| Adj. Flow (vph) | 115 | 707 | 20 | 76 | 560 | 108 | 44 | 258 | 143 | 72 | 112 | 64 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 115 | 727 | 0 | 76 | 668 | 0 | 44 | 401 | 0 | 72 | 176 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 24.0 | 50.0 | | 24.0 | 50.0 | | 18.0 | 32.0 | | 18.0 | 32.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 30.8 | 25.1 | | 27.6 | 21.5 | | 31.5 | 27.5 | | 34.8 | 30.8 | |
| Actuated g/C Ratio | 0.38 | 0.31 | | 0.34 | 0.27 | | 0.39 | 0.34 | | 0.43 | 0.38 | |
| v/c Ratio | 0.44 | 0.66 | | 0.30 | 0.72 | | 0.08 | 0.67 | | 0.21 | 0.26 | |
| Control Delay | 20.7 | 28.6 | | 18.1 | 31.1 | | 14.8 | 31.2 | | 15.7 | 19.5 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 20.7 | 28.6 | | 18.1 | 31.1 | | 14.8 | 31.2 | | 15.7 | 19.5 | |
| LOS | C | C | | B | C | | B | C | | B | B | |
| Approach Delay | | 27.5 | | | 29.8 | | | 29.6 | | | 18.4 | |
| Approach LOS | | C | | | C | | | C | | | B | |

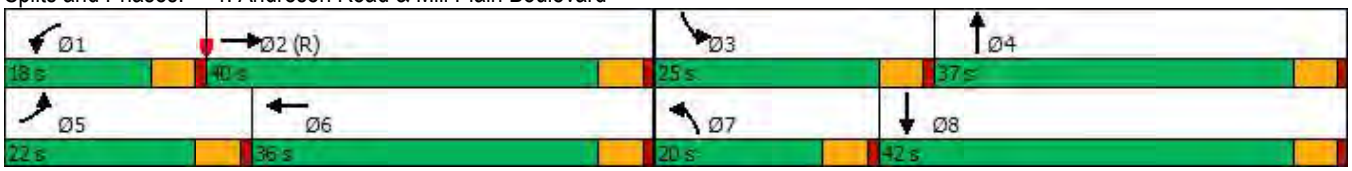
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 124 | | | |
| Actuated Cycle Length: 80.4 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.72 | | | |
| Intersection Signal Delay: 27.7 | | Intersection LOS: C | |
| Intersection Capacity Utilization 56.6% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 3: Devine Road & Mill Plain Boulevard

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 274 | 525 | 32 | 67 | 520 | 338 | 34 | 244 | 39 | 303 | 336 | 180 |
| Future Volume (vph) | 274 | 525 | 32 | 67 | 520 | 338 | 34 | 244 | 39 | 303 | 336 | 180 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 60 | | | 85 | | | 40 | | | 50 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.990 | | | 0.944 | | | 0.976 | | | 0.946 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 3508 | 0 | 1805 | 3353 | 0 | 1752 | 3382 | 0 | 3400 | 3327 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 3508 | 0 | 1805 | 3353 | 0 | 1752 | 3382 | 0 | 3400 | 3327 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 96 | | | 18 | | | 93 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.83 | 0.95 | 0.80 | 0.88 | 0.85 | 0.94 | 0.71 | 0.98 | 0.81 | 0.90 | 0.94 | 0.90 |
| Heavy Vehicles (%) | 1% | 2% | 0% | 0% | 2% | 1% | 3% | 5% | 0% | 3% | 3% | 2% |
| Adj. Flow (vph) | 330 | 553 | 40 | 76 | 612 | 360 | 48 | 249 | 48 | 337 | 357 | 200 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 330 | 593 | 0 | 76 | 972 | 0 | 48 | 297 | 0 | 337 | 557 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 22.0 | 40.0 | | 18.0 | 36.0 | | 20.0 | 37.0 | | 25.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 14.8 | 64.6 | | 8.6 | 56.4 | | 7.1 | 13.5 | | 15.3 | 23.7 | |
| Actuated g/C Ratio | 0.12 | 0.54 | | 0.07 | 0.47 | | 0.06 | 0.11 | | 0.13 | 0.20 | |
| v/c Ratio | 0.77 | 0.31 | | 0.59 | 0.60 | | 0.47 | 0.75 | | 0.78 | 0.76 | |
| Control Delay | 63.4 | 17.9 | | 59.9 | 33.2 | | 68.7 | 60.3 | | 53.1 | 39.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 63.4 | 17.9 | | 59.9 | 33.2 | | 68.7 | 60.3 | | 53.1 | 39.1 | |
| LOS | E | B | | E | C | | E | E | | D | D | |
| Approach Delay | | 34.2 | | | 35.1 | | | 61.5 | | | 44.4 | |
| Approach LOS | | C | | | D | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 87 (73%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.78 | | | |
| Intersection Signal Delay: 40.3 | | Intersection LOS: D | |
| Intersection Capacity Utilization 68.9% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

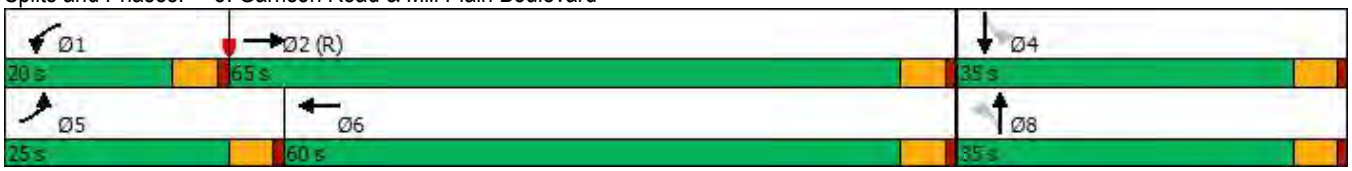
Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

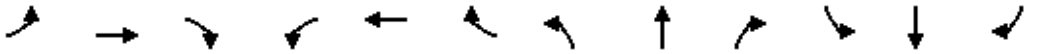


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 121 | 713 | 35 | 21 | 867 | 84 | 24 | 25 | 48 | 82 | 16 | 94 |
| Future Volume (vph) | 121 | 713 | 35 | 21 | 867 | 84 | 24 | 25 | 48 | 82 | 16 | 94 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 50 | | | 50 | | | 25 | | | 50 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.992 | | | 0.979 | | | 0.938 | | | 0.872 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.987 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3515 | 0 | 1805 | 3494 | 0 | 0 | 1743 | 0 | 1787 | 1643 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.665 | | 0.462 | | |
| Satd. Flow (perm) | 1805 | 3515 | 0 | 1805 | 3494 | 0 | 0 | 1174 | 0 | 869 | 1643 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 7 | | | 21 | | | 34 | | | 116 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.82 | 0.89 | 0.73 | 0.75 | 0.94 | 0.55 | 0.67 | 0.63 | 0.75 | 0.82 | 0.80 | 0.81 |
| Heavy Vehicles (%) | 0% | 2% | 0% | 0% | 1% | 2% | 0% | 0% | 2% | 1% | 0% | 1% |
| Adj. Flow (vph) | 148 | 801 | 48 | 28 | 922 | 153 | 36 | 40 | 64 | 100 | 20 | 116 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 148 | 849 | 0 | 28 | 1075 | 0 | 0 | 140 | 0 | 100 | 136 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 25.0 | 65.0 | | 20.0 | 60.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 13.2 | 89.1 | | 5.9 | 77.8 | | | 14.0 | | 14.0 | 14.0 | |
| Actuated g/C Ratio | 0.11 | 0.74 | | 0.05 | 0.65 | | | 0.12 | | 0.12 | 0.12 | |
| v/c Ratio | 0.74 | 0.33 | | 0.32 | 0.47 | | | 0.84 | | 0.99 | 0.46 | |
| Control Delay | 78.5 | 8.0 | | 62.9 | 9.4 | | | 75.6 | | 140.1 | 16.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 78.5 | 8.0 | | 62.9 | 9.4 | | | 75.6 | | 140.1 | 16.7 | |
| LOS | E | A | | E | A | | | E | | F | B | |
| Approach Delay | | 18.5 | | | 10.8 | | | 75.6 | | | 69.0 | |
| Approach LOS | | B | | | B | | | E | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 70 (58%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.99 | | | |
| Intersection Signal Delay: 23.1 | | Intersection LOS: C | |
| Intersection Capacity Utilization 58.1% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 5: Garrison Road & Mill Plain Boulevard

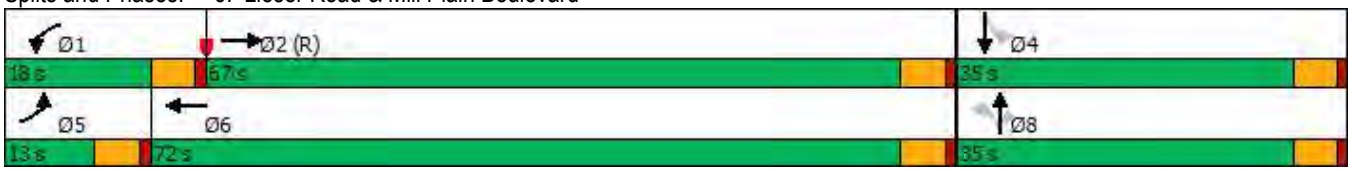


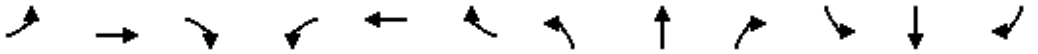


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 778 | 92 | 278 | 932 | 4 | 128 | 3 | 221 | 14 | 18 | 6 |
| Future Volume (vph) | 5 | 778 | 92 | 278 | 932 | 4 | 128 | 3 | 221 | 14 | 18 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 50 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.983 | | | 0.998 | | | | 0.850 | | 0.981 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.953 | | | 0.982 | |
| Satd. Flow (prot) | 1805 | 3457 | 0 | 1805 | 3533 | 0 | 0 | 1793 | 1583 | 0 | 1830 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.732 | | | 0.804 | |
| Satd. Flow (perm) | 1805 | 3457 | 0 | 1805 | 3533 | 0 | 0 | 1377 | 1583 | 0 | 1499 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 17 | | | 2 | | | | 231 | | 7 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.63 | 0.90 | 0.82 | 0.81 | 0.97 | 0.33 | 0.73 | 0.75 | 0.88 | 0.70 | 0.64 | 0.75 |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 2% | 0% | 1% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 8 | 864 | 112 | 343 | 961 | 12 | 175 | 4 | 251 | 20 | 28 | 8 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 8 | 976 | 0 | 343 | 973 | 0 | 0 | 179 | 251 | 0 | 56 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 13.0 | 67.0 | | 18.0 | 72.0 | | 35.0 | 35.0 | 35.0 | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.1 | 62.0 | | 23.8 | 88.8 | | | 19.2 | 19.2 | | 19.2 | |
| Actuated g/C Ratio | 0.04 | 0.52 | | 0.20 | 0.74 | | | 0.16 | 0.16 | | 0.16 | |
| v/c Ratio | 0.11 | 0.54 | | 0.96 | 0.37 | | | 0.81 | 0.56 | | 0.23 | |
| Control Delay | 63.6 | 20.3 | | 87.1 | 7.3 | | | 74.8 | 12.0 | | 38.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 63.6 | 20.3 | | 87.1 | 7.3 | | | 74.8 | 12.0 | | 38.8 | |
| LOS | E | C | | F | A | | | E | B | | D | |
| Approach Delay | | 20.7 | | | 28.1 | | | 38.2 | | | 38.8 | |
| Approach LOS | | C | | | C | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 76 (63%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.96 | | | |
| Intersection Signal Delay: 27.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 66.3% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 6: Lieser Road & Mill Plain Boulevard

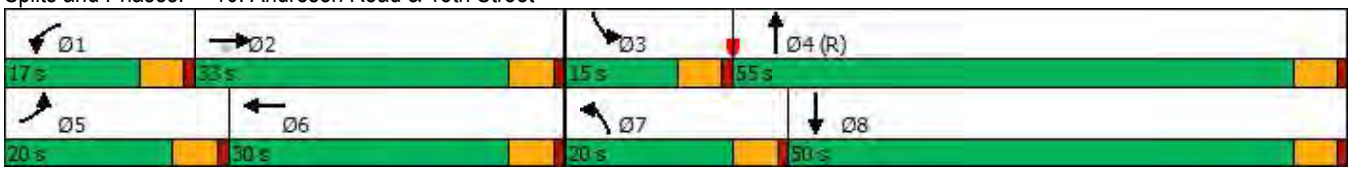


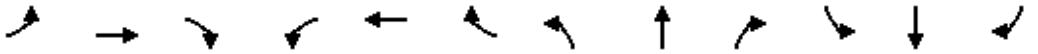


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 130 | 217 | 150 | 119 | 161 | 8 | 116 | 638 | 161 | 48 | 509 | 131 |
| Future Volume (vph) | 130 | 217 | 150 | 119 | 161 | 8 | 116 | 638 | 161 | 48 | 509 | 131 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 45 | | | 55 | | | 75 | | | 50 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.992 | | | 0.969 | | | 0.970 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1752 | 1900 | 1568 | 1752 | 1784 | 0 | 1752 | 3410 | 0 | 1770 | 3460 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1752 | 1900 | 1568 | 1752 | 1784 | 0 | 1752 | 3410 | 0 | 1770 | 3460 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 144 | | 2 | | | 34 | | | 29 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.79 | 0.86 | 0.87 | 0.76 | 0.76 | 0.67 | 0.83 | 0.86 | 0.82 | 0.80 | 0.91 | 0.94 |
| Heavy Vehicles (%) | 3% | 0% | 3% | 3% | 6% | 0% | 3% | 3% | 1% | 2% | 1% | 2% |
| Adj. Flow (vph) | 165 | 252 | 172 | 157 | 212 | 12 | 140 | 742 | 196 | 60 | 559 | 139 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 165 | 252 | 172 | 157 | 224 | 0 | 140 | 938 | 0 | 60 | 698 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 20.0 | 33.0 | 33.0 | 17.0 | 30.0 | | 20.0 | 55.0 | | 15.0 | 50.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 13.4 | 20.5 | 20.5 | 11.7 | 18.8 | | 12.3 | 62.3 | | 7.7 | 55.5 | |
| Actuated g/C Ratio | 0.11 | 0.17 | 0.17 | 0.10 | 0.16 | | 0.10 | 0.52 | | 0.06 | 0.46 | |
| v/c Ratio | 0.85 | 0.78 | 0.44 | 0.92 | 0.80 | | 0.78 | 0.53 | | 0.53 | 0.43 | |
| Control Delay | 86.0 | 63.2 | 13.5 | 104.6 | 68.2 | | 66.4 | 36.4 | | 70.9 | 23.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 86.0 | 63.2 | 13.5 | 104.6 | 68.2 | | 66.4 | 36.4 | | 70.9 | 23.4 | |
| LOS | F | E | B | F | E | | E | D | | E | C | |
| Approach Delay | | 55.1 | | | 83.2 | | | 40.3 | | | 27.1 | |
| Approach LOS | | E | | | F | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 47 (39%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.92 | | | |
| Intersection Signal Delay: 45.7 | | Intersection LOS: D | |
| Intersection Capacity Utilization 62.5% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 10: Andresen Road & 18th Street

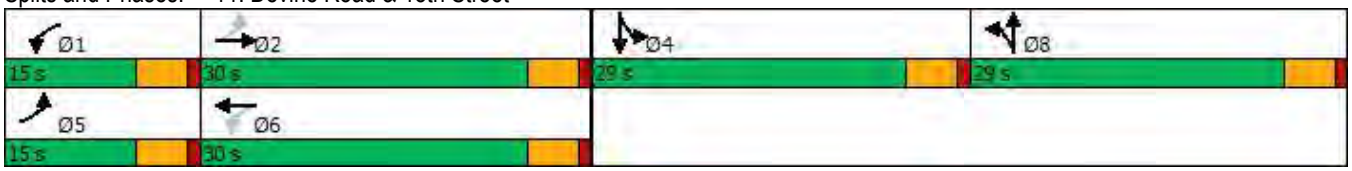




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 218 | 159 | 53 | 308 | 19 | 197 | 12 | 78 | 5 | 6 | 11 |
| Future Volume (vph) | 12 | 218 | 159 | 53 | 308 | 19 | 197 | 12 | 78 | 5 | 6 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 45 | | | 45 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.934 | | | 0.986 | | | 0.960 | | | 0.938 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.970 | | | 0.989 | |
| Satd. Flow (prot) | 1805 | 3256 | 0 | 1770 | 3435 | 0 | 0 | 1691 | 0 | 0 | 1763 | 0 |
| Flt Permitted | 0.528 | | | 0.377 | | | | 0.970 | | | 0.989 | |
| Satd. Flow (perm) | 1003 | 3256 | 0 | 702 | 3435 | 0 | 0 | 1691 | 0 | 0 | 1763 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 184 | | | 10 | | | 19 | | | 24 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.60 | 0.87 | 0.80 | 0.83 | 0.90 | 0.53 | 0.93 | 0.43 | 0.78 | 0.42 | 0.38 | 0.46 |
| Heavy Vehicles (%) | 0% | 4% | 3% | 2% | 4% | 0% | 6% | 0% | 3% | 0% | 0% | 0% |
| Adj. Flow (vph) | 20 | 251 | 199 | 64 | 342 | 36 | 212 | 28 | 100 | 12 | 16 | 24 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 20 | 450 | 0 | 64 | 378 | 0 | 0 | 340 | 0 | 0 | 52 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 29.0 | 29.0 | | 29.0 | 29.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 15.0 | 12.2 | | 17.2 | 16.3 | | | 16.3 | | | 7.5 | |
| Actuated g/C Ratio | 0.29 | 0.24 | | 0.33 | 0.32 | | | 0.32 | | | 0.15 | |
| v/c Ratio | 0.05 | 0.49 | | 0.16 | 0.35 | | | 0.62 | | | 0.19 | |
| Control Delay | 14.2 | 14.7 | | 14.4 | 16.6 | | | 22.9 | | | 21.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 14.2 | 14.7 | | 14.4 | 16.6 | | | 22.9 | | | 21.4 | |
| LOS | B | B | | B | B | | | C | | | C | |
| Approach Delay | | 14.7 | | | 16.3 | | | 22.9 | | | 21.4 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 103 | | | |
| Actuated Cycle Length: 51.5 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.62 | | | |
| Intersection Signal Delay: 17.6 | | Intersection LOS: B | |
| Intersection Capacity Utilization 52.4% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 59.1 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 45 | 161 | 170 | 50 | 122 | 24 | 159 | 319 | 77 | 12 | 349 | 21 |
| Future Vol, veh/h | 45 | 161 | 170 | 50 | 122 | 24 | 159 | 319 | 77 | 12 | 349 | 21 |
| Peak Hour Factor | 0.75 | 0.91 | 0.89 | 0.74 | 0.90 | 0.60 | 0.83 | 0.89 | 0.77 | 0.43 | 0.97 | 0.88 |
| Heavy Vehicles, % | 4 | 1 | 1 | 0 | 1 | 0 | 4 | 1 | 1 | 0 | 1 | 0 |
| Mvmt Flow | 60 | 177 | 191 | 68 | 136 | 40 | 192 | 358 | 100 | 28 | 360 | 24 |
| Number of Lanes | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 1 | 2 |
| HCM Control Delay | 43.4 | 30 | 81.5 | 57.2 |
| HCM LOS | E | D | F | F |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 26% | 100% | 0% |
| Vol Thru, % | 0% | 81% | 0% | 49% | 62% | 0% | 94% |
| Vol Right, % | 0% | 19% | 0% | 51% | 12% | 0% | 6% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 159 | 396 | 45 | 331 | 196 | 12 | 370 |
| LT Vol | 159 | 0 | 45 | 0 | 50 | 12 | 0 |
| Through Vol | 0 | 319 | 0 | 161 | 122 | 0 | 349 |
| RT Vol | 0 | 77 | 0 | 170 | 24 | 0 | 21 |
| Lane Flow Rate | 192 | 458 | 60 | 368 | 243 | 28 | 384 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 7 | 7 |
| Degree of Util (X) | 0.502 | 1.11 | 0.157 | 0.87 | 0.65 | 0.072 | 0.933 |
| Departure Headway (Hd) | 9.439 | 8.72 | 9.823 | 8.872 | 10.096 | 9.67 | 9.122 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 385 | 422 | 367 | 412 | 360 | 373 | 399 |
| Service Time | 7.139 | 6.42 | 7.523 | 6.572 | 8.096 | 7.37 | 6.822 |
| HCM Lane V/C Ratio | 0.499 | 1.085 | 0.163 | 0.893 | 0.675 | 0.075 | 0.962 |
| HCM Control Delay | 21.3 | 106.7 | 14.3 | 48.1 | 30 | 13.1 | 60.4 |
| HCM Lane LOS | C | F | B | E | D | B | F |
| HCM 95th-tile Q | 2.7 | 16.3 | 0.6 | 8.7 | 4.4 | 0.2 | 10.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.7 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 59 | 197 | 15 | 35 | 130 | 99 | 28 | 192 | 35 | 137 | 154 | 80 |
| Future Vol, veh/h | 59 | 197 | 15 | 35 | 130 | 99 | 28 | 192 | 35 | 137 | 154 | 80 |
| Peak Hour Factor | 0.51 | 0.81 | 0.54 | 0.80 | 0.93 | 0.85 | 0.88 | 0.83 | 0.63 | 0.80 | 0.79 | 0.77 |
| Heavy Vehicles, % | 7 | 4 | 0 | 0 | 3 | 6 | 4 | 4 | 11 | 3 | 16 | 9 |
| Mvmt Flow | 116 | 243 | 28 | 44 | 140 | 116 | 32 | 231 | 56 | 171 | 195 | 104 |
| Number of Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 18.2 | 14 | 14.9 | 15.4 |
| HCM LOS | C | B | B | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 65% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 35% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 28 | 128 | 99 | 59 | 197 | 15 | 35 | 130 | 99 | 137 | 103 |
| LT Vol | 28 | 0 | 0 | 59 | 0 | 0 | 35 | 0 | 0 | 137 | 0 |
| Through Vol | 0 | 128 | 64 | 0 | 197 | 0 | 0 | 130 | 0 | 0 | 103 |
| RT Vol | 0 | 0 | 35 | 0 | 0 | 15 | 0 | 0 | 99 | 0 | 0 |
| Lane Flow Rate | 32 | 154 | 133 | 116 | 243 | 28 | 44 | 140 | 116 | 171 | 130 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.078 | 0.357 | 0.302 | 0.28 | 0.551 | 0.057 | 0.107 | 0.326 | 0.251 | 0.402 | 0.295 |
| Departure Headway (Hd) | 8.829 | 8.329 | 8.2 | 8.702 | 8.151 | 7.383 | 8.842 | 8.393 | 7.744 | 8.46 | 8.181 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 404 | 430 | 436 | 412 | 440 | 483 | 404 | 426 | 462 | 425 | 438 |
| Service Time | 6.609 | 6.109 | 5.981 | 6.475 | 5.924 | 5.156 | 6.623 | 6.174 | 5.525 | 6.235 | 5.956 |
| HCM Lane V/C Ratio | 0.079 | 0.358 | 0.305 | 0.282 | 0.552 | 0.058 | 0.109 | 0.329 | 0.251 | 0.402 | 0.297 |
| HCM Control Delay | 12.4 | 15.7 | 14.5 | 14.9 | 20.6 | 10.6 | 12.7 | 15.2 | 13.1 | 16.9 | 14.4 |
| HCM Lane LOS | B | C | B | B | C | B | B | C | B | C | B |
| HCM 95th-tile Q | 0.3 | 1.6 | 1.3 | 1.1 | 3.3 | 0.2 | 0.4 | 1.4 | 1 | 1.9 | 1.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 11.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 45 | 120 | 24 | 18 | 105 | 92 | 17 | 21 | 7 | 78 | 33 | 53 |
| Future Vol, veh/h | 45 | 120 | 24 | 18 | 105 | 92 | 17 | 21 | 7 | 78 | 33 | 53 |
| Peak Hour Factor | 0.63 | 0.81 | 0.67 | 0.64 | 0.85 | 0.77 | 0.71 | 0.66 | 0.88 | 0.65 | 0.83 | 0.53 |
| Heavy Vehicles, % | 7 | 3 | 4 | 11 | 8 | 11 | 12 | 10 | 14 | 5 | 3 | 2 |
| Mvmt Flow | 71 | 148 | 36 | 28 | 124 | 119 | 24 | 32 | 8 | 120 | 40 | 100 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |

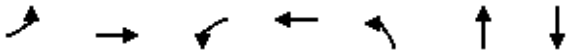
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 2 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 2 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 2 |
| HCM Control Delay | 11.6 | 9.9 | 10.4 | 13.7 |
| HCM LOS | B | A | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 38% | 100% | 0% | 100% | 0% | 0% | 48% |
| Vol Thru, % | 47% | 0% | 83% | 0% | 100% | 0% | 20% |
| Vol Right, % | 16% | 0% | 17% | 0% | 0% | 100% | 32% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 45 | 45 | 144 | 18 | 105 | 92 | 164 |
| LT Vol | 17 | 45 | 0 | 18 | 0 | 0 | 78 |
| Through Vol | 21 | 0 | 120 | 0 | 105 | 0 | 33 |
| RT Vol | 7 | 0 | 24 | 0 | 0 | 92 | 53 |
| Lane Flow Rate | 64 | 71 | 184 | 28 | 124 | 119 | 260 |
| Geometry Grp | 7 | 8 | 8 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.119 | 0.138 | 0.319 | 0.052 | 0.209 | 0.181 | 0.444 |
| Departure Headway (Hd) | 6.707 | 6.947 | 6.25 | 6.661 | 6.102 | 5.443 | 6.153 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 534 | 516 | 574 | 537 | 588 | 658 | 584 |
| Service Time | 4.457 | 4.695 | 3.998 | 4.404 | 3.845 | 3.185 | 3.891 |
| HCM Lane V/C Ratio | 0.12 | 0.138 | 0.321 | 0.052 | 0.211 | 0.181 | 0.445 |
| HCM Control Delay | 10.4 | 10.8 | 11.9 | 9.8 | 10.5 | 9.4 | 13.7 |
| HCM Lane LOS | B | B | B | A | B | A | B |
| HCM 95th-tile Q | 0.4 | 0.5 | 1.4 | 0.2 | 0.8 | 0.7 | 2.3 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 96 | 659 | 8 | 758 | 52 | 259 |
| v/c Ratio | 0.25 | 0.32 | 0.02 | 0.38 | 0.14 | 0.77 |
| Control Delay | 10.5 | 7.9 | 5.3 | 3.9 | 12.0 | 32.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.5 | 7.9 | 5.3 | 3.9 | 12.0 | 32.4 |
| Queue Length 50th (ft) | 15 | 54 | 1 | 29 | 10 | 76 |
| Queue Length 95th (ft) | 45 | 114 | m2 | 67 | 16 | 52 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 384 | 2046 | 438 | 2014 | 651 | 578 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.25 | 0.32 | 0.02 | 0.38 | 0.08 | 0.45 |

Intersection Summary

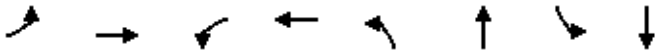
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 16 | 646 | 40 | 545 | 277 | 60 | 48 |
| v/c Ratio | 0.03 | 0.33 | 0.10 | 0.28 | 0.77 | 0.12 | 0.11 |
| Control Delay | 11.8 | 12.6 | 9.0 | 8.4 | 34.0 | 6.4 | 12.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 11.8 | 12.6 | 9.0 | 8.4 | 34.0 | 6.4 | 12.7 |
| Queue Length 50th (ft) | 4 | 90 | 6 | 47 | 92 | 3 | 11 |
| Queue Length 95th (ft) | m11 | 150 | 15 | 90 | 106 | 10 | 15 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 476 | 1942 | 418 | 1933 | 503 | 655 | 602 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.33 | 0.10 | 0.28 | 0.55 | 0.09 | 0.08 |

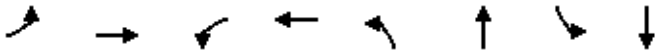
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 115 | 727 | 76 | 668 | 44 | 401 | 72 | 176 |
| v/c Ratio | 0.44 | 0.66 | 0.30 | 0.72 | 0.08 | 0.67 | 0.21 | 0.26 |
| Control Delay | 20.7 | 28.6 | 18.1 | 31.1 | 14.8 | 31.2 | 15.7 | 19.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 20.7 | 28.6 | 18.1 | 31.1 | 14.8 | 31.2 | 15.7 | 19.5 |
| Queue Length 50th (ft) | 36 | 176 | 23 | 158 | 12 | 168 | 20 | 57 |
| Queue Length 95th (ft) | 66 | 255 | 49 | 234 | 28 | 167 | 51 | 99 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 482 | 2026 | 516 | 1976 | 650 | 604 | 466 | 674 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.24 | 0.36 | 0.15 | 0.34 | 0.07 | 0.66 | 0.15 | 0.26 |

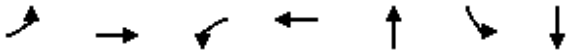
Intersection Summary



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 330 | 593 | 76 | 972 | 48 | 297 | 337 | 557 |
| v/c Ratio | 0.77 | 0.31 | 0.59 | 0.60 | 0.47 | 0.75 | 0.78 | 0.76 |
| Control Delay | 63.4 | 17.9 | 59.9 | 33.2 | 68.7 | 60.3 | 53.1 | 39.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 63.4 | 17.9 | 59.9 | 33.2 | 68.7 | 60.3 | 53.1 | 39.1 |
| Queue Length 50th (ft) | 129 | 132 | 59 | 234 | 37 | 112 | 135 | 191 |
| Queue Length 95th (ft) | 158 | 214 | 110 | 404 | 59 | 154 | m126 | m244 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 503 | 1891 | 195 | 1627 | 219 | 915 | 566 | 1090 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.66 | 0.31 | 0.39 | 0.60 | 0.22 | 0.32 | 0.60 | 0.51 |

Intersection Summary

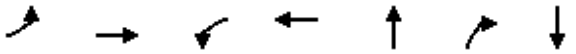
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 148 | 849 | 28 | 1075 | 140 | 100 | 136 |
| v/c Ratio | 0.74 | 0.33 | 0.32 | 0.47 | 0.84 | 0.99 | 0.46 |
| Control Delay | 78.5 | 8.0 | 62.9 | 9.4 | 75.6 | 140.1 | 16.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 78.5 | 8.0 | 62.9 | 9.4 | 75.6 | 140.1 | 16.7 |
| Queue Length 50th (ft) | 117 | 62 | 22 | 125 | 82 | 78 | 14 |
| Queue Length 95th (ft) | 172 | 340 | m43 | 224 | 89 | #123 | 52 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 300 | 2612 | 225 | 2271 | 319 | 217 | 497 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.49 | 0.33 | 0.12 | 0.47 | 0.44 | 0.46 | 0.27 |

Intersection Summary

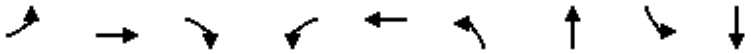
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 8 | 976 | 343 | 973 | 179 | 251 | 56 |
| v/c Ratio | 0.11 | 0.54 | 0.96 | 0.37 | 0.81 | 0.56 | 0.23 |
| Control Delay | 63.6 | 20.3 | 87.1 | 7.3 | 74.8 | 12.0 | 38.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 63.6 | 20.3 | 87.1 | 7.3 | 74.8 | 12.0 | 38.8 |
| Queue Length 50th (ft) | 6 | 335 | 265 | 113 | 135 | 13 | 33 |
| Queue Length 95th (ft) | m15 | 127 | #475 | 252 | 162 | 77 | 46 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 120 | 1794 | 358 | 2613 | 344 | 569 | 380 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.54 | 0.96 | 0.37 | 0.52 | 0.44 | 0.15 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 165 | 252 | 172 | 157 | 224 | 140 | 938 | 60 | 698 |
| v/c Ratio | 0.85 | 0.78 | 0.44 | 0.92 | 0.80 | 0.78 | 0.53 | 0.53 | 0.43 |
| Control Delay | 86.0 | 63.2 | 13.5 | 104.6 | 68.2 | 66.4 | 36.4 | 70.9 | 23.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 86.0 | 63.2 | 13.5 | 104.6 | 68.2 | 66.4 | 36.4 | 70.9 | 23.4 |
| Queue Length 50th (ft) | 125 | 187 | 18 | 122 | 169 | 105 | 337 | 46 | 184 |
| Queue Length 95th (ft) | #178 | 247 | 70 | #189 | 198 | 158 | 436 | 80 | 270 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 219 | 443 | 476 | 175 | 373 | 220 | 1785 | 147 | 1615 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.75 | 0.57 | 0.36 | 0.90 | 0.60 | 0.64 | 0.53 | 0.41 | 0.43 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 20 | 450 | 64 | 378 | 340 | 52 |
| v/c Ratio | 0.05 | 0.49 | 0.16 | 0.35 | 0.62 | 0.19 |
| Control Delay | 14.2 | 14.7 | 14.4 | 16.6 | 22.9 | 21.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 14.2 | 14.7 | 14.4 | 16.6 | 22.9 | 21.4 |
| Queue Length 50th (ft) | 4 | 45 | 15 | 47 | 105 | 10 |
| Queue Length 95th (ft) | 12 | 93 | 39 | 117 | 78 | 12 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 547 | 1994 | 513 | 2035 | 965 | 1007 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.23 | 0.12 | 0.19 | 0.35 | 0.05 |

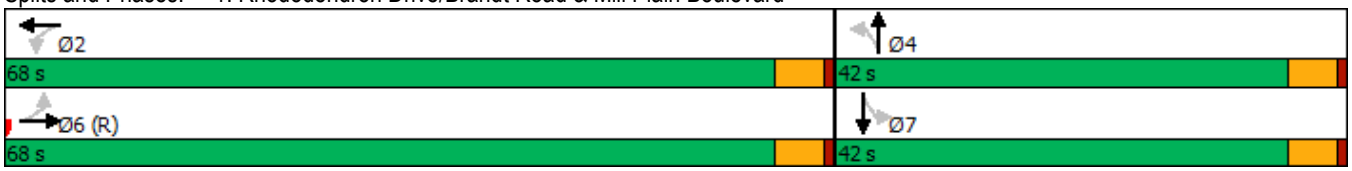
Intersection Summary

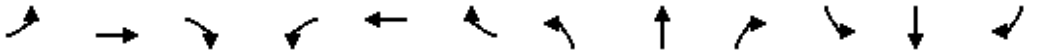
## Attachment B. No-Build Analysis Reports

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 406 | 5 | 1 | 1075 | 123 | 17 | 5 | 4 | 186 | 3 | 20 |
| Future Volume (vph) | 22 | 406 | 5 | 1 | 1075 | 123 | 17 | 5 | 4 | 186 | 3 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.985 | | | 0.980 | | | 0.987 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.968 | | | 0.957 | |
| Satd. Flow (prot) | 1719 | 3433 | 0 | 1805 | 3406 | 0 | 0 | 1738 | 0 | 0 | 1690 | 0 |
| Flt Permitted | 0.170 | | | 0.498 | | | | 0.827 | | | 0.730 | |
| Satd. Flow (perm) | 308 | 3433 | 0 | 946 | 3406 | 0 | 0 | 1485 | 0 | 0 | 1289 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 2 | | | 19 | | | 4 | | | 5 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 5% | 5% | 0% | 0% | 4% | 8% | 0% | 20% | 0% | 6% | 33% | 4% |
| Adj. Flow (vph) | 24 | 432 | 5 | 1 | 1168 | 134 | 18 | 5 | 4 | 202 | 3 | 22 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 24 | 437 | 0 | 1 | 1302 | 0 | 0 | 27 | 0 | 0 | 227 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 68.0 | 68.0 | | 68.0 | 68.0 | | 42.0 | 42.0 | | 42.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 77.1 | 77.1 | | 77.1 | 77.1 | | | 22.9 | | | 22.9 | |
| Actuated g/C Ratio | 0.70 | 0.70 | | 0.70 | 0.70 | | | 0.21 | | | 0.21 | |
| v/c Ratio | 0.11 | 0.18 | | 0.00 | 0.54 | | | 0.09 | | | 0.83 | |
| Control Delay | 9.0 | 6.6 | | 4.0 | 4.1 | | | 28.4 | | | 64.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 9.0 | 6.6 | | 4.0 | 4.1 | | | 28.4 | | | 64.8 | |
| LOS | A | A | | A | A | | | C | | | E | |
| Approach Delay | | 6.8 | | | 4.1 | | | 28.4 | | | 64.8 | |
| Approach LOS | | A | | | A | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 47 (43%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 11.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 57.4% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

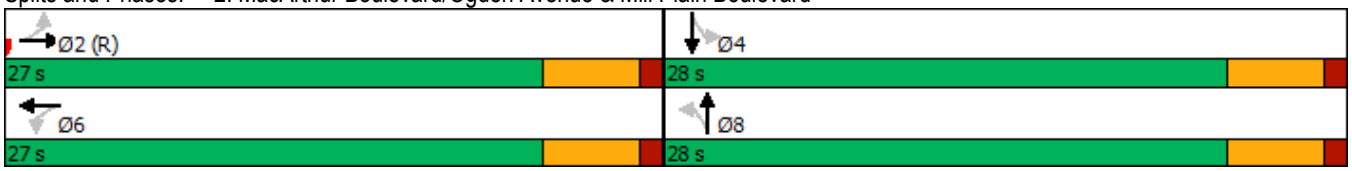




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 10 | 441 | 0 | 73 | 922 | 15 | 220 | 4 | 8 | 22 | 18 | 12 |
| Future Volume (vph) | 10 | 441 | 0 | 73 | 922 | 15 | 220 | 4 | 8 | 22 | 18 | 12 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.998 | | | 0.896 | | | 0.969 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.979 | |
| Satd. Flow (prot) | 1805 | 3438 | 0 | 1752 | 3463 | 0 | 1736 | 1632 | 0 | 0 | 1654 | 0 |
| Flt Permitted | 0.233 | | | 0.485 | | | 0.720 | | | | 0.898 | |
| Satd. Flow (perm) | 443 | 3438 | 0 | 895 | 3463 | 0 | 1315 | 1632 | 0 | 0 | 1517 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 3 | | | 9 | | | 13 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 5% | 5% | 3% | 4% | 7% | 4% | 14% | 0% | 0% | 21% | 7% |
| Adj. Flow (vph) | 11 | 464 | 0 | 79 | 1002 | 16 | 239 | 4 | 9 | 24 | 20 | 13 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 11 | 464 | 0 | 79 | 1018 | 0 | 239 | 13 | 0 | 0 | 57 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 27.0 | 27.0 | | 27.0 | 27.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 30.7 | 30.7 | | 30.7 | 30.7 | | 14.3 | 14.3 | | | 14.3 | |
| Actuated g/C Ratio | 0.56 | 0.56 | | 0.56 | 0.56 | | 0.26 | 0.26 | | | 0.26 | |
| v/c Ratio | 0.04 | 0.24 | | 0.16 | 0.53 | | 0.70 | 0.03 | | | 0.14 | |
| Control Delay | 7.2 | 6.9 | | 9.4 | 10.6 | | 29.1 | 8.7 | | | 11.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 7.2 | 6.9 | | 9.4 | 10.6 | | 29.1 | 8.7 | | | 11.9 | |
| LOS | A | A | | A | B | | C | A | | | B | |
| Approach Delay | | 6.9 | | | 10.5 | | | 28.1 | | | 11.9 | |
| Approach LOS | | A | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 55 | | | |
| Actuated Cycle Length: 55 | | | |
| Offset: 20 (36%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.70 | | | |
| Intersection Signal Delay: 12.0 | | Intersection LOS: B | |
| Intersection Capacity Utilization 67.3% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

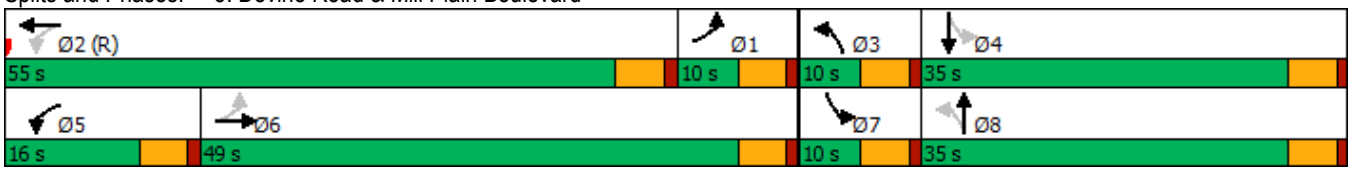
Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 42 | 463 | 18 | 62 | 1089 | 74 | 14 | 195 | 78 | 70 | 160 | 57 |
| Future Volume (vph) | 42 | 463 | 18 | 62 | 1089 | 74 | 14 | 195 | 78 | 70 | 160 | 57 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.994 | | | 0.991 | | | 0.957 | | | 0.961 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1703 | 3455 | 0 | 1787 | 3469 | 0 | 1687 | 1732 | 0 | 1752 | 1711 | 0 |
| Flt Permitted | 0.158 | | | 0.377 | | | 0.461 | | | 0.257 | | |
| Satd. Flow (perm) | 283 | 3455 | 0 | 709 | 3469 | 0 | 819 | 1732 | 0 | 474 | 1711 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 8 | | | 18 | | | 16 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 6% | 4% | 0% | 1% | 3% | 5% | 7% | 7% | 0% | 3% | 7% | 6% |
| Adj. Flow (vph) | 46 | 503 | 20 | 67 | 1184 | 80 | 15 | 212 | 85 | 76 | 174 | 62 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 46 | 523 | 0 | 67 | 1264 | 0 | 15 | 297 | 0 | 76 | 236 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 10.0 | 49.0 | | 16.0 | 55.0 | | 10.0 | 35.0 | | 10.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 62.6 | 61.6 | | 62.6 | 62.6 | | 25.4 | 21.4 | | 27.4 | 25.4 | |
| Actuated g/C Ratio | 0.57 | 0.56 | | 0.57 | 0.57 | | 0.23 | 0.19 | | 0.25 | 0.23 | |
| v/c Ratio | 0.20 | 0.27 | | 0.15 | 0.64 | | 0.07 | 0.85 | | 0.43 | 0.58 | |
| Control Delay | 17.6 | 11.6 | | 5.4 | 6.7 | | 25.9 | 60.6 | | 35.8 | 40.2 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 17.6 | 11.6 | | 5.4 | 6.7 | | 25.9 | 60.6 | | 35.8 | 40.2 | |
| LOS | B | B | | A | A | | C | E | | D | D | |
| Approach Delay | | 12.1 | | | 6.6 | | | 58.9 | | | 39.2 | |
| Approach LOS | | B | | | A | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 54 (49%), Referenced to phase 2:WBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.85 | | | |
| Intersection Signal Delay: 18.3 | | Intersection LOS: B | |
| Intersection Capacity Utilization 72.5% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

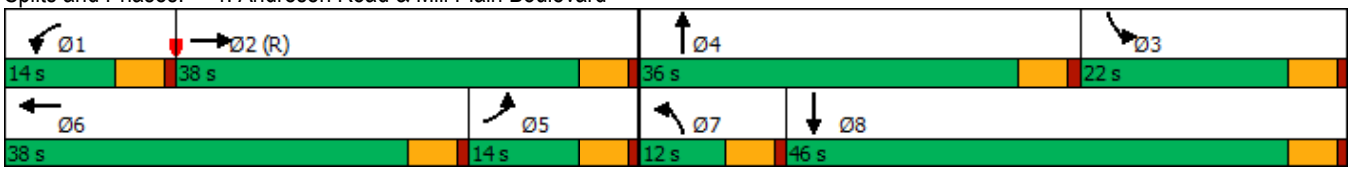
Splits and Phases: 3: Devine Road & Mill Plain Boulevard

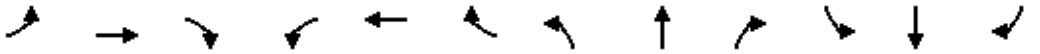


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 123 | 452 | 27 | 62 | 939 | 203 | 38 | 256 | 29 | 475 | 499 | 318 |
| Future Volume (vph) | 123 | 452 | 27 | 62 | 939 | 203 | 38 | 256 | 29 | 475 | 499 | 318 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.992 | | | 0.973 | | | 0.985 | | | 0.942 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3367 | 3462 | 0 | 1703 | 3404 | 0 | 1597 | 3374 | 0 | 3367 | 3275 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3367 | 3462 | 0 | 1703 | 3404 | 0 | 1597 | 3374 | 0 | 3367 | 3275 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 24 | | | 11 | | | 149 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 4% | 3% | 11% | 6% | 3% | 4% | 13% | 6% | 0% | 4% | 5% | 2% |
| Adj. Flow (vph) | 134 | 491 | 29 | 67 | 1021 | 221 | 41 | 278 | 32 | 516 | 542 | 346 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 134 | 520 | 0 | 67 | 1242 | 0 | 41 | 310 | 0 | 516 | 888 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 14.0 | 38.0 | | 14.0 | 38.0 | | 12.0 | 36.0 | | 22.0 | 46.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 9.0 | 47.2 | | 7.9 | 44.1 | | 6.1 | 13.3 | | 23.6 | 34.8 | |
| Actuated g/C Ratio | 0.08 | 0.43 | | 0.07 | 0.40 | | 0.06 | 0.12 | | 0.21 | 0.32 | |
| v/c Ratio | 0.49 | 0.35 | | 0.55 | 0.90 | | 0.47 | 0.74 | | 0.72 | 0.78 | |
| Control Delay | 47.3 | 18.6 | | 84.4 | 33.8 | | 67.6 | 55.9 | | 24.2 | 12.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 47.3 | 18.6 | | 84.4 | 33.8 | | 67.6 | 55.9 | | 24.2 | 12.7 | |
| LOS | D | B | | F | C | | E | E | | C | B | |
| Approach Delay | | 24.5 | | | 36.4 | | | 57.3 | | | 16.9 | |
| Approach LOS | | C | | | D | | | E | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 20 (18%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.90 | | | |
| Intersection Signal Delay: 28.9 | | Intersection LOS: C | |
| Intersection Capacity Utilization 81.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

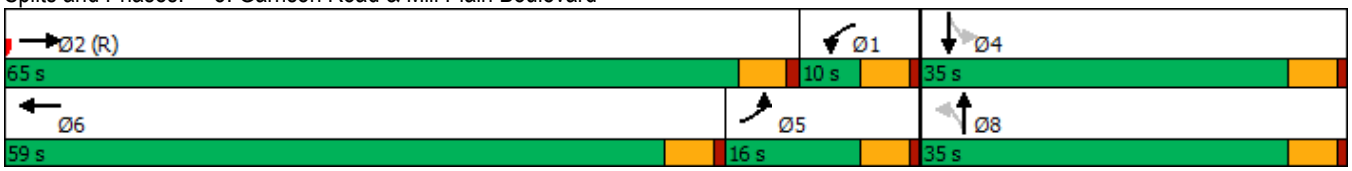


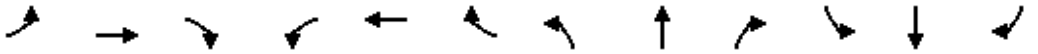


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 53 | 838 | 9 | 18 | 1096 | 25 | 15 | 9 | 37 | 53 | 7 | 110 |
| Future Volume (vph) | 53 | 838 | 9 | 18 | 1096 | 25 | 15 | 9 | 37 | 53 | 7 | 110 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.997 | | | 0.918 | | | 0.859 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.988 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3495 | 0 | 1703 | 3484 | 0 | 0 | 1660 | 0 | 1752 | 1545 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.583 | | 0.730 | | |
| Satd. Flow (perm) | 1805 | 3495 | 0 | 1703 | 3484 | 0 | 0 | 980 | 0 | 1347 | 1545 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 2 | | | 3 | | | 40 | | | 120 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 3% | 11% | 6% | 3% | 17% | 0% | 13% | 3% | 3% | 0% | 6% |
| Adj. Flow (vph) | 58 | 882 | 10 | 20 | 1191 | 27 | 16 | 10 | 40 | 58 | 8 | 120 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 58 | 892 | 0 | 20 | 1218 | 0 | 0 | 66 | 0 | 58 | 128 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 16.0 | 65.0 | | 10.0 | 59.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 7.9 | 87.7 | | 5.0 | 80.7 | | | 8.3 | | 8.3 | 8.3 | |
| Actuated g/C Ratio | 0.07 | 0.80 | | 0.05 | 0.73 | | | 0.08 | | 0.08 | 0.08 | |
| v/c Ratio | 0.45 | 0.32 | | 0.26 | 0.48 | | | 0.59 | | 0.57 | 0.56 | |
| Control Delay | 48.1 | 3.4 | | 64.4 | 4.2 | | | 45.3 | | 69.6 | 19.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 48.1 | 3.4 | | 64.4 | 4.2 | | | 45.3 | | 69.6 | 19.9 | |
| LOS | D | A | | E | A | | | D | | E | B | |
| Approach Delay | | 6.2 | | | 5.2 | | | 45.3 | | | 35.4 | |
| Approach LOS | | A | | | A | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 86 (78%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.59 | | | |
| Intersection Signal Delay: 9.0 | | Intersection LOS: A | |
| Intersection Capacity Utilization 58.0% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 5: Garrison Road & Mill Plain Boulevard

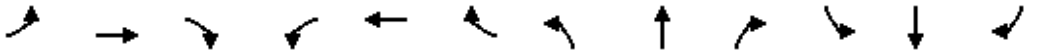




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 3 | 860 | 89 | 256 | 1090 | 5 | 100 | 6 | 270 | 7 | 4 | 3 |
| Future Volume (vph) | 3 | 860 | 89 | 256 | 1090 | 5 | 100 | 6 | 270 | 7 | 4 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 2 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.985 | | | 0.999 | | | | 0.850 | | 0.973 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.955 | | | 0.974 | |
| Satd. Flow (prot) | 1805 | 3466 | 0 | 3367 | 3502 | 0 | 0 | 1733 | 1583 | 0 | 1801 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.728 | | | 0.844 | |
| Satd. Flow (perm) | 1805 | 3466 | 0 | 3367 | 3502 | 0 | 0 | 1321 | 1583 | 0 | 1560 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 14 | | | 1 | | | | 293 | | 3 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.98 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 2% | 8% | 4% | 3% | 0% | 5% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 3 | 878 | 97 | 278 | 1185 | 5 | 109 | 7 | 293 | 8 | 4 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 3 | 975 | 0 | 278 | 1190 | 0 | 0 | 116 | 293 | 0 | 15 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 10.0 | 57.0 | | 22.0 | 69.0 | | 31.0 | 31.0 | 31.0 | 31.0 | 31.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.0 | 69.4 | | 12.5 | 84.9 | | | 13.1 | 13.1 | | 13.1 | |
| Actuated g/C Ratio | 0.05 | 0.63 | | 0.11 | 0.77 | | | 0.12 | 0.12 | | 0.12 | |
| v/c Ratio | 0.04 | 0.45 | | 0.73 | 0.44 | | | 0.74 | 0.66 | | 0.08 | |
| Control Delay | 39.0 | 6.1 | | 58.3 | 6.0 | | | 72.0 | 12.3 | | 35.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 39.0 | 6.1 | | 58.3 | 6.0 | | | 72.0 | 12.3 | | 35.1 | |
| LOS | D | A | | E | A | | | E | B | | D | |
| Approach Delay | | 6.2 | | | 15.9 | | | 29.3 | | | 35.1 | |
| Approach LOS | | A | | | B | | | C | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 70 (64%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.74 | | | |
| Intersection Signal Delay: 14.6 | | Intersection LOS: B | |
| Intersection Capacity Utilization 60.0% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

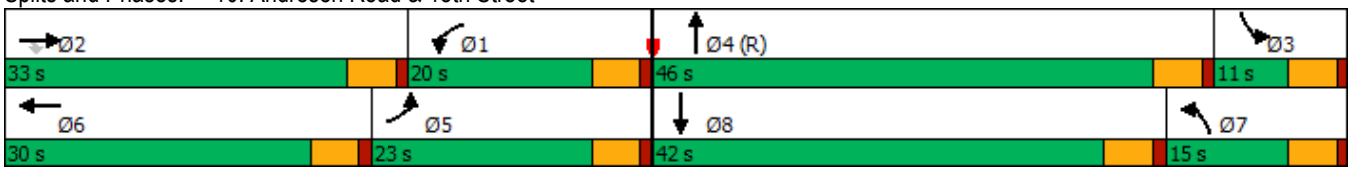
Splits and Phases: 6: Lieser Road & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 155 | 146 | 158 | 124 | 174 | 6 | 151 | 415 | 68 | 22 | 1075 | 106 |
| Future Volume (vph) | 155 | 146 | 158 | 124 | 174 | 6 | 151 | 415 | 68 | 22 | 1075 | 106 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.995 | | | 0.979 | | | 0.987 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1641 | 1696 | 1429 | 1770 | 1855 | 0 | 1719 | 3357 | 0 | 1467 | 3435 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1641 | 1696 | 1429 | 1770 | 1855 | 0 | 1719 | 3357 | 0 | 1467 | 3435 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 172 | | 2 | | | 19 | | | 10 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 10% | 12% | 13% | 2% | 2% | 0% | 5% | 5% | 7% | 23% | 3% | 11% |
| Adj. Flow (vph) | 168 | 159 | 172 | 135 | 189 | 7 | 164 | 451 | 74 | 24 | 1168 | 115 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 168 | 159 | 172 | 135 | 196 | 0 | 164 | 525 | 0 | 24 | 1283 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 23.0 | 33.0 | 33.0 | 20.0 | 30.0 | | 15.0 | 46.0 | | 11.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 14.6 | 13.8 | 13.8 | 15.8 | 15.0 | | 10.0 | 58.8 | | 6.0 | 50.4 | |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.13 | 0.14 | 0.14 | | 0.09 | 0.53 | | 0.05 | 0.46 | |
| v/c Ratio | 0.77 | 0.75 | 0.52 | 0.53 | 0.77 | | 1.05 | 0.29 | | 0.30 | 0.81 | |
| Control Delay | 68.1 | 66.8 | 12.2 | 50.3 | 64.7 | | 124.5 | 5.9 | | 60.0 | 32.6 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 68.1 | 66.8 | 12.2 | 50.3 | 64.7 | | 124.5 | 5.9 | | 60.0 | 32.6 | |
| LOS | E | E | B | D | E | | F | A | | E | C | |
| Approach Delay | | 48.4 | | | 58.9 | | | 34.1 | | | 33.1 | |
| Approach LOS | | D | | | E | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 109 (99%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.05 | | | |
| Intersection Signal Delay: 39.1 | | Intersection LOS: D | |
| Intersection Capacity Utilization 76.2% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

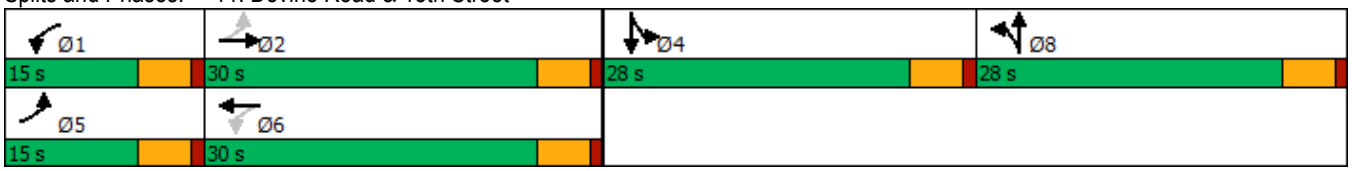
Splits and Phases: 10: Andresen Road & 18th Street



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 219 | 238 | 117 | 228 | 3 | 167 | 1 | 117 | 0 | 2 | 1 |
| Future Volume (vph) | 1 | 219 | 238 | 117 | 228 | 3 | 167 | 1 | 117 | 0 | 2 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.921 | | | 0.998 | | | 0.945 | | | 0.955 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.971 | | | | |
| Satd. Flow (prot) | 1805 | 3107 | 0 | 1671 | 3466 | 0 | 0 | 1654 | 0 | 0 | 1814 | 0 |
| Flt Permitted | 0.596 | | | 0.305 | | | | 0.971 | | | | |
| Satd. Flow (perm) | 1132 | 3107 | 0 | 537 | 3466 | 0 | 0 | 1654 | 0 | 0 | 1814 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 259 | | | 1 | | | 32 | | | 1 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 7% | 7% | 8% | 4% | 0% | 5% | 0% | 6% | 0% | 0% | 0% |
| Adj. Flow (vph) | 1 | 233 | 259 | 127 | 248 | 3 | 182 | 1 | 127 | 0 | 2 | 1 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1 | 492 | 0 | 127 | 251 | 0 | 0 | 310 | 0 | 0 | 3 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 15.4 | 10.8 | | 20.4 | 18.9 | | | 13.5 | | | 6.9 | |
| Actuated g/C Ratio | 0.33 | 0.23 | | 0.44 | 0.41 | | | 0.29 | | | 0.15 | |
| v/c Ratio | 0.00 | 0.53 | | 0.29 | 0.18 | | | 0.62 | | | 0.01 | |
| Control Delay | 11.0 | 11.4 | | 11.3 | 11.9 | | | 21.1 | | | 24.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 11.0 | 11.4 | | 11.3 | 11.9 | | | 21.1 | | | 24.3 | |
| LOS | B | B | | B | B | | | C | | | C | |
| Approach Delay | | 11.4 | | | 11.7 | | | 21.1 | | | 24.3 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 101 | | | |
| Actuated Cycle Length: 46.6 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.62 | | | |
| Intersection Signal Delay: 14.1 | | Intersection LOS: B | |
| Intersection Capacity Utilization 55.8% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 125.5 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 57 | 110 | 383 | 88 | 257 | 27 | 115 | 274 | 74 | 5 | 297 | 58 |
| Future Vol, veh/h | 57 | 110 | 383 | 88 | 257 | 27 | 115 | 274 | 74 | 5 | 297 | 58 |
| Peak Hour Factor | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 6 | 5 | 6 | 2 | 2 | 0 | 4 | 2 | 0 | 0 | 5 | 11 |
| Mvmt Flow | 61 | 120 | 416 | 96 | 279 | 29 | 125 | 298 | 80 | 5 | 323 | 63 |
| Number of Lanes | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 1 | 2 |
| HCM Control Delay | 191.6 | 130.1 | 69.2 | 92.2 |
| HCM LOS | F | F | F | F |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 24% | 100% | 0% |
| Vol Thru, % | 0% | 79% | 0% | 22% | 69% | 0% | 84% |
| Vol Right, % | 0% | 21% | 0% | 78% | 7% | 0% | 16% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 115 | 348 | 57 | 493 | 372 | 5 | 355 |
| LT Vol | 115 | 0 | 57 | 0 | 88 | 5 | 0 |
| Through Vol | 0 | 274 | 0 | 110 | 257 | 0 | 297 |
| RT Vol | 0 | 74 | 0 | 383 | 27 | 0 | 58 |
| Lane Flow Rate | 125 | 378 | 61 | 536 | 404 | 5 | 386 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 7 | 7 |
| Degree of Util (X) | 0.356 | 1.006 | 0.172 | 1.374 | 1.144 | 0.015 | 1.035 |
| Departure Headway (Hd) | 11.642 | 10.913 | 10.973 | 9.853 | 11.438 | 11.486 | 10.922 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 311 | 337 | 329 | 375 | 319 | 314 | 336 |
| Service Time | 9.342 | 8.613 | 8.673 | 7.553 | 9.438 | 9.186 | 8.622 |
| HCM Lane V/C Ratio | 0.402 | 1.122 | 0.185 | 1.429 | 1.266 | 0.016 | 1.149 |
| HCM Control Delay | 20.6 | 85.3 | 15.9 | 211.5 | 130.1 | 14.4 | 93.3 |
| HCM Lane LOS | C | F | C | F | F | B | F |
| HCM 95th-tile Q | 1.6 | 11.3 | 0.6 | 24.7 | 14.8 | 0 | 12.1 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 24.9 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 49 | 189 | 11 | 40 | 296 | 96 | 57 | 217 | 9 | 281 | 232 | 93 |
| Future Vol, veh/h | 49 | 189 | 11 | 40 | 296 | 96 | 57 | 217 | 9 | 281 | 232 | 93 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 5 | 2 | 0 | 0 | 3 | 6 | 7 | 5 | 0 | 8 | 3 | 8 |
| Mvmt Flow | 53 | 205 | 12 | 43 | 322 | 104 | 62 | 236 | 10 | 305 | 252 | 101 |
| Number of Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 20.7 | 31 | 16.7 | 26.1 |
| HCM LOS | C | D | C | D |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 89% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 11% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 57 | 145 | 81 | 49 | 189 | 11 | 40 | 296 | 96 | 281 | 155 |
| LT Vol | 57 | 0 | 0 | 49 | 0 | 0 | 40 | 0 | 0 | 281 | 0 |
| Through Vol | 0 | 145 | 72 | 0 | 189 | 0 | 0 | 296 | 0 | 0 | 155 |
| RT Vol | 0 | 0 | 9 | 0 | 0 | 11 | 0 | 0 | 96 | 0 | 0 |
| Lane Flow Rate | 62 | 157 | 88 | 53 | 205 | 12 | 43 | 322 | 104 | 305 | 168 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.171 | 0.411 | 0.227 | 0.148 | 0.54 | 0.029 | 0.113 | 0.798 | 0.24 | 0.773 | 0.398 |
| Departure Headway (Hd) | 9.954 | 9.42 | 9.258 | 10.016 | 9.465 | 8.731 | 9.382 | 8.933 | 8.284 | 9.108 | 8.523 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 361 | 382 | 388 | 358 | 382 | 410 | 383 | 405 | 434 | 397 | 422 |
| Service Time | 7.708 | 7.174 | 7.012 | 7.77 | 7.219 | 6.485 | 7.129 | 6.68 | 6.031 | 6.851 | 6.266 |
| HCM Lane V/C Ratio | 0.172 | 0.411 | 0.227 | 0.148 | 0.537 | 0.029 | 0.112 | 0.795 | 0.24 | 0.768 | 0.398 |
| HCM Control Delay | 14.8 | 18.6 | 14.7 | 14.5 | 22.8 | 11.7 | 13.3 | 39 | 13.6 | 36.9 | 16.8 |
| HCM Lane LOS | B | C | B | B | C | B | B | E | B | E | C |
| HCM 95th-tile Q | 0.6 | 2 | 0.9 | 0.5 | 3.1 | 0.1 | 0.4 | 7 | 0.9 | 6.5 | 1.9 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.6 |
| Intersection LOS | B |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 60 | 87 | 15 | 13 | 230 | 268 | 30 | 26 | 9 | 45 | 18 | 32 |
| Future Vol, veh/h | 60 | 87 | 15 | 13 | 230 | 268 | 30 | 26 | 9 | 45 | 18 | 32 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 2 | 4 | 29 | 27 | 3 | 6 | 8 | 0 | 0 | 3 | 21 | 3 |
| Mvmt Flow | 65 | 95 | 16 | 14 | 250 | 291 | 33 | 28 | 10 | 49 | 20 | 35 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |

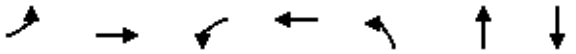
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 2 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 2 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 2 |
| HCM Control Delay | 10.4 | 10.7 | 10.4 | 10.5 |
| HCM LOS | B | B | B | B |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 46% | 100% | 0% | 100% | 0% | 0% | 47% |
| Vol Thru, % | 40% | 0% | 85% | 0% | 100% | 0% | 19% |
| Vol Right, % | 14% | 0% | 15% | 0% | 0% | 100% | 34% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 65 | 60 | 102 | 13 | 230 | 268 | 95 |
| LT Vol | 30 | 60 | 0 | 13 | 0 | 0 | 45 |
| Through Vol | 26 | 0 | 87 | 0 | 230 | 0 | 18 |
| RT Vol | 9 | 0 | 15 | 0 | 0 | 268 | 32 |
| Lane Flow Rate | 71 | 65 | 111 | 14 | 250 | 291 | 103 |
| Geometry Grp | 7 | 8 | 8 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.131 | 0.123 | 0.191 | 0.024 | 0.368 | 0.376 | 0.183 |
| Departure Headway (Hd) | 6.674 | 6.764 | 6.188 | 6.221 | 5.306 | 4.652 | 6.392 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 539 | 532 | 582 | 570 | 670 | 763 | 564 |
| Service Time | 4.388 | 4.477 | 3.902 | 4.017 | 3.101 | 2.447 | 4.105 |
| HCM Lane V/C Ratio | 0.132 | 0.122 | 0.191 | 0.025 | 0.373 | 0.381 | 0.183 |
| HCM Control Delay | 10.4 | 10.4 | 10.4 | 9.2 | 11.2 | 10.3 | 10.5 |
| HCM Lane LOS | B | B | B | A | B | B | B |
| HCM 95th-tile Q | 0.4 | 0.4 | 0.7 | 0.1 | 1.7 | 1.8 | 0.7 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 24 | 437 | 1 | 1302 | 27 | 227 |
| v/c Ratio | 0.11 | 0.18 | 0.00 | 0.54 | 0.09 | 0.83 |
| Control Delay | 9.0 | 6.6 | 4.0 | 4.1 | 28.4 | 64.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 9.0 | 6.6 | 4.0 | 4.1 | 28.4 | 64.8 |
| Queue Length 50th (ft) | 5 | 49 | 0 | 67 | 13 | 151 |
| Queue Length 95th (ft) | 20 | 90 | m0 | 260 | 33 | 219 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 215 | 2407 | 663 | 2393 | 502 | 436 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.11 | 0.18 | 0.00 | 0.54 | 0.05 | 0.52 |

Intersection Summary

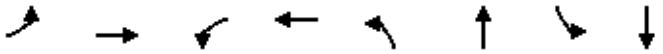
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 11 | 464 | 79 | 1018 | 239 | 13 | 57 |
| v/c Ratio | 0.04 | 0.24 | 0.16 | 0.53 | 0.70 | 0.03 | 0.14 |
| Control Delay | 7.2 | 6.9 | 9.4 | 10.6 | 29.1 | 8.7 | 11.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.2 | 6.9 | 9.4 | 10.6 | 29.1 | 8.7 | 11.9 |
| Queue Length 50th (ft) | 2 | 58 | 22 | 166 | 71 | 1 | 11 |
| Queue Length 95th (ft) | m6 | 65 | m55 | 276 | 115 | 9 | 28 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 247 | 1920 | 499 | 1935 | 549 | 687 | 641 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.24 | 0.16 | 0.53 | 0.44 | 0.02 | 0.09 |

Intersection Summary

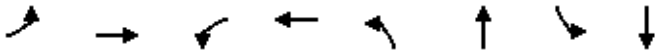
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 46 | 523 | 67 | 1264 | 15 | 297 | 76 | 236 |
| v/c Ratio | 0.20 | 0.27 | 0.15 | 0.64 | 0.07 | 0.85 | 0.43 | 0.58 |
| Control Delay | 17.6 | 11.6 | 5.4 | 6.7 | 25.9 | 60.6 | 35.8 | 40.2 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 17.6 | 11.6 | 5.4 | 6.7 | 25.9 | 60.6 | 35.8 | 40.2 |
| Queue Length 50th (ft) | 11 | 78 | 11 | 131 | 8 | 192 | 40 | 128 |
| Queue Length 95th (ft) | 39 | 143 | m14 | m153 | 21 | 268 | 70 | 211 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 225 | 1936 | 511 | 1976 | 228 | 485 | 176 | 483 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.20 | 0.27 | 0.13 | 0.64 | 0.07 | 0.61 | 0.43 | 0.49 |

Intersection Summary

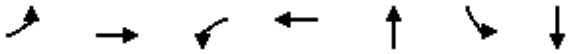
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 134 | 520 | 67 | 1242 | 41 | 310 | 516 | 888 |
| v/c Ratio | 0.49 | 0.35 | 0.55 | 0.90 | 0.47 | 0.74 | 0.72 | 0.78 |
| Control Delay | 47.3 | 18.6 | 84.4 | 33.8 | 67.6 | 55.9 | 24.2 | 12.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 47.3 | 18.6 | 84.4 | 33.8 | 67.6 | 55.9 | 24.2 | 12.7 |
| Queue Length 50th (ft) | 39 | 61 | 50 | 426 | 29 | 108 | 150 | 203 |
| Queue Length 95th (ft) | 74 | 224 | 94 | #638 | 65 | 150 | m132 | 45 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 275 | 1489 | 148 | 1380 | 101 | 958 | 721 | 1314 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.49 | 0.35 | 0.45 | 0.90 | 0.41 | 0.32 | 0.72 | 0.68 |

Intersection Summary

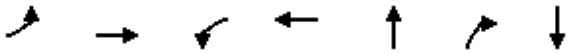
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 58 | 892 | 20 | 1218 | 66 | 58 | 128 |
| v/c Ratio | 0.45 | 0.32 | 0.26 | 0.48 | 0.59 | 0.57 | 0.56 |
| Control Delay | 48.1 | 3.4 | 64.4 | 4.2 | 45.3 | 69.6 | 19.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 48.1 | 3.4 | 64.4 | 4.2 | 45.3 | 69.6 | 19.9 |
| Queue Length 50th (ft) | 39 | 1 | 14 | 92 | 18 | 40 | 5 |
| Queue Length 95th (ft) | m58 | 95 | m35 | 59 | 62 | 81 | 61 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 180 | 2785 | 77 | 2557 | 296 | 367 | 508 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.32 | 0.32 | 0.26 | 0.48 | 0.22 | 0.16 | 0.25 |

Intersection Summary

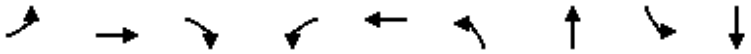
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 3 | 975 | 278 | 1190 | 116 | 293 | 15 |
| v/c Ratio | 0.04 | 0.45 | 0.73 | 0.44 | 0.74 | 0.66 | 0.08 |
| Control Delay | 39.0 | 6.1 | 58.3 | 6.0 | 72.0 | 12.3 | 35.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 39.0 | 6.1 | 58.3 | 6.0 | 72.0 | 12.3 | 35.1 |
| Queue Length 50th (ft) | 2 | 69 | 99 | 112 | 80 | 0 | 8 |
| Queue Length 95th (ft) | m6 | 155 | 139 | 275 | 134 | 75 | 26 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 82 | 2191 | 520 | 2702 | 312 | 597 | 371 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.45 | 0.53 | 0.44 | 0.37 | 0.49 | 0.04 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 168 | 159 | 172 | 135 | 196 | 164 | 525 | 24 | 1283 |
| v/c Ratio | 0.77 | 0.75 | 0.52 | 0.53 | 0.77 | 1.05 | 0.29 | 0.30 | 0.81 |
| Control Delay | 68.1 | 66.8 | 12.2 | 50.3 | 64.7 | 124.5 | 5.9 | 60.0 | 32.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 68.1 | 66.8 | 12.2 | 50.3 | 64.7 | 124.5 | 5.9 | 60.0 | 32.6 |
| Queue Length 50th (ft) | 116 | 110 | 0 | 89 | 134 | ~130 | 53 | 17 | 398 |
| Queue Length 95th (ft) | 179 | 171 | 59 | 143 | 201 | m#236 | m88 | 45 | #667 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 276 | 431 | 491 | 278 | 423 | 156 | 1803 | 80 | 1579 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.61 | 0.37 | 0.35 | 0.49 | 0.46 | 1.05 | 0.29 | 0.30 | 0.81 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

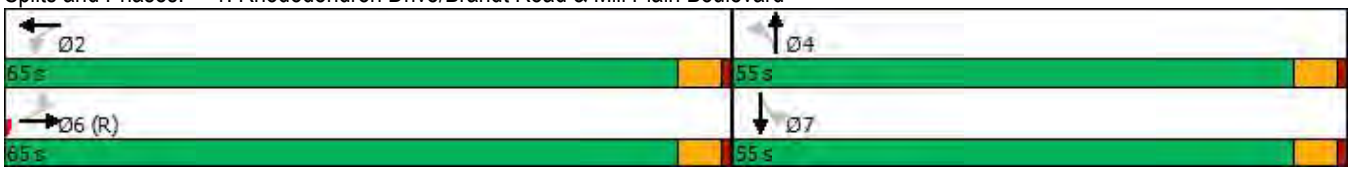
| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 1 | 492 | 127 | 251 | 310 | 3 |
| v/c Ratio | 0.00 | 0.53 | 0.29 | 0.18 | 0.62 | 0.01 |
| Control Delay | 11.0 | 11.4 | 11.3 | 11.9 | 21.1 | 24.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 11.0 | 11.4 | 11.3 | 11.9 | 21.1 | 24.3 |
| Queue Length 50th (ft) | 0 | 25 | 16 | 15 | 59 | 1 |
| Queue Length 95th (ft) | 3 | 94 | 71 | 77 | 189 | 9 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 647 | 1985 | 528 | 2100 | 952 | 1030 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.00 | 0.25 | 0.24 | 0.12 | 0.33 | 0.00 |

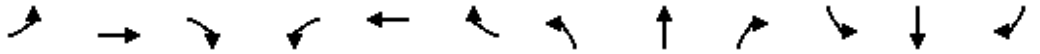
Intersection Summary

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 21 | 819 | 7 | 3 | 565 | 225 | 9 | 7 | 7 | 184 | 6 | 25 |
| Future Volume (vph) | 21 | 819 | 7 | 3 | 565 | 225 | 9 | 7 | 7 | 184 | 6 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.999 | | | 0.957 | | | 0.958 | | | 0.984 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.981 | | | 0.959 | |
| Satd. Flow (prot) | 1805 | 3469 | 0 | 1805 | 3313 | 0 | 0 | 1712 | 0 | 0 | 1667 | 0 |
| Flt Permitted | 0.304 | | | 0.295 | | | | 0.893 | | | 0.739 | |
| Satd. Flow (perm) | 578 | 3469 | 0 | 560 | 3313 | 0 | 0 | 1558 | 0 | 0 | 1285 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 1 | | | 72 | | | 8 | | | 7 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 0% | 0% | 4% | 5% | 0% | 14% | 0% | 8% | 0% | 6% |
| Adj. Flow (vph) | 23 | 871 | 8 | 3 | 608 | 245 | 10 | 8 | 8 | 200 | 7 | 27 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 23 | 879 | 0 | 3 | 853 | 0 | 0 | 26 | 0 | 0 | 234 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 65.0 | 65.0 | | 65.0 | 65.0 | | 55.0 | 55.0 | | 55.0 | 55.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 84.2 | 84.2 | | 84.2 | 84.2 | | | 25.8 | | | 25.8 | |
| Actuated g/C Ratio | 0.70 | 0.70 | | 0.70 | 0.70 | | | 0.22 | | | 0.22 | |
| v/c Ratio | 0.06 | 0.36 | | 0.01 | 0.36 | | | 0.08 | | | 0.83 | |
| Control Delay | 8.2 | 8.6 | | 6.3 | 5.4 | | | 25.8 | | | 66.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 8.2 | 8.6 | | 6.3 | 5.4 | | | 25.8 | | | 66.7 | |
| LOS | A | A | | A | A | | | C | | | E | |
| Approach Delay | | 8.6 | | | 5.4 | | | 25.8 | | | 66.7 | |
| Approach LOS | | A | | | A | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 83 (69%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 14.2 | | Intersection LOS: B | |
| Intersection Capacity Utilization 49.9% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

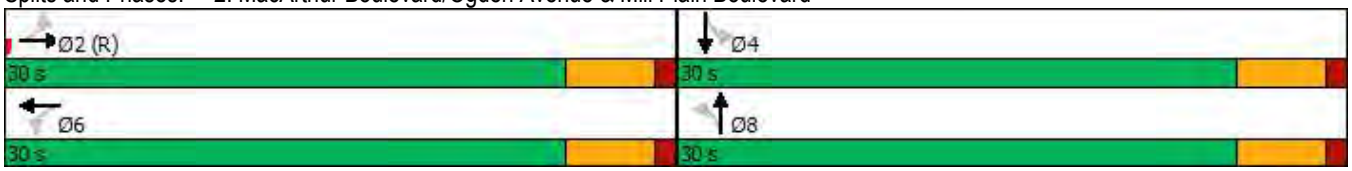


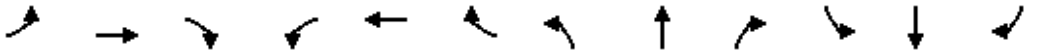


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 8 | 796 | 0 | 22 | 548 | 6 | 242 | 6 | 36 | 12 | 6 | 3 |
| Future Volume (vph) | 8 | 796 | 0 | 22 | 548 | 6 | 242 | 6 | 36 | 12 | 6 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.998 | | | 0.873 | | | 0.982 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.973 | |
| Satd. Flow (prot) | 1805 | 3471 | 0 | 1805 | 3459 | 0 | 1719 | 1618 | 0 | 0 | 1757 | 0 |
| Flt Permitted | 0.417 | | | 0.310 | | | 0.742 | | | | 0.881 | |
| Satd. Flow (perm) | 792 | 3471 | 0 | 589 | 3459 | 0 | 1343 | 1618 | 0 | 0 | 1591 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 2 | | | 39 | | | 3 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 5% | 0% | 4% | 17% | 5% | 0% | 3% | 0% | 11% | 0% |
| Adj. Flow (vph) | 9 | 821 | 0 | 24 | 596 | 7 | 263 | 7 | 39 | 13 | 7 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 9 | 821 | 0 | 24 | 603 | 0 | 263 | 46 | 0 | 0 | 23 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 30.0 | 30.0 | | 30.0 | 30.0 | | 30.0 | 30.0 | | 30.0 | 30.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 34.1 | 34.1 | | 34.1 | 34.1 | | 15.9 | 15.9 | | | 15.9 | |
| Actuated g/C Ratio | 0.57 | 0.57 | | 0.57 | 0.57 | | 0.26 | 0.26 | | | 0.26 | |
| v/c Ratio | 0.02 | 0.42 | | 0.07 | 0.31 | | 0.74 | 0.10 | | | 0.05 | |
| Control Delay | 6.5 | 7.3 | | 10.1 | 9.7 | | 32.3 | 6.5 | | | 12.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 6.5 | 7.3 | | 10.1 | 9.7 | | 32.3 | 6.5 | | | 12.7 | |
| LOS | A | A | | B | A | | C | A | | | B | |
| Approach Delay | | 7.3 | | | 9.7 | | | 28.4 | | | 12.7 | |
| Approach LOS | | A | | | A | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 60 | | | |
| Actuated Cycle Length: 60 | | | |
| Offset: 1 (2%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.74 | | | |
| Intersection Signal Delay: 11.9 | | Intersection LOS: B | |
| Intersection Capacity Utilization 50.4% | | ICU Level of Service A | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard





| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 84 | 807 | 11 | 82 | 629 | 95 | 31 | 211 | 81 | 85 | 193 | 43 |
| Future Volume (vph) | 84 | 807 | 11 | 82 | 629 | 95 | 31 | 211 | 81 | 85 | 193 | 43 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.980 | | | 0.958 | | | 0.973 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 3533 | 0 | 1805 | 3446 | 0 | 1805 | 1731 | 0 | 1805 | 1756 | 0 |
| Flt Permitted | 0.286 | | | 0.239 | | | 0.438 | | | 0.228 | | |
| Satd. Flow (perm) | 518 | 3533 | 0 | 454 | 3446 | 0 | 832 | 1731 | 0 | 433 | 1756 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 1 | | | 18 | | | 16 | | | 10 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 5% | 2% | 0% | 0% | 2% | 7% | 0% | 6% | 3% | 0% | 6% | 2% |
| Adj. Flow (vph) | 91 | 877 | 12 | 89 | 669 | 103 | 34 | 229 | 88 | 92 | 210 | 47 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 91 | 889 | 0 | 89 | 772 | 0 | 34 | 317 | 0 | 92 | 257 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 12.0 | 52.0 | | 16.0 | 56.0 | | 10.0 | 41.0 | | 11.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 69.6 | 63.2 | | 69.2 | 63.0 | | 29.8 | 24.8 | | 33.2 | 29.6 | |
| Actuated g/C Ratio | 0.58 | 0.53 | | 0.58 | 0.52 | | 0.25 | 0.21 | | 0.28 | 0.25 | |
| v/c Ratio | 0.25 | 0.48 | | 0.27 | 0.42 | | 0.14 | 0.86 | | 0.50 | 0.59 | |
| Control Delay | 7.9 | 13.1 | | 11.5 | 15.0 | | 28.7 | 64.7 | | 39.1 | 43.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 7.9 | 13.1 | | 11.5 | 15.0 | | 28.7 | 64.7 | | 39.1 | 43.8 | |
| LOS | A | B | | B | B | | C | E | | D | D | |
| Approach Delay | | 12.6 | | | 14.6 | | | 61.2 | | | 42.6 | |
| Approach LOS | | B | | | B | | | E | | | D | |

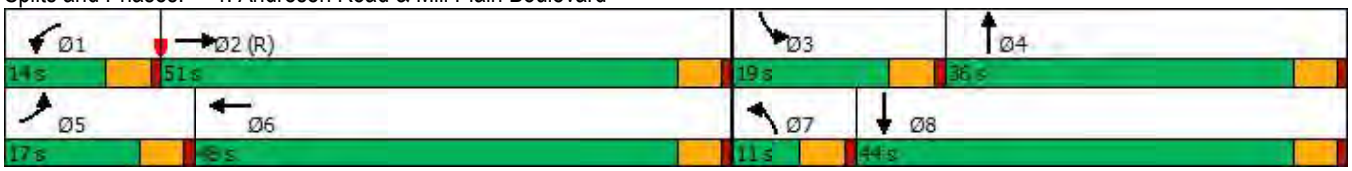
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 2 (2%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.86 | | | |
| Intersection Signal Delay: 24.1 | | Intersection LOS: C | |
| Intersection Capacity Utilization 64.6% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

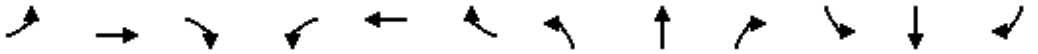
Splits and Phases: 3: Devine Road & Mill Plain Boulevard

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 297 | 780 | 32 | 55 | 647 | 438 | 34 | 281 | 38 | 335 | 323 | 199 |
| Future Volume (vph) | 297 | 780 | 32 | 55 | 647 | 438 | 34 | 281 | 38 | 335 | 323 | 199 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.994 | | | 0.940 | | | 0.981 | | | 0.942 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 3521 | 0 | 1805 | 3340 | 0 | 1752 | 3393 | 0 | 3400 | 3314 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 3521 | 0 | 1805 | 3340 | 0 | 1752 | 3393 | 0 | 3400 | 3314 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 146 | | | 13 | | | 122 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.98 | 0.92 | 0.92 | 0.94 | 0.92 |
| Heavy Vehicles (%) | 1% | 2% | 0% | 0% | 2% | 1% | 3% | 5% | 0% | 3% | 3% | 2% |
| Adj. Flow (vph) | 323 | 821 | 35 | 60 | 703 | 466 | 37 | 287 | 41 | 364 | 344 | 216 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 323 | 856 | 0 | 60 | 1169 | 0 | 37 | 328 | 0 | 364 | 560 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 17.0 | 51.0 | | 14.0 | 48.0 | | 11.0 | 36.0 | | 19.0 | 44.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 15.7 | 65.8 | | 7.7 | 55.8 | | 5.6 | 14.7 | | 13.8 | 26.9 | |
| Actuated g/C Ratio | 0.13 | 0.55 | | 0.06 | 0.46 | | 0.05 | 0.12 | | 0.12 | 0.22 | |
| v/c Ratio | 0.71 | 0.44 | | 0.52 | 0.72 | | 0.46 | 0.77 | | 0.93 | 0.67 | |
| Control Delay | 59.0 | 9.7 | | 70.6 | 16.8 | | 73.3 | 61.0 | | 70.2 | 28.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 59.0 | 9.7 | | 70.6 | 16.8 | | 73.3 | 61.0 | | 70.2 | 28.3 | |
| LOS | E | A | | E | B | | E | E | | E | C | |
| Approach Delay | | 23.2 | | | 19.4 | | | 62.3 | | | 44.8 | |
| Approach LOS | | C | | | B | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 74 (62%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.93 | | | |
| Intersection Signal Delay: 31.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 76.5% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

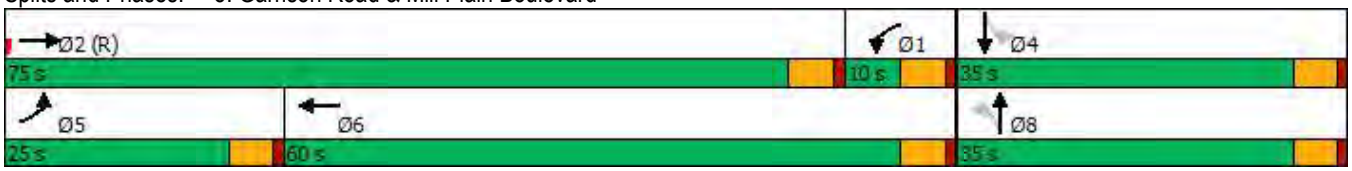


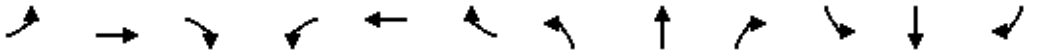


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 163 | 960 | 40 | 21 | 1079 | 74 | 24 | 30 | 48 | 71 | 18 | 124 |
| Future Volume (vph) | 163 | 960 | 40 | 21 | 1079 | 74 | 24 | 30 | 48 | 71 | 18 | 124 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.994 | | | 0.990 | | | 0.937 | | | 0.869 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.988 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3521 | 0 | 1805 | 3536 | 0 | 0 | 1743 | 0 | 1787 | 1637 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.456 | | 0.490 | | |
| Satd. Flow (perm) | 1805 | 3521 | 0 | 1805 | 3536 | 0 | 0 | 804 | 0 | 922 | 1637 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 8 | | | 35 | | | 135 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 2% | 0% | 0% | 1% | 2% | 0% | 0% | 2% | 1% | 0% | 1% |
| Adj. Flow (vph) | 177 | 1043 | 43 | 23 | 1148 | 80 | 26 | 33 | 52 | 77 | 20 | 135 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 177 | 1086 | 0 | 23 | 1228 | 0 | 0 | 111 | 0 | 77 | 155 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 25.0 | 75.0 | | 10.0 | 60.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 15.2 | 93.0 | | 5.0 | 78.8 | | | 11.0 | | 11.0 | 11.0 | |
| Actuated g/C Ratio | 0.13 | 0.78 | | 0.04 | 0.66 | | | 0.09 | | 0.09 | 0.09 | |
| v/c Ratio | 0.78 | 0.40 | | 0.31 | 0.53 | | | 1.06 | | 0.92 | 0.57 | |
| Control Delay | 65.0 | 4.3 | | 60.6 | 8.5 | | | 138.6 | | 129.7 | 19.8 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 65.0 | 4.3 | | 60.6 | 8.5 | | | 138.6 | | 129.7 | 19.8 | |
| LOS | E | A | | E | A | | | F | | F | B | |
| Approach Delay | | 12.8 | | | 9.5 | | | 138.6 | | | 56.2 | |
| Approach LOS | | B | | | A | | | F | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 22 (18%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.06 | | | |
| Intersection Signal Delay: 19.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 72.3% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 5: Garrison Road & Mill Plain Boulevard

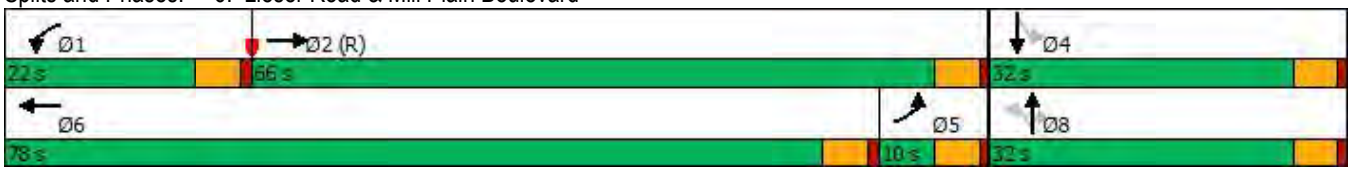


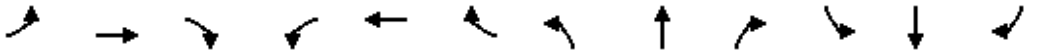


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 1015 | 90 | 260 | 1120 | 4 | 140 | 3 | 225 | 14 | 18 | 6 |
| Future Volume (vph) | 5 | 1015 | 90 | 260 | 1120 | 4 | 140 | 3 | 225 | 14 | 18 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 2 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.988 | | | 0.999 | | | | 0.850 | | 0.977 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.953 | | | 0.982 | |
| Satd. Flow (prot) | 1805 | 3471 | 0 | 3502 | 3536 | 0 | 0 | 1793 | 1583 | 0 | 1823 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.774 | | | 0.871 | |
| Satd. Flow (perm) | 1805 | 3471 | 0 | 3502 | 3536 | 0 | 0 | 1456 | 1583 | 0 | 1617 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 11 | | | 1 | | | | 245 | | 7 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 2% | 0% | 1% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 5 | 1103 | 98 | 283 | 1155 | 4 | 152 | 3 | 245 | 15 | 20 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 5 | 1201 | 0 | 283 | 1159 | 0 | 0 | 155 | 245 | 0 | 42 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 10.0 | 66.0 | | 22.0 | 78.0 | | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.0 | 74.3 | | 13.1 | 90.4 | | | 17.6 | 17.6 | | 17.6 | |
| Actuated g/C Ratio | 0.04 | 0.62 | | 0.11 | 0.75 | | | 0.15 | 0.15 | | 0.15 | |
| v/c Ratio | 0.07 | 0.56 | | 0.74 | 0.44 | | | 0.73 | 0.56 | | 0.17 | |
| Control Delay | 44.6 | 6.4 | | 63.6 | 7.2 | | | 67.2 | 10.2 | | 37.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 44.6 | 6.4 | | 63.6 | 7.2 | | | 67.2 | 10.2 | | 37.9 | |
| LOS | D | A | | E | A | | | E | B | | D | |
| Approach Delay | | 6.6 | | | 18.3 | | | 32.3 | | | 37.9 | |
| Approach LOS | | A | | | B | | | C | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 40 (33%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.74 | | | |
| Intersection Signal Delay: 15.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 65.4% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 6: Lieser Road & Mill Plain Boulevard

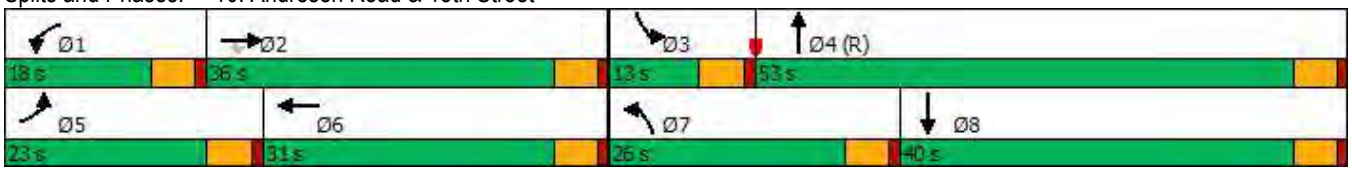


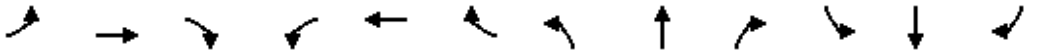


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 111 | 304 | 198 | 112 | 230 | 8 | 205 | 778 | 158 | 48 | 519 | 223 |
| Future Volume (vph) | 111 | 304 | 198 | 112 | 230 | 8 | 205 | 778 | 158 | 48 | 519 | 223 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.995 | | | 0.975 | | | 0.956 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1752 | 1900 | 1568 | 1752 | 1787 | 0 | 1752 | 3428 | 0 | 1770 | 3407 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1752 | 1900 | 1568 | 1752 | 1787 | 0 | 1752 | 3428 | 0 | 1770 | 3407 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 155 | | 1 | | | 24 | | | 54 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 |
| Heavy Vehicles (%) | 3% | 0% | 3% | 3% | 6% | 0% | 3% | 3% | 1% | 2% | 1% | 2% |
| Adj. Flow (vph) | 121 | 330 | 215 | 122 | 250 | 9 | 223 | 846 | 172 | 52 | 564 | 237 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 121 | 330 | 215 | 122 | 259 | 0 | 223 | 1018 | 0 | 52 | 801 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 23.0 | 36.0 | 36.0 | 18.0 | 31.0 | | 26.0 | 53.0 | | 13.0 | 40.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 11.7 | 24.1 | 24.1 | 10.9 | 23.3 | | 18.0 | 60.2 | | 7.1 | 47.1 | |
| Actuated g/C Ratio | 0.10 | 0.20 | 0.20 | 0.09 | 0.19 | | 0.15 | 0.50 | | 0.06 | 0.39 | |
| v/c Ratio | 0.71 | 0.87 | 0.49 | 0.77 | 0.75 | | 0.85 | 0.59 | | 0.50 | 0.59 | |
| Control Delay | 74.1 | 68.0 | 16.1 | 83.0 | 58.7 | | 68.0 | 18.9 | | 71.2 | 31.1 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 74.1 | 68.0 | 16.1 | 83.0 | 58.7 | | 68.0 | 18.9 | | 71.2 | 31.1 | |
| LOS | E | E | B | F | E | | E | B | | E | C | |
| Approach Delay | | 52.3 | | | 66.5 | | | 27.8 | | | 33.6 | |
| Approach LOS | | D | | | E | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 9 (8%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.87 | | | |
| Intersection Signal Delay: 39.3 | | Intersection LOS: D | |
| Intersection Capacity Utilization 71.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 10: Andresen Road & 18th Street

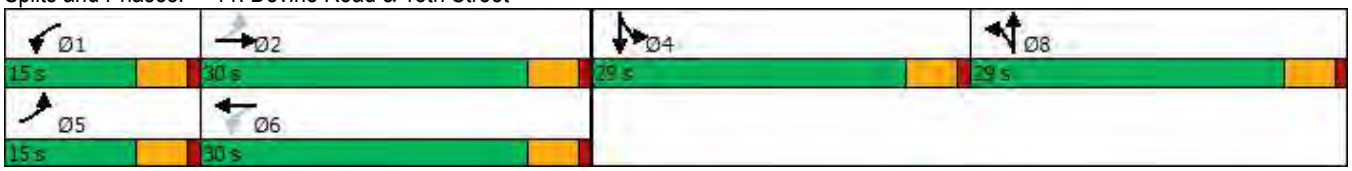




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 288 | 194 | 77 | 399 | 19 | 222 | 12 | 125 | 5 | 6 | 11 |
| Future Volume (vph) | 12 | 288 | 194 | 77 | 399 | 19 | 222 | 12 | 125 | 5 | 6 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.940 | | | 0.993 | | | 0.953 | | | 0.932 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.970 | | | 0.990 | |
| Satd. Flow (prot) | 1805 | 3276 | 0 | 1770 | 3453 | 0 | 0 | 1677 | 0 | 0 | 1753 | 0 |
| Flt Permitted | 0.490 | | | 0.287 | | | | 0.970 | | | 0.990 | |
| Satd. Flow (perm) | 931 | 3276 | 0 | 535 | 3453 | 0 | 0 | 1677 | 0 | 0 | 1753 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 150 | | | 4 | | | 25 | | | 12 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 3% | 2% | 4% | 0% | 6% | 0% | 3% | 0% | 0% | 0% |
| Adj. Flow (vph) | 13 | 313 | 211 | 84 | 434 | 21 | 239 | 13 | 136 | 5 | 7 | 12 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 13 | 524 | 0 | 84 | 455 | 0 | 0 | 388 | 0 | 0 | 24 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 29.0 | 29.0 | | 29.0 | 29.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 18.4 | 13.9 | | 22.5 | 21.4 | | | 20.1 | | | 6.7 | |
| Actuated g/C Ratio | 0.32 | 0.24 | | 0.39 | 0.37 | | | 0.35 | | | 0.12 | |
| v/c Ratio | 0.03 | 0.58 | | 0.22 | 0.35 | | | 0.64 | | | 0.11 | |
| Control Delay | 13.1 | 18.1 | | 13.9 | 15.9 | | | 23.9 | | | 24.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 13.1 | 18.1 | | 13.9 | 15.9 | | | 23.9 | | | 24.0 | |
| LOS | B | B | | B | B | | | C | | | C | |
| Approach Delay | | 18.0 | | | 15.6 | | | 23.9 | | | 24.0 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 103 | | | |
| Actuated Cycle Length: 57.6 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.64 | | | |
| Intersection Signal Delay: 18.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 59.8% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 71.9 |
| Intersection LOS | F |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 93 | 274 | 192 | 48 | 164 | 18 | 232 | 294 | 71 | 13 | 297 | 35 |
| Future Vol, veh/h | 93 | 274 | 192 | 48 | 164 | 18 | 232 | 294 | 71 | 13 | 297 | 35 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.97 | 0.92 |
| Heavy Vehicles, % | 4 | 1 | 1 | 0 | 1 | 0 | 4 | 1 | 1 | 0 | 1 | 0 |
| Mvmt Flow | 101 | 298 | 209 | 52 | 178 | 20 | 252 | 320 | 77 | 14 | 306 | 38 |
| Number of Lanes | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 1 | 2 | 2 | 2 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 2 | 2 | 2 | 1 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 2 | 2 | 1 | 2 |
| HCM Control Delay | 123.8 | 32.7 | 51.3 | 48.7 |
| HCM LOS | F | D | F | E |

| Lane | NBLn1 | NBLn2 | EBLn1 | EBLn2 | WBLn1 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 100% | 0% | 21% | 100% | 0% |
| Vol Thru, % | 0% | 81% | 0% | 59% | 71% | 0% | 89% |
| Vol Right, % | 0% | 19% | 0% | 41% | 8% | 0% | 11% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 232 | 365 | 93 | 466 | 230 | 13 | 332 |
| LT Vol | 232 | 0 | 93 | 0 | 48 | 13 | 0 |
| Through Vol | 0 | 294 | 0 | 274 | 164 | 0 | 297 |
| RT Vol | 0 | 71 | 0 | 192 | 18 | 0 | 35 |
| Lane Flow Rate | 252 | 397 | 101 | 507 | 250 | 14 | 344 |
| Geometry Grp | 7 | 7 | 7 | 7 | 6 | 7 | 7 |
| Degree of Util (X) | 0.653 | 0.952 | 0.268 | 1.218 | 0.676 | 0.038 | 0.863 |
| Departure Headway (Hd) | 9.998 | 9.276 | 9.529 | 8.655 | 10.429 | 10.249 | 9.662 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 363 | 393 | 376 | 420 | 350 | 351 | 379 |
| Service Time | 7.698 | 6.976 | 7.31 | 6.436 | 8.429 | 7.949 | 7.362 |
| HCM Lane V/C Ratio | 0.694 | 1.01 | 0.269 | 1.207 | 0.714 | 0.04 | 0.908 |
| HCM Control Delay | 29.7 | 65.1 | 15.8 | 145.3 | 32.7 | 13.4 | 50.1 |
| HCM Lane LOS | D | F | C | F | D | B | F |
| HCM 95th-tile Q | 4.4 | 10.7 | 1.1 | 20.4 | 4.7 | 0.1 | 8.2 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 20 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 59 | 310 | 15 | 12 | 182 | 144 | 20 | 216 | 35 | 140 | 184 | 92 |
| Future Vol, veh/h | 59 | 310 | 15 | 12 | 182 | 144 | 20 | 216 | 35 | 140 | 184 | 92 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 7 | 4 | 0 | 0 | 3 | 6 | 4 | 4 | 11 | 3 | 16 | 9 |
| Mvmt Flow | 64 | 337 | 16 | 13 | 196 | 157 | 22 | 235 | 38 | 152 | 200 | 100 |
| Number of Lanes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 2 | 0 |

| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 3 | 3 | 3 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 3 | 3 | 3 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 3 | 3 | 3 | 3 |
| HCM Control Delay | 30.6 | 16.6 | 15.7 | 15.8 |
| HCM LOS | D | C | C | C |

| Lane | NBLn1 | NBLn2 | NBLn3 | EBLn1 | EBLn2 | EBLn3 | WBLn1 | WBLn2 | WBLn3 | SBLn1 | SBLn2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Vol Left, % | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% | 0% |
| Vol Thru, % | 0% | 100% | 67% | 0% | 100% | 0% | 0% | 100% | 0% | 0% | 100% |
| Vol Right, % | 0% | 0% | 33% | 0% | 0% | 100% | 0% | 0% | 100% | 0% | 0% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 20 | 144 | 107 | 59 | 310 | 15 | 12 | 182 | 144 | 140 | 123 |
| LT Vol | 20 | 0 | 0 | 59 | 0 | 0 | 12 | 0 | 0 | 140 | 0 |
| Through Vol | 0 | 144 | 72 | 0 | 310 | 0 | 0 | 182 | 0 | 0 | 123 |
| RT Vol | 0 | 0 | 35 | 0 | 0 | 15 | 0 | 0 | 144 | 0 | 0 |
| Lane Flow Rate | 22 | 157 | 116 | 64 | 337 | 16 | 13 | 196 | 157 | 152 | 133 |
| Geometry Grp | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Degree of Util (X) | 0.056 | 0.378 | 0.278 | 0.158 | 0.777 | 0.034 | 0.032 | 0.462 | 0.341 | 0.372 | 0.316 |
| Departure Headway (Hd) | 9.202 | 8.702 | 8.592 | 8.851 | 8.3 | 7.532 | 8.945 | 8.496 | 7.847 | 8.799 | 8.52 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 387 | 412 | 416 | 403 | 435 | 473 | 398 | 423 | 455 | 408 | 420 |
| Service Time | 7.002 | 6.502 | 6.392 | 6.643 | 6.092 | 5.324 | 6.744 | 6.295 | 5.646 | 6.592 | 6.313 |
| HCM Lane V/C Ratio | 0.057 | 0.381 | 0.279 | 0.159 | 0.775 | 0.034 | 0.033 | 0.463 | 0.345 | 0.373 | 0.317 |
| HCM Control Delay | 12.6 | 16.8 | 14.7 | 13.3 | 34.8 | 10.6 | 12 | 18.5 | 14.7 | 16.8 | 15.2 |
| HCM Lane LOS | B | C | B | B | D | B | B | C | B | C | C |
| HCM 95th-tile Q | 0.2 | 1.7 | 1.1 | 0.6 | 6.7 | 0.1 | 0.1 | 2.4 | 1.5 | 1.7 | 1.3 |

| Intersection | |
|---|---|
| Intersection Delay, s/veh | 15.1 |
| Intersection LOS | C |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Vol, veh/h | 45 | 213 | 30 | 22 | 131 | 139 | 19 | 20 | 8 | 211 | 39 | 53 |
| Future Vol, veh/h | 45 | 213 | 30 | 22 | 131 | 139 | 19 | 20 | 8 | 211 | 39 | 53 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles, % | 7 | 3 | 4 | 11 | 8 | 11 | 12 | 10 | 14 | 5 | 3 | 2 |
| Mvmt Flow | 49 | 232 | 33 | 24 | 142 | 151 | 21 | 22 | 9 | 229 | 42 | 58 |
| Number of Lanes | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |

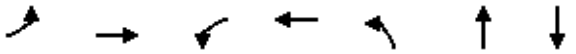
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Opposing Approach | WB | EB | SB | NB |
| Opposing Lanes | 3 | 2 | 1 | 1 |
| Conflicting Approach Left | SB | NB | EB | WB |
| Conflicting Lanes Left | 1 | 1 | 2 | 3 |
| Conflicting Approach Right | NB | SB | WB | EB |
| Conflicting Lanes Right | 1 | 1 | 3 | 2 |
| HCM Control Delay | 15.2 | 11 | 11 | 19.6 |
| HCM LOS | C | B | B | C |

| Lane | NBLn1 | EBLn1 | EBLn2 | WBLn1 | WBLn2 | WBLn3 | SBLn1 |
|---|---|---|---|---|---|---|---|
| Vol Left, % | 40% | 100% | 0% | 100% | 0% | 0% | 70% |
| Vol Thru, % | 43% | 0% | 88% | 0% | 100% | 0% | 13% |
| Vol Right, % | 17% | 0% | 12% | 0% | 0% | 100% | 17% |
| Sign Control | Stop | Stop | Stop | Stop | Stop | Stop | Stop |
| Traffic Vol by Lane | 47 | 45 | 243 | 22 | 131 | 139 | 303 |
| LT Vol | 19 | 45 | 0 | 22 | 0 | 0 | 211 |
| Through Vol | 20 | 0 | 213 | 0 | 131 | 0 | 39 |
| RT Vol | 8 | 0 | 30 | 0 | 0 | 139 | 53 |
| Lane Flow Rate | 51 | 49 | 264 | 24 | 142 | 151 | 329 |
| Geometry Grp | 7 | 8 | 8 | 7 | 7 | 7 | 7 |
| Degree of Util (X) | 0.104 | 0.101 | 0.494 | 0.047 | 0.259 | 0.247 | 0.613 |
| Departure Headway (Hd) | 7.326 | 7.408 | 6.739 | 7.114 | 6.552 | 5.89 | 6.704 |
| Convergence, Y/N | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cap | 486 | 481 | 531 | 501 | 545 | 606 | 537 |
| Service Time | 5.125 | 5.192 | 4.522 | 4.894 | 4.332 | 3.669 | 4.469 |
| HCM Lane V/C Ratio | 0.105 | 0.102 | 0.497 | 0.048 | 0.261 | 0.249 | 0.613 |
| HCM Control Delay | 11 | 11 | 16 | 10.2 | 11.6 | 10.6 | 19.6 |
| HCM Lane LOS | B | B | C | B | B | B | C |
| HCM 95th-tile Q | 0.3 | 0.3 | 2.7 | 0.1 | 1 | 1 | 4.1 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 23 | 879 | 3 | 853 | 26 | 234 |
| v/c Ratio | 0.06 | 0.36 | 0.01 | 0.36 | 0.08 | 0.83 |
| Control Delay | 8.2 | 8.6 | 6.3 | 5.4 | 25.8 | 66.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 8.2 | 8.6 | 6.3 | 5.4 | 25.8 | 66.7 |
| Queue Length 50th (ft) | 5 | 128 | 1 | 52 | 11 | 170 |
| Queue Length 95th (ft) | 18 | 216 | m2 | 83 | 32 | 239 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 405 | 2435 | 393 | 2347 | 653 | 539 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.36 | 0.01 | 0.36 | 0.04 | 0.43 |

Intersection Summary

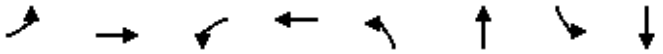
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 9 | 821 | 24 | 603 | 263 | 46 | 23 |
| v/c Ratio | 0.02 | 0.42 | 0.07 | 0.31 | 0.74 | 0.10 | 0.05 |
| Control Delay | 6.5 | 7.3 | 10.1 | 9.7 | 32.3 | 6.5 | 12.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 6.5 | 7.3 | 10.1 | 9.7 | 32.3 | 6.5 | 12.7 |
| Queue Length 50th (ft) | 1 | 61 | 5 | 84 | 87 | 2 | 5 |
| Queue Length 95th (ft) | m4 | 103 | m28 | 252 | 134 | 18 | 17 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 450 | 1972 | 334 | 1966 | 559 | 696 | 664 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.42 | 0.07 | 0.31 | 0.47 | 0.07 | 0.03 |

Intersection Summary

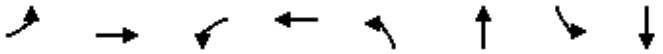
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 91 | 889 | 89 | 772 | 34 | 317 | 92 | 257 |
| v/c Ratio | 0.25 | 0.48 | 0.27 | 0.42 | 0.14 | 0.86 | 0.50 | 0.59 |
| Control Delay | 7.9 | 13.1 | 11.5 | 15.0 | 28.7 | 64.7 | 39.1 | 43.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.9 | 13.1 | 11.5 | 15.0 | 28.7 | 64.7 | 39.1 | 43.8 |
| Queue Length 50th (ft) | 23 | 166 | 21 | 111 | 19 | 227 | 53 | 177 |
| Queue Length 95th (ft) | 49 | 203 | m47 | 180 | 39 | 306 | 85 | 244 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 379 | 1861 | 402 | 1817 | 246 | 530 | 188 | 548 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.24 | 0.48 | 0.22 | 0.42 | 0.14 | 0.60 | 0.49 | 0.47 |

Intersection Summary

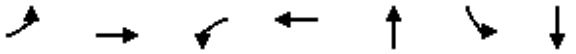
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 323 | 856 | 60 | 1169 | 37 | 328 | 364 | 560 |
| v/c Ratio | 0.71 | 0.44 | 0.52 | 0.72 | 0.46 | 0.77 | 0.93 | 0.67 |
| Control Delay | 59.0 | 9.7 | 70.6 | 16.8 | 73.3 | 61.0 | 70.2 | 28.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 59.0 | 9.7 | 70.6 | 16.8 | 73.3 | 61.0 | 70.2 | 28.3 |
| Queue Length 50th (ft) | 91 | 180 | 0 | 126 | 28 | 126 | 140 | 182 |
| Queue Length 95th (ft) | 151 | 227 | m95 | 215 | 65 | 170 | #235 | 204 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 453 | 1933 | 141 | 1630 | 87 | 886 | 396 | 1159 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.71 | 0.44 | 0.43 | 0.72 | 0.43 | 0.37 | 0.92 | 0.48 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



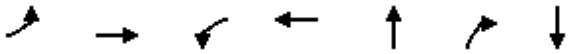
| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 177 | 1086 | 23 | 1228 | 111 | 77 | 155 |
| v/c Ratio | 0.78 | 0.40 | 0.31 | 0.53 | 1.06 | 0.92 | 0.57 |
| Control Delay | 65.0 | 4.3 | 60.6 | 8.5 | 138.6 | 129.7 | 19.8 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 65.0 | 4.3 | 60.6 | 8.5 | 138.6 | 129.7 | 19.8 |
| Queue Length 50th (ft) | 130 | 159 | 18 | 177 | ~68 | 60 | 14 |
| Queue Length 95th (ft) | m175 | m192 | m41 | 158 | #158 | #120 | 76 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 304 | 2729 | 75 | 2325 | 227 | 230 | 510 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.58 | 0.40 | 0.31 | 0.53 | 0.49 | 0.33 | 0.30 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

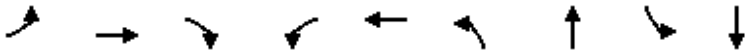
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 5 | 1201 | 283 | 1159 | 155 | 245 | 42 |
| v/c Ratio | 0.07 | 0.56 | 0.74 | 0.44 | 0.73 | 0.56 | 0.17 |
| Control Delay | 44.6 | 6.4 | 63.6 | 7.2 | 67.2 | 10.2 | 37.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 44.6 | 6.4 | 63.6 | 7.2 | 67.2 | 10.2 | 37.9 |
| Queue Length 50th (ft) | 3 | 73 | 111 | 136 | 116 | 0 | 24 |
| Queue Length 95th (ft) | m8 | 274 | 153 | 302 | 177 | 67 | 54 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 75 | 2153 | 497 | 2664 | 327 | 546 | 369 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.56 | 0.57 | 0.44 | 0.47 | 0.45 | 0.11 |

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 121 | 330 | 215 | 122 | 259 | 223 | 1018 | 52 | 801 |
| v/c Ratio | 0.71 | 0.87 | 0.49 | 0.77 | 0.75 | 0.85 | 0.59 | 0.50 | 0.59 |
| Control Delay | 74.1 | 68.0 | 16.1 | 83.0 | 58.7 | 68.0 | 18.9 | 71.2 | 31.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 74.1 | 68.0 | 16.1 | 83.0 | 58.7 | 68.0 | 18.9 | 71.2 | 31.1 |
| Queue Length 50th (ft) | 92 | 249 | 39 | 93 | 187 | 139 | 285 | 40 | 245 |
| Queue Length 95th (ft) | 151 | 335 | 105 | #169 | 275 | m#261 | 418 | 82 | 356 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 262 | 490 | 520 | 189 | 393 | 309 | 1731 | 119 | 1368 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.46 | 0.67 | 0.41 | 0.65 | 0.66 | 0.72 | 0.59 | 0.44 | 0.59 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 13 | 524 | 84 | 455 | 388 | 24 |
| v/c Ratio | 0.03 | 0.58 | 0.22 | 0.35 | 0.64 | 0.11 |
| Control Delay | 13.1 | 18.1 | 13.9 | 15.9 | 23.9 | 24.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 13.1 | 18.1 | 13.9 | 15.9 | 23.9 | 24.0 |
| Queue Length 50th (ft) | 2 | 55 | 15 | 44 | 94 | 4 |
| Queue Length 95th (ft) | 13 | 128 | 50 | 138 | #282 | 28 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 523 | 1662 | 456 | 1704 | 792 | 820 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.32 | 0.18 | 0.27 | 0.49 | 0.03 |

Intersection Summary

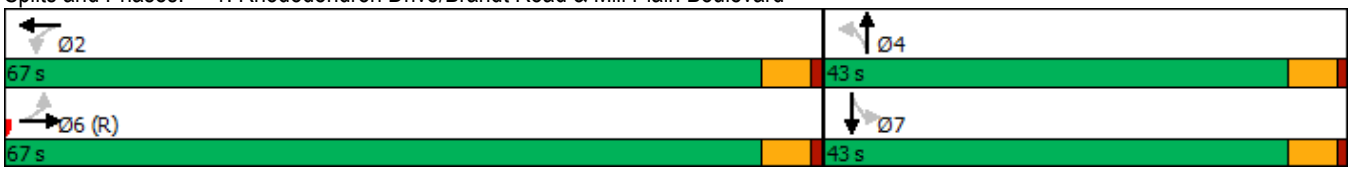
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

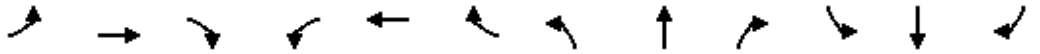
## Attachment C. Build Analysis Reports

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 437 | 5 | 1 | 1210 | 139 | 17 | 5 | 4 | 200 | 30 | 20 |
| Future Volume (vph) | 22 | 437 | 5 | 1 | 1210 | 139 | 17 | 5 | 4 | 200 | 30 | 20 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.985 | | | 0.980 | | | 0.989 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.968 | | | 0.962 | |
| Satd. Flow (prot) | 1719 | 3433 | 0 | 1805 | 3406 | 0 | 0 | 1738 | 0 | 0 | 1657 | 0 |
| Flt Permitted | 0.124 | | | 0.477 | | | | 0.808 | | | 0.751 | |
| Satd. Flow (perm) | 224 | 3433 | 0 | 906 | 3406 | 0 | 0 | 1451 | 0 | 0 | 1293 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 2 | | | 18 | | | 4 | | | 4 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 5% | 5% | 0% | 0% | 4% | 8% | 0% | 20% | 0% | 6% | 33% | 4% |
| Adj. Flow (vph) | 24 | 465 | 5 | 1 | 1315 | 151 | 18 | 5 | 4 | 217 | 33 | 22 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 24 | 470 | 0 | 1 | 1466 | 0 | 0 | 27 | 0 | 0 | 272 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 67.0 | 67.0 | | 67.0 | 67.0 | | 43.0 | 43.0 | | 43.0 | 43.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 73.3 | 73.3 | | 73.3 | 73.3 | | | 26.7 | | | 26.7 | |
| Actuated g/C Ratio | 0.67 | 0.67 | | 0.67 | 0.67 | | | 0.24 | | | 0.24 | |
| v/c Ratio | 0.16 | 0.21 | | 0.00 | 0.64 | | | 0.08 | | | 0.86 | |
| Control Delay | 12.8 | 8.3 | | 8.0 | 8.3 | | | 25.5 | | | 63.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 12.8 | 8.3 | | 8.0 | 8.3 | | | 25.5 | | | 63.1 | |
| LOS | B | A | | A | A | | | C | | | E | |
| Approach Delay | | 8.5 | | | 8.3 | | | 25.5 | | | 63.1 | |
| Approach LOS | | A | | | A | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 48 (44%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.86 | | | |
| Intersection Signal Delay: 15.1 | | Intersection LOS: B | |
| Intersection Capacity Utilization 63.7% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

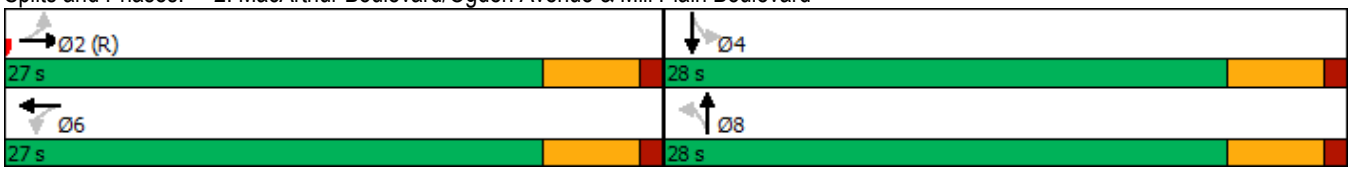




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 10 | 487 | 0 | 79 | 1004 | 16 | 293 | 5 | 11 | 24 | 18 | 12 |
| Future Volume (vph) | 10 | 487 | 0 | 79 | 1004 | 16 | 293 | 5 | 11 | 24 | 18 | 12 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.998 | | | 0.894 | | | 0.970 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.978 | |
| Satd. Flow (prot) | 1805 | 3438 | 0 | 1752 | 3463 | 0 | 1736 | 1631 | 0 | 0 | 1659 | 0 |
| Flt Permitted | 0.185 | | | 0.463 | | | 0.719 | | | | 0.898 | |
| Satd. Flow (perm) | 352 | 3438 | 0 | 854 | 3463 | 0 | 1314 | 1631 | 0 | 0 | 1523 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 3 | | | 12 | | | 13 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 5% | 5% | 3% | 4% | 7% | 4% | 14% | 0% | 0% | 21% | 7% |
| Adj. Flow (vph) | 11 | 513 | 0 | 86 | 1091 | 17 | 318 | 5 | 12 | 26 | 20 | 13 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 11 | 513 | 0 | 86 | 1108 | 0 | 318 | 17 | 0 | 0 | 59 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 27.0 | 27.0 | | 27.0 | 27.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 28.1 | 28.1 | | 28.1 | 28.1 | | 16.9 | 16.9 | | | 16.9 | |
| Actuated g/C Ratio | 0.51 | 0.51 | | 0.51 | 0.51 | | 0.31 | 0.31 | | | 0.31 | |
| v/c Ratio | 0.06 | 0.29 | | 0.20 | 0.63 | | 0.79 | 0.03 | | | 0.12 | |
| Control Delay | 12.1 | 9.9 | | 11.1 | 13.1 | | 31.2 | 7.1 | | | 10.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 12.1 | 9.9 | | 11.1 | 13.1 | | 31.2 | 7.1 | | | 10.1 | |
| LOS | B | A | | B | B | | C | A | | | B | |
| Approach Delay | | 10.0 | | | 13.0 | | | 30.0 | | | 10.1 | |
| Approach LOS | | A | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 55 | | | |
| Actuated Cycle Length: 55 | | | |
| Offset: 25 (45%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.79 | | | |
| Intersection Signal Delay: 14.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 73.7% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

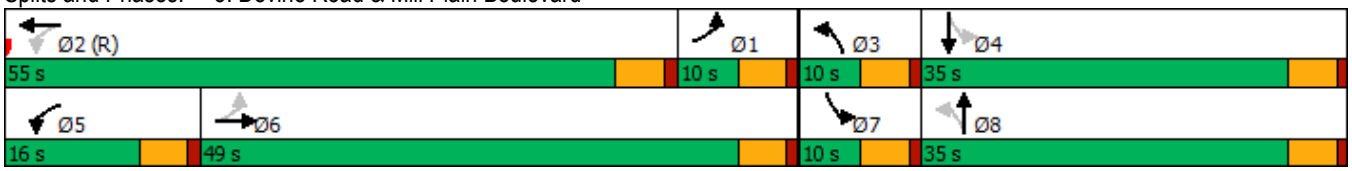
Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 55 | 592 | 24 | 73 | 1174 | 81 | 17 | 246 | 99 | 76 | 190 | 61 |
| Future Volume (vph) | 55 | 592 | 24 | 73 | 1174 | 81 | 17 | 246 | 99 | 76 | 190 | 61 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.994 | | | 0.990 | | | 0.957 | | | 0.964 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1703 | 3455 | 0 | 1787 | 3465 | 0 | 1687 | 1732 | 0 | 1752 | 1716 | 0 |
| Flt Permitted | 0.112 | | | 0.285 | | | 0.433 | | | 0.199 | | |
| Satd. Flow (perm) | 201 | 3455 | 0 | 536 | 3465 | 0 | 769 | 1732 | 0 | 367 | 1716 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 8 | | | 18 | | | 14 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 6% | 4% | 0% | 1% | 3% | 5% | 7% | 7% | 0% | 3% | 7% | 6% |
| Adj. Flow (vph) | 60 | 643 | 26 | 79 | 1276 | 88 | 18 | 267 | 108 | 83 | 207 | 66 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 60 | 669 | 0 | 79 | 1364 | 0 | 18 | 375 | 0 | 83 | 273 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 10.0 | 49.0 | | 16.0 | 55.0 | | 10.0 | 35.0 | | 10.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 58.0 | 57.0 | | 58.4 | 58.4 | | 29.6 | 25.6 | | 31.6 | 29.6 | |
| Actuated g/C Ratio | 0.53 | 0.52 | | 0.53 | 0.53 | | 0.27 | 0.23 | | 0.29 | 0.27 | |
| v/c Ratio | 0.34 | 0.37 | | 0.22 | 0.74 | | 0.07 | 0.90 | | 0.49 | 0.58 | |
| Control Delay | 26.7 | 14.0 | | 5.6 | 7.7 | | 24.0 | 63.6 | | 36.3 | 37.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 26.7 | 14.0 | | 5.6 | 7.7 | | 24.0 | 63.6 | | 36.3 | 37.9 | |
| LOS | C | B | | A | A | | C | E | | D | D | |
| Approach Delay | | 15.1 | | | 7.6 | | | 61.8 | | | 37.5 | |
| Approach LOS | | B | | | A | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 55 (50%), Referenced to phase 2:WBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.90 | | | |
| Intersection Signal Delay: 20.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 79.0% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

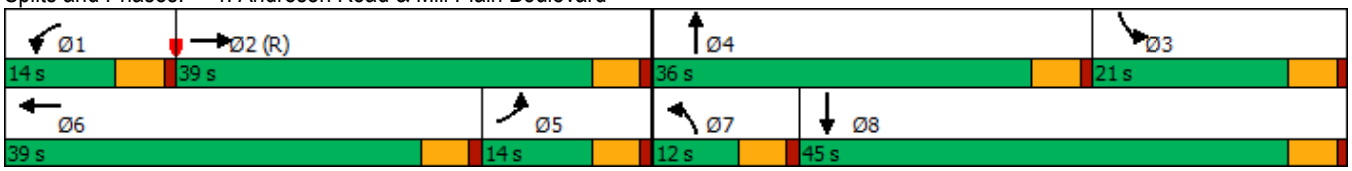
Splits and Phases: 3: Devine Road & Mill Plain Boulevard

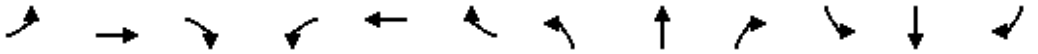


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 162 | 593 | 35 | 62 | 969 | 203 | 39 | 258 | 29 | 476 | 501 | 328 |
| Future Volume (vph) | 162 | 593 | 35 | 62 | 969 | 203 | 39 | 258 | 29 | 476 | 501 | 328 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.992 | | | 0.974 | | | 0.985 | | | 0.941 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3367 | 3462 | 0 | 1703 | 3408 | 0 | 1597 | 3374 | 0 | 3367 | 3272 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3367 | 3462 | 0 | 1703 | 3408 | 0 | 1597 | 3374 | 0 | 3367 | 3272 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 23 | | | 11 | | | 156 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 4% | 3% | 11% | 6% | 3% | 4% | 13% | 6% | 0% | 4% | 5% | 2% |
| Adj. Flow (vph) | 176 | 645 | 38 | 67 | 1053 | 221 | 42 | 280 | 32 | 517 | 545 | 357 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 176 | 683 | 0 | 67 | 1274 | 0 | 42 | 312 | 0 | 517 | 902 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 14.0 | 39.0 | | 14.0 | 39.0 | | 12.0 | 36.0 | | 21.0 | 45.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 9.0 | 46.1 | | 7.7 | 42.9 | | 6.1 | 13.4 | | 24.7 | 36.1 | |
| Actuated g/C Ratio | 0.08 | 0.42 | | 0.07 | 0.39 | | 0.06 | 0.12 | | 0.22 | 0.33 | |
| v/c Ratio | 0.64 | 0.47 | | 0.56 | 0.95 | | 0.48 | 0.74 | | 0.68 | 0.77 | |
| Control Delay | 54.4 | 22.0 | | 81.1 | 40.2 | | 68.3 | 55.8 | | 22.5 | 11.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 54.4 | 22.0 | | 81.1 | 40.2 | | 68.3 | 55.8 | | 22.5 | 11.4 | |
| LOS | D | C | | F | D | | E | E | | C | B | |
| Approach Delay | | 28.7 | | | 42.2 | | | 57.2 | | | 15.5 | |
| Approach LOS | | C | | | D | | | E | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 24 (22%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.95 | | | |
| Intersection Signal Delay: 31.1 | | Intersection LOS: C | |
| Intersection Capacity Utilization 83.1% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

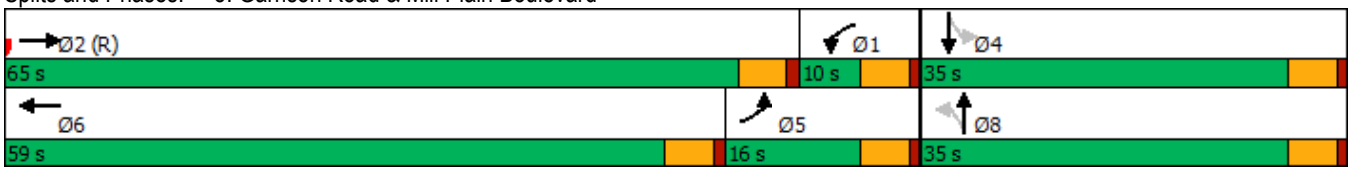


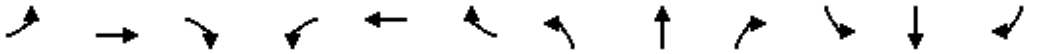


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 61 | 967 | 10 | 18 | 1123 | 25 | 15 | 9 | 37 | 53 | 7 | 113 |
| Future Volume (vph) | 61 | 967 | 10 | 18 | 1123 | 25 | 15 | 9 | 37 | 53 | 7 | 113 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.997 | | | 0.918 | | | 0.859 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.988 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3495 | 0 | 1703 | 3484 | 0 | 0 | 1660 | 0 | 1752 | 1545 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.562 | | 0.730 | | |
| Satd. Flow (perm) | 1805 | 3495 | 0 | 1703 | 3484 | 0 | 0 | 944 | 0 | 1347 | 1545 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 1 | | | 3 | | | 40 | | | 123 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 3% | 11% | 6% | 3% | 17% | 0% | 13% | 3% | 3% | 0% | 6% |
| Adj. Flow (vph) | 66 | 1018 | 11 | 20 | 1221 | 27 | 16 | 10 | 40 | 58 | 8 | 123 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 66 | 1029 | 0 | 20 | 1248 | 0 | 0 | 66 | 0 | 58 | 131 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 16.0 | 65.0 | | 10.0 | 59.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 8.1 | 87.7 | | 5.0 | 80.6 | | | 8.3 | | 8.3 | 8.3 | |
| Actuated g/C Ratio | 0.07 | 0.80 | | 0.05 | 0.73 | | | 0.08 | | 0.08 | 0.08 | |
| v/c Ratio | 0.50 | 0.37 | | 0.26 | 0.49 | | | 0.61 | | 0.57 | 0.57 | |
| Control Delay | 52.6 | 4.2 | | 61.9 | 4.3 | | | 47.0 | | 69.6 | 19.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 52.6 | 4.2 | | 61.9 | 4.3 | | | 47.0 | | 69.6 | 19.9 | |
| LOS | D | A | | E | A | | | D | | E | B | |
| Approach Delay | | 7.2 | | | 5.2 | | | 47.0 | | | 35.1 | |
| Approach LOS | | A | | | A | | | D | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 86 (78%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.61 | | | |
| Intersection Signal Delay: 9.3 | | Intersection LOS: A | |
| Intersection Capacity Utilization 58.7% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 5: Garrison Road & Mill Plain Boulevard

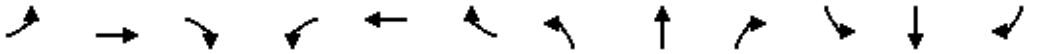




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 3 | 977 | 101 | 256 | 1115 | 5 | 102 | 6 | 270 | 7 | 4 | 3 |
| Future Volume (vph) | 3 | 977 | 101 | 256 | 1115 | 5 | 102 | 6 | 270 | 7 | 4 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 2 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.985 | | | 0.999 | | | | 0.850 | | 0.973 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.955 | | | 0.974 | |
| Satd. Flow (prot) | 1805 | 3466 | 0 | 3367 | 3502 | 0 | 0 | 1733 | 1583 | 0 | 1801 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.728 | | | 0.845 | |
| Satd. Flow (perm) | 1805 | 3466 | 0 | 3367 | 3502 | 0 | 0 | 1321 | 1583 | 0 | 1562 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 15 | | | 1 | | | | 293 | | 3 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.98 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 2% | 8% | 4% | 3% | 0% | 5% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 3 | 997 | 110 | 278 | 1212 | 5 | 111 | 7 | 293 | 8 | 4 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 3 | 1107 | 0 | 278 | 1217 | 0 | 0 | 118 | 293 | 0 | 15 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 10.0 | 59.0 | | 22.0 | 71.0 | | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.0 | 69.3 | | 12.5 | 84.7 | | | 13.3 | 13.3 | | 13.3 | |
| Actuated g/C Ratio | 0.05 | 0.63 | | 0.11 | 0.77 | | | 0.12 | 0.12 | | 0.12 | |
| v/c Ratio | 0.04 | 0.51 | | 0.73 | 0.45 | | | 0.74 | 0.65 | | 0.08 | |
| Control Delay | 38.3 | 6.8 | | 58.3 | 6.2 | | | 72.3 | 12.2 | | 35.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 38.3 | 6.8 | | 58.3 | 6.2 | | | 72.3 | 12.2 | | 35.0 | |
| LOS | D | A | | E | A | | | E | B | | C | |
| Approach Delay | | 6.9 | | | 15.9 | | | 29.5 | | | 35.0 | |
| Approach LOS | | A | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 70 (64%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.74 | | | |
| Intersection Signal Delay: 14.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 63.6% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

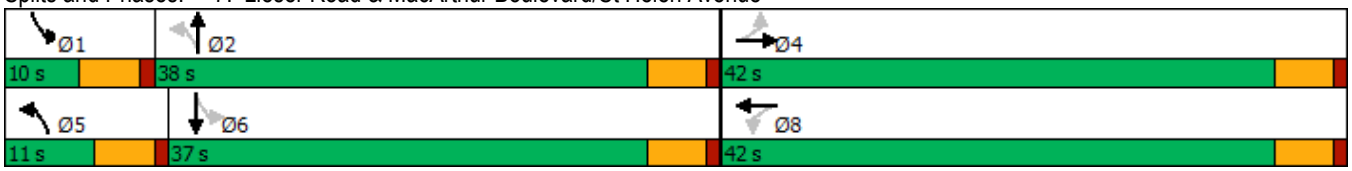
Splits and Phases: 6: Lieser Road & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 59 | 115 | 400 | 88 | 275 | 27 | 124 | 274 | 74 | 5 | 307 | 63 |
| Future Volume (vph) | 59 | 115 | 400 | 88 | 275 | 27 | 124 | 274 | 74 | 5 | 307 | 63 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.883 | | | 0.987 | | | 0.968 | | | 0.975 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1703 | 1586 | 0 | 1770 | 1842 | 0 | 1736 | 1811 | 0 | 1805 | 1747 | 0 |
| Flt Permitted | 0.432 | | | 0.206 | | | 0.330 | | | 0.525 | | |
| Satd. Flow (perm) | 774 | 1586 | 0 | 384 | 1842 | 0 | 603 | 1811 | 0 | 998 | 1747 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 236 | | | 7 | | | 17 | | | 13 | |
| Link Speed (mph) | | 35 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 712 | | | 960 | | | 705 | | | 2501 | |
| Travel Time (s) | | 13.9 | | | 26.2 | | | 19.2 | | | 68.2 | |
| Peak Hour Factor | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 6% | 5% | 6% | 2% | 2% | 0% | 4% | 2% | 0% | 0% | 5% | 11% |
| Adj. Flow (vph) | 63 | 125 | 435 | 96 | 299 | 29 | 135 | 298 | 80 | 5 | 334 | 68 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 63 | 560 | 0 | 96 | 328 | 0 | 135 | 378 | 0 | 5 | 402 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Total Split (s) | 42.0 | 42.0 | | 42.0 | 42.0 | | 11.0 | 38.0 | | 10.0 | 37.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 19.4 | 19.4 | | 19.4 | 19.4 | | 27.7 | 26.9 | | 23.7 | 20.0 | |
| Actuated g/C Ratio | 0.33 | 0.33 | | 0.33 | 0.33 | | 0.47 | 0.45 | | 0.40 | 0.34 | |
| v/c Ratio | 0.25 | 0.83 | | 0.77 | 0.54 | | 0.33 | 0.46 | | 0.01 | 0.67 | |
| Control Delay | 19.1 | 22.7 | | 59.0 | 20.5 | | 13.0 | 15.2 | | 11.0 | 25.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 19.1 | 22.7 | | 59.0 | 20.5 | | 13.0 | 15.2 | | 11.0 | 25.3 | |
| LOS | B | C | | E | C | | B | B | | B | C | |
| Approach Delay | | 22.3 | | | 29.2 | | | 14.7 | | | 25.1 | |
| Approach LOS | | C | | | C | | | B | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 90 | | | |
| Actuated Cycle Length: 59.4 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 22.4 | | Intersection LOS: C | |
| Intersection Capacity Utilization 79.1% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

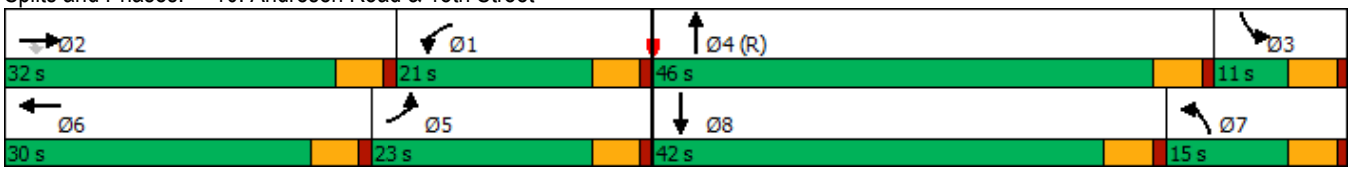
Splits and Phases: 7: Lieser Road & MacArthur Boulevard/St Helen Avenue



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 165 | 158 | 169 | 125 | 178 | 6 | 157 | 425 | 69 | 22 | 1083 | 106 |
| Future Volume (vph) | 165 | 158 | 169 | 125 | 178 | 6 | 157 | 425 | 69 | 22 | 1083 | 106 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.995 | | | 0.979 | | | 0.987 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1641 | 1696 | 1429 | 1770 | 1855 | 0 | 1719 | 3357 | 0 | 1467 | 3436 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1641 | 1696 | 1429 | 1770 | 1855 | 0 | 1719 | 3357 | 0 | 1467 | 3436 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 184 | | 2 | | | 19 | | | 10 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 10% | 12% | 13% | 2% | 2% | 0% | 5% | 5% | 7% | 23% | 3% | 11% |
| Adj. Flow (vph) | 179 | 172 | 184 | 136 | 193 | 7 | 171 | 462 | 75 | 24 | 1177 | 115 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 179 | 172 | 184 | 136 | 200 | 0 | 171 | 537 | 0 | 24 | 1292 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 23.0 | 32.0 | 32.0 | 21.0 | 30.0 | | 15.0 | 46.0 | | 11.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 15.4 | 14.7 | 14.7 | 16.0 | 15.2 | | 10.0 | 57.8 | | 6.0 | 49.4 | |
| Actuated g/C Ratio | 0.14 | 0.13 | 0.13 | 0.15 | 0.14 | | 0.09 | 0.53 | | 0.05 | 0.45 | |
| v/c Ratio | 0.78 | 0.76 | 0.53 | 0.53 | 0.78 | | 1.10 | 0.30 | | 0.30 | 0.83 | |
| Control Delay | 67.3 | 66.5 | 11.6 | 50.2 | 64.7 | | 134.1 | 5.2 | | 60.0 | 34.3 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 67.3 | 66.5 | 11.6 | 50.2 | 64.7 | | 134.1 | 5.2 | | 60.0 | 34.3 | |
| LOS | E | E | B | D | E | | F | A | | E | C | |
| Approach Delay | | 47.9 | | | 58.8 | | | 36.3 | | | 34.8 | |
| Approach LOS | | D | | | E | | | D | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 110 | | | |
| Actuated Cycle Length: 110 | | | |
| Offset: 4 (4%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.10 | | | |
| Intersection Signal Delay: 40.4 | | Intersection LOS: D | |
| Intersection Capacity Utilization 77.6% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

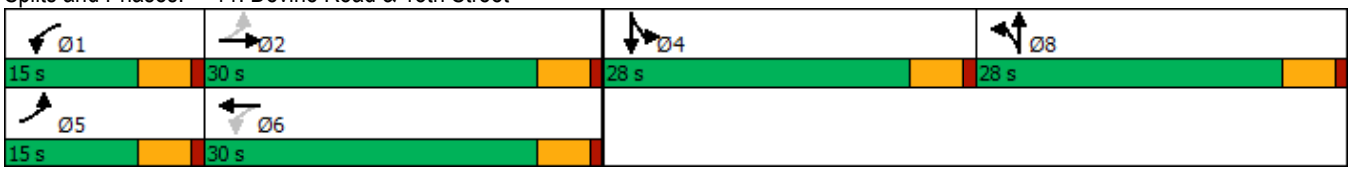
Splits and Phases: 10: Andresen Road & 18th Street



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 1 | 219 | 259 | 127 | 230 | 3 | 216 | 1 | 151 | 0 | 5 | 1 |
| Future Volume (vph) | 1 | 219 | 259 | 127 | 230 | 3 | 216 | 1 | 151 | 0 | 5 | 1 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.918 | | | 0.998 | | | 0.945 | | | 0.977 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.971 | | | | |
| Satd. Flow (prot) | 1805 | 3097 | 0 | 1671 | 3466 | 0 | 0 | 1654 | 0 | 0 | 1856 | 0 |
| Flt Permitted | 0.595 | | | 0.267 | | | | 0.971 | | | | |
| Satd. Flow (perm) | 1130 | 3097 | 0 | 470 | 3466 | 0 | 0 | 1654 | 0 | 0 | 1856 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 282 | | | 1 | | | 32 | | | 1 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 7% | 7% | 8% | 4% | 0% | 5% | 0% | 6% | 0% | 0% | 0% |
| Adj. Flow (vph) | 1 | 233 | 282 | 138 | 250 | 3 | 235 | 1 | 164 | 0 | 5 | 1 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 1 | 515 | 0 | 138 | 253 | 0 | 0 | 400 | 0 | 0 | 6 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | | | 4.0 | | | 4.0 | |
| Act Effct Green (s) | 17.5 | 12.3 | | 21.8 | 20.2 | | | 21.3 | | | 7.6 | |
| Actuated g/C Ratio | 0.33 | 0.23 | | 0.41 | 0.38 | | | 0.40 | | | 0.14 | |
| v/c Ratio | 0.00 | 0.55 | | 0.35 | 0.19 | | | 0.59 | | | 0.02 | |
| Control Delay | 11.0 | 11.8 | | 13.2 | 13.1 | | | 19.3 | | | 26.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 11.0 | 11.8 | | 13.2 | 13.1 | | | 19.3 | | | 26.0 | |
| LOS | B | B | | B | B | | | B | | | C | |
| Approach Delay | | 11.8 | | | 13.2 | | | 19.3 | | | 26.0 | |
| Approach LOS | | B | | | B | | | B | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 101 | | | |
| Actuated Cycle Length: 53.2 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.59 | | | |
| Intersection Signal Delay: 14.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 59.3% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 17.7 |
| Intersection LOS | C |

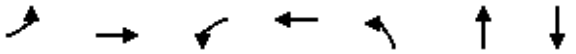
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 300 | 500 | 313 | 674 |
| Demand Flow Rate, veh/h | 308 | 517 | 330 | 716 |
| Vehicles Circulating, veh/h | 639 | 378 | 628 | 479 |
| Vehicles Exiting, veh/h | 556 | 580 | 319 | 416 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 11.1 | 11.5 | 11.7 | 28.1 |
| Approach LOS | B | B | B | D |

| Lane | Left | Left | Left | Left |
|---|---|---|---|---|
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 308 | 517 | 330 | 716 |
| Cap Entry Lane, veh/h | 719 | 938 | 727 | 847 |
| Entry HV Adj Factor | 0.975 | 0.968 | 0.949 | 0.942 |
| Flow Entry, veh/h | 300 | 500 | 313 | 674 |
| Cap Entry, veh/h | 701 | 908 | 690 | 797 |
| V/C Ratio | 0.428 | 0.551 | 0.454 | 0.846 |
| Control Delay, s/veh | 11.1 | 11.5 | 11.7 | 28.1 |
| LOS | B | B | B | D |
| 95th %tile Queue, veh | 2 | 3 | 2 | 10 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 24 | 470 | 1 | 1466 | 27 | 272 |
| v/c Ratio | 0.16 | 0.21 | 0.00 | 0.64 | 0.08 | 0.86 |
| Control Delay | 12.8 | 8.3 | 8.0 | 8.3 | 25.5 | 63.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.8 | 8.3 | 8.0 | 8.3 | 25.5 | 63.1 |
| Queue Length 50th (ft) | 6 | 61 | 0 | 88 | 13 | 182 |
| Queue Length 95th (ft) | 25 | 108 | m0 | 388 | 31 | 253 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 149 | 2287 | 603 | 2274 | 503 | 449 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.16 | 0.21 | 0.00 | 0.64 | 0.05 | 0.61 |

Intersection Summary

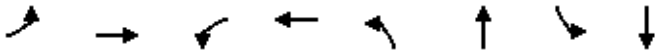
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 11 | 513 | 86 | 1108 | 318 | 17 | 59 |
| v/c Ratio | 0.06 | 0.29 | 0.20 | 0.63 | 0.79 | 0.03 | 0.12 |
| Control Delay | 12.1 | 9.9 | 11.1 | 13.1 | 31.2 | 7.1 | 10.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 12.1 | 9.9 | 11.1 | 13.1 | 31.2 | 7.1 | 10.1 |
| Queue Length 50th (ft) | 2 | 87 | 26 | 185 | 93 | 1 | 10 |
| Queue Length 95th (ft) | m10 | 113 | m48 | 277 | 146 | 10 | 26 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 180 | 1757 | 436 | 1771 | 549 | 689 | 644 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.06 | 0.29 | 0.20 | 0.63 | 0.58 | 0.02 | 0.09 |

Intersection Summary

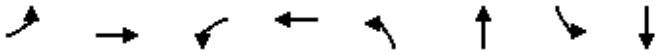
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 60 | 669 | 79 | 1364 | 18 | 375 | 83 | 273 |
| v/c Ratio | 0.34 | 0.37 | 0.22 | 0.74 | 0.07 | 0.90 | 0.49 | 0.58 |
| Control Delay | 26.7 | 14.0 | 5.6 | 7.7 | 24.0 | 63.6 | 36.3 | 37.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 26.7 | 14.0 | 5.6 | 7.7 | 24.0 | 63.6 | 36.3 | 37.9 |
| Queue Length 50th (ft) | 18 | 119 | 13 | 143 | 9 | 243 | 41 | 143 |
| Queue Length 95th (ft) | 54 | 220 | m14 | m151 | 24 | #371 | 74 | 245 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 174 | 1791 | 409 | 1842 | 248 | 485 | 168 | 509 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.34 | 0.37 | 0.19 | 0.74 | 0.07 | 0.77 | 0.49 | 0.54 |

Intersection Summary

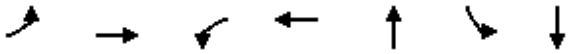
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 176 | 683 | 67 | 1274 | 42 | 312 | 517 | 902 |
| v/c Ratio | 0.64 | 0.47 | 0.56 | 0.95 | 0.48 | 0.74 | 0.68 | 0.77 |
| Control Delay | 54.4 | 22.0 | 81.1 | 40.2 | 68.3 | 55.8 | 22.5 | 11.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 54.4 | 22.0 | 81.1 | 40.2 | 68.3 | 55.8 | 22.5 | 11.4 |
| Queue Length 50th (ft) | 50 | 75 | 46 | 444 | 29 | 109 | 144 | 187 |
| Queue Length 95th (ft) | m98 | 308 | 86 | #666 | 66 | 151 | m124 | 46 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 275 | 1455 | 145 | 1341 | 101 | 958 | 757 | 1289 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.64 | 0.47 | 0.46 | 0.95 | 0.42 | 0.33 | 0.68 | 0.70 |

Intersection Summary

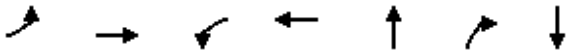
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 66 | 1029 | 20 | 1248 | 66 | 58 | 131 |
| v/c Ratio | 0.50 | 0.37 | 0.26 | 0.49 | 0.61 | 0.57 | 0.57 |
| Control Delay | 52.6 | 4.2 | 61.9 | 4.3 | 47.0 | 69.6 | 19.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 52.6 | 4.2 | 61.9 | 4.3 | 47.0 | 69.6 | 19.9 |
| Queue Length 50th (ft) | 39 | 9 | 14 | 103 | 18 | 40 | 5 |
| Queue Length 95th (ft) | m67 | 143 | m34 | 69 | 63 | 81 | 62 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 180 | 2785 | 77 | 2552 | 286 | 367 | 510 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.37 | 0.37 | 0.26 | 0.49 | 0.23 | 0.16 | 0.26 |

Intersection Summary

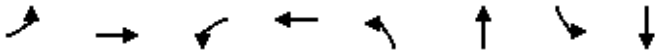
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 3 | 1107 | 278 | 1217 | 118 | 293 | 15 |
| v/c Ratio | 0.04 | 0.51 | 0.73 | 0.45 | 0.74 | 0.65 | 0.08 |
| Control Delay | 38.3 | 6.8 | 58.3 | 6.2 | 72.3 | 12.2 | 35.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 38.3 | 6.8 | 58.3 | 6.2 | 72.3 | 12.2 | 35.0 |
| Queue Length 50th (ft) | 2 | 57 | 99 | 117 | 82 | 0 | 8 |
| Queue Length 95th (ft) | m5 | 182 | 139 | 285 | 136 | 75 | 26 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 82 | 2187 | 520 | 2698 | 288 | 574 | 343 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.04 | 0.51 | 0.53 | 0.45 | 0.41 | 0.51 | 0.04 |

Intersection Summary

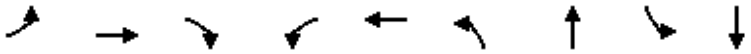
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 63 | 560 | 96 | 328 | 135 | 378 | 5 | 402 |
| v/c Ratio | 0.25 | 0.83 | 0.77 | 0.54 | 0.33 | 0.46 | 0.01 | 0.67 |
| Control Delay | 19.1 | 22.7 | 59.0 | 20.5 | 13.0 | 15.2 | 11.0 | 25.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 19.1 | 22.7 | 59.0 | 20.5 | 13.0 | 15.2 | 11.0 | 25.3 |
| Queue Length 50th (ft) | 16 | 101 | 30 | 90 | 22 | 69 | 1 | 116 |
| Queue Length 95th (ft) | 51 | 276 | #118 | 199 | 76 | 251 | 7 | 283 |
| Internal Link Dist (ft) | | 632 | | 880 | | 625 | | 2421 |
| Turn Bay Length (ft) | 150 | | 150 | | 150 | | 150 | |
| Base Capacity (vph) | 514 | 1134 | 255 | 1227 | 415 | 1135 | 478 | 1057 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.12 | 0.49 | 0.38 | 0.27 | 0.33 | 0.33 | 0.01 | 0.38 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 179 | 172 | 184 | 136 | 200 | 171 | 537 | 24 | 1292 |
| v/c Ratio | 0.78 | 0.76 | 0.53 | 0.53 | 0.78 | 1.10 | 0.30 | 0.30 | 0.83 |
| Control Delay | 67.3 | 66.5 | 11.6 | 50.2 | 64.7 | 134.1 | 5.2 | 60.0 | 34.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 67.3 | 66.5 | 11.6 | 50.2 | 64.7 | 134.1 | 5.2 | 60.0 | 34.3 |
| Queue Length 50th (ft) | 123 | 119 | 0 | 90 | 137 | ~141 | 48 | 17 | 410 |
| Queue Length 95th (ft) | 189 | 182 | 60 | 144 | 204 | m#245 | m82 | 45 | #688 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 279 | 416 | 489 | 285 | 423 | 156 | 1772 | 80 | 1548 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.64 | 0.41 | 0.38 | 0.48 | 0.47 | 1.10 | 0.30 | 0.30 | 0.83 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 1 | 515 | 138 | 253 | 400 | 6 |
| v/c Ratio | 0.00 | 0.55 | 0.35 | 0.19 | 0.59 | 0.02 |
| Control Delay | 11.0 | 11.8 | 13.2 | 13.1 | 19.3 | 26.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 11.0 | 11.8 | 13.2 | 13.1 | 19.3 | 26.0 |
| Queue Length 50th (ft) | 0 | 32 | 24 | 22 | 86 | 1 |
| Queue Length 95th (ft) | 3 | 93 | 73 | 76 | #286 | 14 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 610 | 1778 | 471 | 1843 | 827 | 911 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.00 | 0.29 | 0.29 | 0.14 | 0.48 | 0.01 |

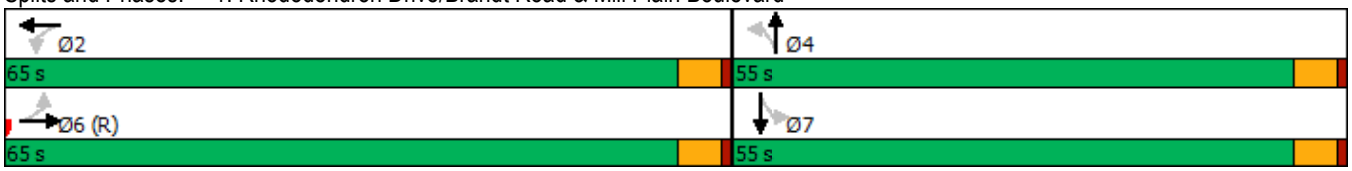
Intersection Summary

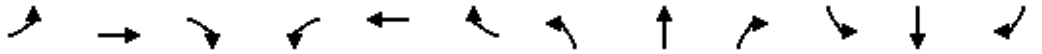
# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 21 | 974 | 7 | 3 | 611 | 243 | 9 | 7 | 8 | 219 | 6 | 25 |
| Future Volume (vph) | 21 | 974 | 7 | 3 | 611 | 243 | 9 | 7 | 8 | 219 | 6 | 25 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 65 | | 0 | 115 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.999 | | | 0.957 | | | 0.955 | | | 0.987 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.982 | | | 0.958 | |
| Satd. Flow (prot) | 1805 | 3469 | 0 | 1805 | 3313 | 0 | 0 | 1711 | 0 | 0 | 1670 | 0 |
| Flt Permitted | 0.273 | | | 0.232 | | | | 0.883 | | | 0.733 | |
| Satd. Flow (perm) | 519 | 3469 | 0 | 441 | 3313 | 0 | 0 | 1538 | 0 | 0 | 1278 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 1 | | | 72 | | | 9 | | | 6 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 809 | | | 1133 | | | 894 | | | 1375 | |
| Travel Time (s) | | 15.8 | | | 22.1 | | | 24.4 | | | 37.5 | |
| Peak Hour Factor | 0.92 | 0.94 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 0% | 0% | 4% | 5% | 0% | 14% | 0% | 8% | 0% | 6% |
| Adj. Flow (vph) | 23 | 1036 | 8 | 3 | 657 | 264 | 10 | 8 | 9 | 238 | 7 | 27 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 23 | 1044 | 0 | 3 | 921 | 0 | 0 | 27 | 0 | 0 | 272 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 6 | | | 2 | | | 4 | | | 7 | |
| Permitted Phases | 6 | | | 2 | | | 4 | | | 7 | | |
| Total Split (s) | 65.0 | 65.0 | | 65.0 | 65.0 | | 55.0 | 55.0 | | 55.0 | 55.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 80.2 | 80.2 | | 80.2 | 80.2 | | | 29.8 | | | 29.8 | |
| Actuated g/C Ratio | 0.67 | 0.67 | | 0.67 | 0.67 | | | 0.25 | | | 0.25 | |
| v/c Ratio | 0.07 | 0.45 | | 0.01 | 0.41 | | | 0.07 | | | 0.85 | |
| Control Delay | 10.2 | 11.4 | | 6.7 | 5.9 | | | 22.6 | | | 64.0 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 10.2 | 11.4 | | 6.7 | 5.9 | | | 22.6 | | | 64.0 | |
| LOS | B | B | | A | A | | | C | | | E | |
| Approach Delay | | 11.3 | | | 5.9 | | | 22.6 | | | 64.0 | |
| Approach LOS | | B | | | A | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 70 (58%), Referenced to phase 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.85 | | | |
| Intersection Signal Delay: 15.5 | | Intersection LOS: B | |
| Intersection Capacity Utilization 56.1% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 1: Rhododendron Drive/Brandt Road & Mill Plain Boulevard

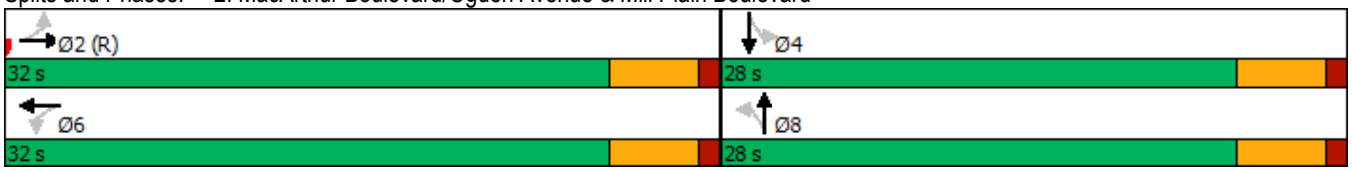




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 8 | 991 | 0 | 23 | 579 | 6 | 277 | 8 | 42 | 15 | 6 | 3 |
| Future Volume (vph) | 8 | 991 | 0 | 23 | 579 | 6 | 277 | 8 | 42 | 15 | 6 | 3 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 100 | | 0 | 95 | | 0 | 130 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | | | | 0.998 | | | 0.875 | | | 0.984 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | | 0.970 | |
| Satd. Flow (prot) | 1805 | 3471 | 0 | 1805 | 3459 | 0 | 1719 | 1622 | 0 | 0 | 1761 | 0 |
| Flt Permitted | 0.396 | | | 0.226 | | | 0.740 | | | | 0.866 | |
| Satd. Flow (perm) | 752 | 3471 | 0 | 429 | 3459 | 0 | 1339 | 1622 | 0 | 0 | 1573 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | | | 2 | | | 46 | | | 3 | |
| Link Speed (mph) | | 35 | | | 35 | | | 30 | | | 25 | |
| Link Distance (ft) | | 570 | | | 1299 | | | 436 | | | 830 | |
| Travel Time (s) | | 11.1 | | | 25.3 | | | 9.9 | | | 22.6 | |
| Peak Hour Factor | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 5% | 0% | 4% | 17% | 5% | 0% | 3% | 0% | 11% | 0% |
| Adj. Flow (vph) | 9 | 1022 | 0 | 25 | 629 | 7 | 301 | 9 | 46 | 16 | 7 | 3 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 9 | 1022 | 0 | 25 | 636 | 0 | 301 | 55 | 0 | 0 | 26 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | | 2 | | | 6 | | | 8 | | | 4 | |
| Permitted Phases | 2 | | | 6 | | | 8 | | | 4 | | |
| Total Split (s) | 32.0 | 32.0 | | 32.0 | 32.0 | | 28.0 | 28.0 | | 28.0 | 28.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 33.1 | 33.1 | | 33.1 | 33.1 | | 16.9 | 16.9 | | | 16.9 | |
| Actuated g/C Ratio | 0.55 | 0.55 | | 0.55 | 0.55 | | 0.28 | 0.28 | | | 0.28 | |
| v/c Ratio | 0.02 | 0.53 | | 0.11 | 0.33 | | 0.80 | 0.11 | | | 0.06 | |
| Control Delay | 7.9 | 9.1 | | 13.0 | 11.9 | | 35.2 | 6.1 | | | 12.3 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | |
| Total Delay | 7.9 | 9.1 | | 13.0 | 11.9 | | 35.2 | 6.1 | | | 12.3 | |
| LOS | A | A | | B | B | | D | A | | | B | |
| Approach Delay | | 9.1 | | | 11.9 | | | 30.7 | | | 12.3 | |
| Approach LOS | | A | | | B | | | C | | | B | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 60 | | | |
| Actuated Cycle Length: 60 | | | |
| Offset: 49 (82%), Referenced to phase 2:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.80 | | | |
| Intersection Signal Delay: 13.8 | | Intersection LOS: B | |
| Intersection Capacity Utilization 57.7% | | ICU Level of Service B | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 2: MacArthur Boulevard/Ogden Avenue & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 99 | 944 | 14 | 113 | 659 | 106 | 34 | 243 | 94 | 88 | 273 | 45 |
| Future Volume (vph) | 99 | 944 | 14 | 113 | 659 | 106 | 34 | 243 | 94 | 88 | 273 | 45 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 90 | | 0 | 95 | | 0 | 85 | | 0 | 70 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.998 | | | 0.979 | | | 0.958 | | | 0.979 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1719 | 3533 | 0 | 1805 | 3441 | 0 | 1805 | 1731 | 0 | 1805 | 1764 | 0 |
| Flt Permitted | 0.259 | | | 0.165 | | | 0.312 | | | 0.196 | | |
| Satd. Flow (perm) | 469 | 3533 | 0 | 314 | 3441 | 0 | 593 | 1731 | 0 | 372 | 1764 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 1 | | | 19 | | | 17 | | | 7 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 1299 | | | 3120 | | | 1751 | | | 431 | |
| Travel Time (s) | | 25.3 | | | 60.8 | | | 47.8 | | | 11.8 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 5% | 2% | 0% | 0% | 2% | 7% | 0% | 6% | 3% | 0% | 6% | 2% |
| Adj. Flow (vph) | 108 | 1026 | 15 | 123 | 701 | 115 | 37 | 264 | 102 | 96 | 297 | 49 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 108 | 1041 | 0 | 123 | 816 | 0 | 37 | 366 | 0 | 96 | 346 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | | 2 | | | 8 | | | 4 | | |
| Total Split (s) | 14.0 | 52.0 | | 16.0 | 54.0 | | 10.0 | 41.0 | | 11.0 | 42.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 65.8 | 58.9 | | 66.9 | 59.5 | | 32.8 | 27.8 | | 36.2 | 32.6 | |
| Actuated g/C Ratio | 0.55 | 0.49 | | 0.56 | 0.50 | | 0.27 | 0.23 | | 0.30 | 0.27 | |
| v/c Ratio | 0.33 | 0.60 | | 0.46 | 0.48 | | 0.17 | 0.88 | | 0.53 | 0.71 | |
| Control Delay | 10.5 | 17.5 | | 16.7 | 13.0 | | 27.4 | 64.6 | | 38.6 | 47.5 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 10.5 | 17.5 | | 16.7 | 13.0 | | 27.4 | 64.6 | | 38.6 | 47.5 | |
| LOS | B | B | | B | B | | C | E | | D | D | |
| Approach Delay | | 16.8 | | | 13.5 | | | 61.2 | | | 45.6 | |
| Approach LOS | | B | | | B | | | E | | | D | |

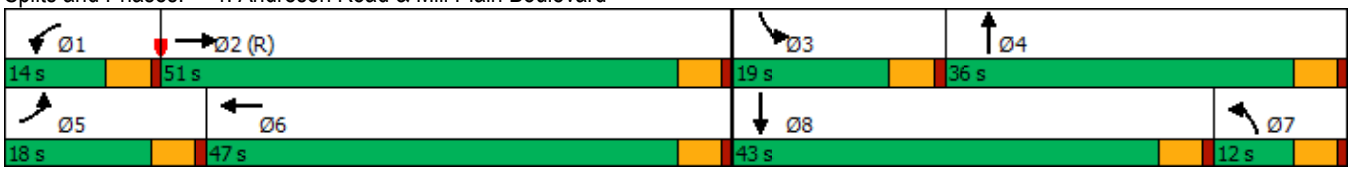
| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 108 (90%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 26.2 | | Intersection LOS: C | |
| Intersection Capacity Utilization 72.9% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

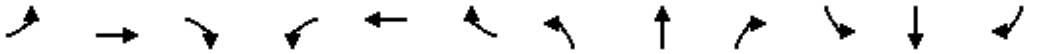
Splits and Phases: 3: Devine Road & Mill Plain Boulevard

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 334 | 875 | 36 | 55 | 721 | 438 | 38 | 284 | 38 | 336 | 324 | 221 |
| Future Volume (vph) | 334 | 875 | 36 | 55 | 721 | 438 | 38 | 284 | 38 | 336 | 324 | 221 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 120 | | 0 | 115 | | 0 | 130 | | 0 | 235 | | 0 |
| Storage Lanes | 2 | | 0 | 1 | | 0 | 1 | | 0 | 2 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 0.97 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 |
| Frt | | 0.994 | | | 0.944 | | | 0.981 | | | 0.938 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 3467 | 3521 | 0 | 1805 | 3353 | 0 | 1752 | 3393 | 0 | 3400 | 3301 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 3467 | 3521 | 0 | 1805 | 3353 | 0 | 1752 | 3393 | 0 | 3400 | 3301 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 4 | | | 112 | | | 12 | | | 153 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 3120 | | | 2729 | | | 1015 | | | 3686 | |
| Travel Time (s) | | 60.8 | | | 53.2 | | | 19.8 | | | 71.8 | |
| Peak Hour Factor | 0.92 | 0.95 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.98 | 0.92 | 0.92 | 0.94 | 0.92 |
| Heavy Vehicles (%) | 1% | 2% | 0% | 0% | 2% | 1% | 3% | 5% | 0% | 3% | 3% | 2% |
| Adj. Flow (vph) | 363 | 921 | 39 | 60 | 784 | 466 | 41 | 290 | 41 | 365 | 345 | 240 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 363 | 960 | 0 | 60 | 1250 | 0 | 41 | 331 | 0 | 365 | 585 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | | | | | | | | | | |
| Total Split (s) | 18.0 | 51.0 | | 14.0 | 47.0 | | 12.0 | 36.0 | | 19.0 | 43.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 17.5 | 65.1 | | 7.7 | 53.2 | | 8.0 | 15.4 | | 13.8 | 23.2 | |
| Actuated g/C Ratio | 0.15 | 0.54 | | 0.06 | 0.44 | | 0.07 | 0.13 | | 0.12 | 0.19 | |
| v/c Ratio | 0.72 | 0.50 | | 0.52 | 0.81 | | 0.35 | 0.74 | | 0.93 | 0.77 | |
| Control Delay | 76.9 | 7.7 | | 77.4 | 21.3 | | 61.6 | 58.5 | | 77.6 | 28.9 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 76.9 | 7.7 | | 77.4 | 21.3 | | 61.6 | 58.5 | | 77.6 | 28.9 | |
| LOS | E | A | | E | C | | E | E | | E | C | |
| Approach Delay | | 26.7 | | | 23.8 | | | 58.8 | | | 47.6 | |
| Approach LOS | | C | | | C | | | E | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 50 (42%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.93 | | | |
| Intersection Signal Delay: 33.8 | | Intersection LOS: C | |
| Intersection Capacity Utilization 80.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 4: Andresen Road & Mill Plain Boulevard

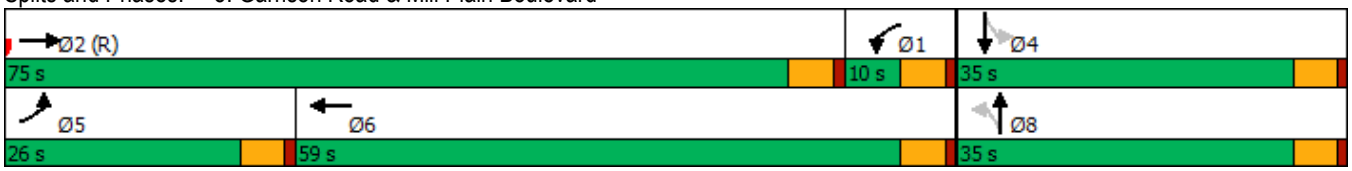




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 176 | 1038 | 43 | 21 | 1145 | 74 | 25 | 30 | 48 | 71 | 18 | 131 |
| Future Volume (vph) | 176 | 1038 | 43 | 21 | 1145 | 74 | 25 | 30 | 48 | 71 | 18 | 131 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 155 | | 0 | 155 | | 0 | 0 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.994 | | | 0.991 | | | 0.937 | | | 0.869 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.988 | | 0.950 | | |
| Satd. Flow (prot) | 1805 | 3521 | 0 | 1805 | 3540 | 0 | 0 | 1743 | 0 | 1787 | 1637 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.412 | | 0.488 | | |
| Satd. Flow (perm) | 1805 | 3521 | 0 | 1805 | 3540 | 0 | 0 | 727 | 0 | 918 | 1637 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 6 | | | 7 | | | 35 | | | 142 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2729 | | | 1573 | | | 556 | | | 1388 | |
| Travel Time (s) | | 53.2 | | | 30.6 | | | 15.2 | | | 37.9 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 2% | 0% | 0% | 1% | 2% | 0% | 0% | 2% | 1% | 0% | 1% |
| Adj. Flow (vph) | 191 | 1128 | 47 | 23 | 1218 | 80 | 27 | 33 | 52 | 77 | 20 | 142 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 191 | 1175 | 0 | 23 | 1298 | 0 | 0 | 112 | 0 | 77 | 162 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | | 4 | | |
| Total Split (s) | 26.0 | 75.0 | | 10.0 | 59.0 | | 35.0 | 35.0 | | 35.0 | 35.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 16.1 | 93.0 | | 5.0 | 77.9 | | | 11.0 | | 11.0 | 11.0 | |
| Actuated g/C Ratio | 0.13 | 0.78 | | 0.04 | 0.65 | | | 0.09 | | 0.09 | 0.09 | |
| v/c Ratio | 0.79 | 0.43 | | 0.31 | 0.56 | | | 1.14 | | 0.92 | 0.58 | |
| Control Delay | 65.5 | 2.3 | | 62.1 | 10.6 | | | 167.6 | | 130.3 | 19.6 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 65.5 | 2.3 | | 62.1 | 10.6 | | | 167.6 | | 130.3 | 19.6 | |
| LOS | E | A | | E | B | | | F | | F | B | |
| Approach Delay | | 11.1 | | | 11.5 | | | 167.6 | | | 55.3 | |
| Approach LOS | | B | | | B | | | F | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 111 (93%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 1.14 | | | |
| Intersection Signal Delay: 20.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 75.4% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

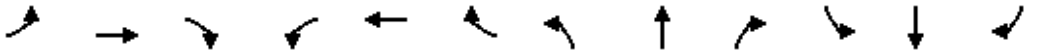
Splits and Phases: 5: Garrison Road & Mill Plain Boulevard



| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 1087 | 96 | 260 | 1179 | 4 | 147 | 3 | 228 | 14 | 18 | 6 |
| Future Volume (vph) | 5 | 1087 | 96 | 260 | 1179 | 4 | 147 | 3 | 228 | 14 | 18 | 6 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 70 | | 0 | 135 | | 0 | 0 | | 120 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 2 | | 0 | 0 | | 1 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 0.97 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.988 | | | | | | | 0.850 | | 0.977 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.953 | | | 0.982 | |
| Satd. Flow (prot) | 1805 | 3471 | 0 | 3502 | 3539 | 0 | 0 | 1793 | 1583 | 0 | 1823 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | | 0.771 | | | 0.871 | |
| Satd. Flow (perm) | 1805 | 3471 | 0 | 3502 | 3539 | 0 | 0 | 1451 | 1583 | 0 | 1617 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 11 | | | | | | | 248 | | 7 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 30 | |
| Link Distance (ft) | | 1573 | | | 1099 | | | 2501 | | | 287 | |
| Travel Time (s) | | 30.6 | | | 21.4 | | | 68.2 | | | 6.5 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.97 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 3% | 0% | 0% | 2% | 0% | 1% | 0% | 2% | 0% | 0% | 0% |
| Adj. Flow (vph) | 5 | 1182 | 104 | 283 | 1215 | 4 | 160 | 3 | 248 | 15 | 20 | 7 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 5 | 1286 | 0 | 283 | 1219 | 0 | 0 | 163 | 248 | 0 | 42 | 0 |
| Turn Type | Prot | NA | | Prot | NA | | Perm | NA | Perm | Perm | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | | 8 | | | 4 | |
| Permitted Phases | | | | | | | 8 | | 8 | 4 | | |
| Total Split (s) | 10.0 | 68.0 | | 20.0 | 78.0 | | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | 5.0 | | 5.0 | |
| Act Effct Green (s) | 5.0 | 73.9 | | 12.8 | 89.7 | | | 18.3 | 18.3 | | 18.3 | |
| Actuated g/C Ratio | 0.04 | 0.62 | | 0.11 | 0.75 | | | 0.15 | 0.15 | | 0.15 | |
| v/c Ratio | 0.07 | 0.60 | | 0.76 | 0.46 | | | 0.74 | 0.55 | | 0.17 | |
| Control Delay | 54.2 | 13.5 | | 65.3 | 7.8 | | | 66.9 | 9.8 | | 37.1 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | 0.0 | | 0.0 | |
| Total Delay | 54.2 | 13.5 | | 65.3 | 7.8 | | | 66.9 | 9.8 | | 37.1 | |
| LOS | D | B | | E | A | | | E | A | | D | |
| Approach Delay | | 13.6 | | | 18.6 | | | 32.5 | | | 37.1 | |
| Approach LOS | | B | | | B | | | C | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 110 (92%), Referenced to phase 2:EBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.76 | | | |
| Intersection Signal Delay: 18.6 | | Intersection LOS: B | |
| Intersection Capacity Utilization 68.0% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

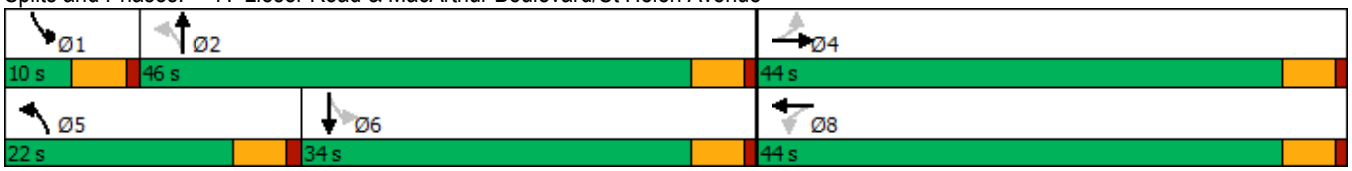
Splits and Phases: 6: Lieser Road & Mill Plain Boulevard

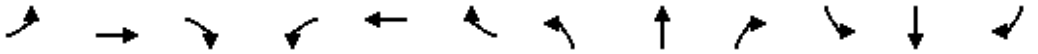


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 100 | 294 | 205 | 48 | 193 | 18 | 272 | 294 | 71 | 13 | 303 | 40 |
| Future Volume (vph) | 100 | 294 | 205 | 48 | 193 | 18 | 272 | 294 | 71 | 13 | 303 | 40 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 150 | | 0 | 150 | | 0 | 150 | | 0 | 150 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.938 | | | 0.987 | | | 0.971 | | | 0.982 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1736 | 1765 | 0 | 1805 | 1858 | 0 | 1736 | 1827 | 0 | 1805 | 1850 | 0 |
| Flt Permitted | 0.548 | | | 0.154 | | | 0.280 | | | 0.528 | | |
| Satd. Flow (perm) | 1001 | 1765 | 0 | 293 | 1858 | 0 | 512 | 1827 | 0 | 1003 | 1850 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 41 | | | 6 | | | 15 | | | 7 | |
| Link Speed (mph) | | 35 | | | 25 | | | 25 | | | 25 | |
| Link Distance (ft) | | 712 | | | 960 | | | 705 | | | 2501 | |
| Travel Time (s) | | 13.9 | | | 26.2 | | | 19.2 | | | 68.2 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.97 | 0.92 |
| Heavy Vehicles (%) | 4% | 1% | 1% | 0% | 1% | 0% | 4% | 1% | 1% | 0% | 1% | 0% |
| Adj. Flow (vph) | 109 | 320 | 223 | 52 | 210 | 20 | 296 | 320 | 77 | 14 | 312 | 43 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 109 | 543 | 0 | 52 | 230 | 0 | 296 | 397 | 0 | 14 | 355 | 0 |
| Turn Type | Perm | NA | | Perm | NA | | pm+pt | NA | | pm+pt | NA | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | | 2 | | | 6 | | |
| Total Split (s) | 44.0 | 44.0 | | 44.0 | 44.0 | | 22.0 | 46.0 | | 10.0 | 34.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 28.4 | 28.4 | | 28.4 | 28.4 | | 41.3 | 39.6 | | 25.6 | 20.3 | |
| Actuated g/C Ratio | 0.35 | 0.35 | | 0.35 | 0.35 | | 0.51 | 0.49 | | 0.32 | 0.25 | |
| v/c Ratio | 0.31 | 0.83 | | 0.50 | 0.35 | | 0.59 | 0.44 | | 0.04 | 0.75 | |
| Control Delay | 22.8 | 35.1 | | 41.2 | 21.0 | | 17.9 | 16.6 | | 13.5 | 39.4 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 22.8 | 35.1 | | 41.2 | 21.0 | | 17.9 | 16.6 | | 13.5 | 39.4 | |
| LOS | C | D | | D | C | | B | B | | B | D | |
| Approach Delay | | 33.0 | | | 24.7 | | | 17.2 | | | 38.4 | |
| Approach LOS | | C | | | C | | | B | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 100 | | | |
| Actuated Cycle Length: 80.2 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.83 | | | |
| Intersection Signal Delay: 27.3 | | Intersection LOS: C | |
| Intersection Capacity Utilization 82.3% | | ICU Level of Service E | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 7: Lieser Road & MacArthur Boulevard/St Helen Avenue

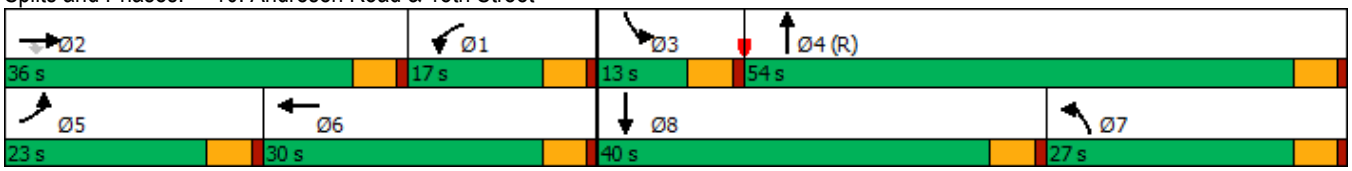


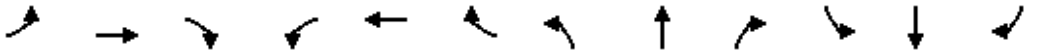


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 114 | 316 | 205 | 114 | 239 | 8 | 216 | 790 | 160 | 48 | 532 | 233 |
| Future Volume (vph) | 114 | 316 | 205 | 114 | 239 | 8 | 216 | 790 | 160 | 48 | 532 | 233 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 | | 110 | 125 | | 0 | 190 | | 0 | 105 | | 0 |
| Storage Lanes | 1 | | 1 | 1 | | 0 | 1 | | 0 | 1 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 |
| Frt | | | 0.850 | | 0.995 | | | 0.975 | | | 0.955 | |
| Flt Protected | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (prot) | 1752 | 1900 | 1568 | 1752 | 1787 | 0 | 1752 | 3428 | 0 | 1770 | 3403 | 0 |
| Flt Permitted | 0.950 | | | 0.950 | | | 0.950 | | | 0.950 | | |
| Satd. Flow (perm) | 1752 | 1900 | 1568 | 1752 | 1787 | 0 | 1752 | 3428 | 0 | 1770 | 3403 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | | 155 | | 1 | | | 24 | | | 56 | |
| Link Speed (mph) | | 35 | | | 35 | | | 35 | | | 35 | |
| Link Distance (ft) | | 1206 | | | 930 | | | 3686 | | | 1354 | |
| Travel Time (s) | | 23.5 | | | 18.1 | | | 71.8 | | | 26.4 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.94 |
| Heavy Vehicles (%) | 3% | 0% | 3% | 3% | 6% | 0% | 3% | 3% | 1% | 2% | 1% | 2% |
| Adj. Flow (vph) | 124 | 343 | 223 | 124 | 260 | 9 | 235 | 859 | 174 | 52 | 578 | 248 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 124 | 343 | 223 | 124 | 269 | 0 | 235 | 1033 | 0 | 52 | 826 | 0 |
| Turn Type | Prot | NA | Perm | Prot | NA | | Prot | NA | | Prot | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 7 | 4 | | 3 | 8 | |
| Permitted Phases | | | 2 | | | | | | | | | |
| Total Split (s) | 23.0 | 36.0 | 36.0 | 17.0 | 30.0 | | 27.0 | 54.0 | | 13.0 | 40.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | 5.0 | 5.0 | | 5.0 | 5.0 | |
| Act Effct Green (s) | 11.9 | 24.7 | 24.7 | 11.2 | 24.0 | | 22.0 | 59.3 | | 7.0 | 42.1 | |
| Actuated g/C Ratio | 0.10 | 0.21 | 0.21 | 0.09 | 0.20 | | 0.18 | 0.49 | | 0.06 | 0.35 | |
| v/c Ratio | 0.72 | 0.88 | 0.50 | 0.76 | 0.75 | | 0.73 | 0.61 | | 0.50 | 0.67 | |
| Control Delay | 73.9 | 68.8 | 16.9 | 80.9 | 58.4 | | 59.3 | 28.2 | | 71.8 | 35.4 | |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | | 0.0 | 0.0 | |
| Total Delay | 73.9 | 68.8 | 16.9 | 80.9 | 58.4 | | 59.3 | 28.2 | | 71.8 | 35.4 | |
| LOS | E | E | B | F | E | | E | C | | E | D | |
| Approach Delay | | 52.9 | | | 65.5 | | | 33.9 | | | 37.6 | |
| Approach LOS | | D | | | E | | | C | | | D | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 120 | | | |
| Actuated Cycle Length: 120 | | | |
| Offset: 49 (41%), Referenced to phase 4:NBT, Start of Green | | | |
| Control Type: Actuated-Coordinated | | | |
| Maximum v/c Ratio: 0.88 | | | |
| Intersection Signal Delay: 42.8 | | Intersection LOS: D | |
| Intersection Capacity Utilization 73.7% | | ICU Level of Service D | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 10: Andresen Road & 18th Street

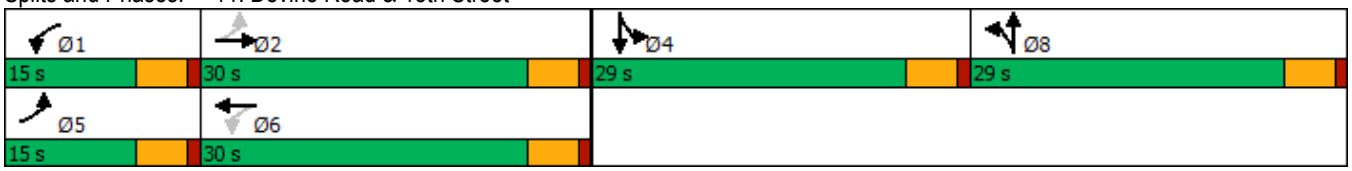




| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 12 | 288 | 266 | 105 | 401 | 19 | 250 | 13 | 142 | 5 | 30 | 11 |
| Future Volume (vph) | 12 | 288 | 266 | 105 | 401 | 19 | 250 | 13 | 142 | 5 | 30 | 11 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 95 | | 0 | 95 | | 0 | 0 | | 0 | 0 | | 0 |
| Storage Lanes | 1 | | 0 | 1 | | 0 | 0 | | 0 | 0 | | 0 |
| Taper Length (ft) | 25 | | | 25 | | | 25 | | | 25 | | |
| Lane Util. Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt | | 0.928 | | | 0.993 | | | 0.952 | | | 0.968 | |
| Flt Protected | 0.950 | | | 0.950 | | | | 0.970 | | | 0.995 | |
| Satd. Flow (prot) | 1805 | 3236 | 0 | 1770 | 3453 | 0 | 0 | 1675 | 0 | 0 | 1830 | 0 |
| Flt Permitted | 0.489 | | | 0.212 | | | | 0.970 | | | 0.995 | |
| Satd. Flow (perm) | 929 | 3236 | 0 | 395 | 3453 | 0 | 0 | 1675 | 0 | 0 | 1830 | 0 |
| Right Turn on Red | | | Yes | | | Yes | | | Yes | | | Yes |
| Satd. Flow (RTOR) | | 215 | | | 4 | | | 25 | | | 12 | |
| Link Speed (mph) | | 35 | | | 35 | | | 25 | | | 25 | |
| Link Distance (ft) | | 2872 | | | 1198 | | | 869 | | | 351 | |
| Travel Time (s) | | 55.9 | | | 23.3 | | | 23.7 | | | 9.6 | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.93 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Heavy Vehicles (%) | 0% | 4% | 3% | 2% | 4% | 0% | 6% | 0% | 3% | 0% | 0% | 0% |
| Adj. Flow (vph) | 13 | 313 | 289 | 114 | 436 | 21 | 269 | 14 | 154 | 5 | 33 | 12 |
| Shared Lane Traffic (%) | | | | | | | | | | | | |
| Lane Group Flow (vph) | 13 | 602 | 0 | 114 | 457 | 0 | 0 | 437 | 0 | 0 | 50 | 0 |
| Turn Type | pm+pt | NA | | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 5 | 2 | | 1 | 6 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 2 | | | 6 | | | | | | | | |
| Total Split (s) | 15.0 | 30.0 | | 15.0 | 30.0 | | 29.0 | 29.0 | | 29.0 | 29.0 | |
| Total Lost Time (s) | 5.0 | 5.0 | | 5.0 | 5.0 | | | 5.0 | | | 5.0 | |
| Act Effct Green (s) | 19.5 | 15.0 | | 24.1 | 22.7 | | | 25.4 | | | 6.6 | |
| Actuated g/C Ratio | 0.29 | 0.23 | | 0.36 | 0.34 | | | 0.38 | | | 0.10 | |
| v/c Ratio | 0.04 | 0.67 | | 0.37 | 0.39 | | | 0.67 | | | 0.26 | |
| Control Delay | 14.2 | 19.7 | | 17.7 | 18.3 | | | 27.5 | | | 30.7 | |
| Queue Delay | 0.0 | 0.0 | | 0.0 | 0.0 | | | 0.0 | | | 0.0 | |
| Total Delay | 14.2 | 19.7 | | 17.7 | 18.3 | | | 27.5 | | | 30.7 | |
| LOS | B | B | | B | B | | | C | | | C | |
| Approach Delay | | 19.6 | | | 18.2 | | | 27.5 | | | 30.7 | |
| Approach LOS | | B | | | B | | | C | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| Area Type: | Other | | |
| Cycle Length: 103 | | | |
| Actuated Cycle Length: 66.4 | | | |
| Control Type: Actuated-Uncoordinated | | | |
| Maximum v/c Ratio: 0.67 | | | |
| Intersection Signal Delay: 21.5 | | Intersection LOS: C | |
| Intersection Capacity Utilization 64.7% | | ICU Level of Service C | |
| Analysis Period (min) 15 | | | |

Splits and Phases: 11: Devine Road & 18th Street



| Intersection | |
|---|---|
| Intersection Delay, s/veh | 10.9 |
| Intersection LOS | B |

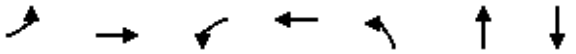
| Approach | EB | WB | NB | SB |
|---|---|---|---|---|
| Entry Lanes | 1 | 1 | 1 | 1 |
| Conflicting Circle Lanes | 1 | 1 | 1 | 1 |
| Adj Approach Flow, veh/h | 464 | 446 | 302 | 490 |
| Demand Flow Rate, veh/h | 484 | 463 | 316 | 539 |
| Vehicles Circulating, veh/h | 404 | 346 | 624 | 327 |
| Vehicles Exiting, veh/h | 462 | 594 | 264 | 482 |
| Ped Vol Crossing Leg, #/h | 0 | 0 | 0 | 0 |
| Ped Cap Adj | 1.000 | 1.000 | 1.000 | 1.000 |
| Approach Delay, s/veh | 11.3 | 9.7 | 11.2 | 11.4 |
| Approach LOS | B | A | B | B |

| Lane | Left | Left | Left | Left |
|---|---|---|---|---|
| Designated Moves | LTR | LTR | LTR | LTR |
| Assumed Moves | LTR | LTR | LTR | LTR |
| RT Channelized | | | | |
| Lane Util | 1.000 | 1.000 | 1.000 | 1.000 |
| Follow-Up Headway, s | 2.609 | 2.609 | 2.609 | 2.609 |
| Critical Headway, s | 4.976 | 4.976 | 4.976 | 4.976 |
| Entry Flow, veh/h | 484 | 463 | 316 | 539 |
| Cap Entry Lane, veh/h | 914 | 970 | 730 | 989 |
| Entry HV Adj Factor | 0.958 | 0.963 | 0.954 | 0.909 |
| Flow Entry, veh/h | 464 | 446 | 302 | 490 |
| Cap Entry, veh/h | 876 | 933 | 697 | 898 |
| V/C Ratio | 0.530 | 0.478 | 0.433 | 0.545 |
| Control Delay, s/veh | 11.3 | 9.7 | 11.2 | 11.4 |
| LOS | B | A | B | B |
| 95th %tile Queue, veh | 3 | 3 | 2 | 3 |

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 23 | 1044 | 3 | 921 | 27 | 272 |
| v/c Ratio | 0.07 | 0.45 | 0.01 | 0.41 | 0.07 | 0.85 |
| Control Delay | 10.2 | 11.4 | 6.7 | 5.9 | 22.6 | 64.0 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.2 | 11.4 | 6.7 | 5.9 | 22.6 | 64.0 |
| Queue Length 50th (ft) | 6 | 185 | 0 | 70 | 11 | 197 |
| Queue Length 95th (ft) | 21 | 304 | m0 | 94 | 31 | 268 |
| Internal Link Dist (ft) | | 729 | | 1053 | 814 | 1295 |
| Turn Bay Length (ft) | 65 | | 115 | | | |
| Base Capacity (vph) | 347 | 2319 | 294 | 2238 | 646 | 536 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.45 | 0.01 | 0.41 | 0.04 | 0.51 |

Intersection Summary

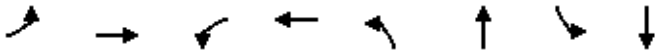
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 9 | 1022 | 25 | 636 | 301 | 55 | 26 |
| v/c Ratio | 0.02 | 0.53 | 0.11 | 0.33 | 0.80 | 0.11 | 0.06 |
| Control Delay | 7.9 | 9.1 | 13.0 | 11.9 | 35.2 | 6.1 | 12.3 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 7.9 | 9.1 | 13.0 | 11.9 | 35.2 | 6.1 | 12.3 |
| Queue Length 50th (ft) | 1 | 87 | 7 | 128 | 99 | 2 | 6 |
| Queue Length 95th (ft) | m5 | 194 | m28 | 260 | 156 | 20 | 18 |
| Internal Link Dist (ft) | | 490 | | 1219 | | 356 | 750 |
| Turn Bay Length (ft) | 100 | | 95 | | 130 | | |
| Base Capacity (vph) | 414 | 1913 | 236 | 1908 | 513 | 650 | 604 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.02 | 0.53 | 0.11 | 0.33 | 0.59 | 0.08 | 0.04 |

Intersection Summary

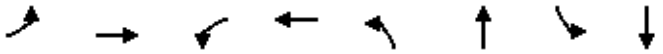
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 108 | 1041 | 123 | 816 | 37 | 366 | 96 | 346 |
| v/c Ratio | 0.33 | 0.60 | 0.46 | 0.48 | 0.17 | 0.88 | 0.53 | 0.71 |
| Control Delay | 10.5 | 17.5 | 16.7 | 13.0 | 27.4 | 64.6 | 38.6 | 47.5 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 10.5 | 17.5 | 16.7 | 13.0 | 27.4 | 64.6 | 38.6 | 47.5 |
| Queue Length 50th (ft) | 29 | 204 | 27 | 95 | 20 | 263 | 53 | 248 |
| Queue Length 95th (ft) | 76 | 313 | m44 | 128 | 41 | 350 | 85 | 330 |
| Internal Link Dist (ft) | | 1219 | | 3040 | | 1671 | | 351 |
| Turn Bay Length (ft) | 90 | | 95 | | 85 | | 70 | |
| Base Capacity (vph) | 359 | 1735 | 320 | 1715 | 212 | 531 | 183 | 548 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.30 | 0.60 | 0.38 | 0.48 | 0.17 | 0.69 | 0.52 | 0.63 |

Intersection Summary

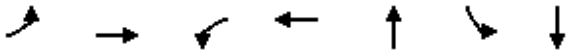
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 363 | 960 | 60 | 1250 | 41 | 331 | 365 | 585 |
| v/c Ratio | 0.72 | 0.50 | 0.52 | 0.81 | 0.35 | 0.74 | 0.93 | 0.77 |
| Control Delay | 76.9 | 7.7 | 77.4 | 21.3 | 61.6 | 58.5 | 77.6 | 28.9 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 76.9 | 7.7 | 77.4 | 21.3 | 61.6 | 58.5 | 77.6 | 28.9 |
| Queue Length 50th (ft) | 152 | 76 | 49 | 143 | 31 | 127 | 122 | 92 |
| Queue Length 95th (ft) | 205 | 92 | m89 | #251 | 68 | 167 | #230 | 150 |
| Internal Link Dist (ft) | | 3040 | | 2649 | | 935 | | 3606 |
| Turn Bay Length (ft) | 120 | | 115 | | 130 | | 235 | |
| Base Capacity (vph) | 506 | 1911 | 141 | 1548 | 123 | 885 | 396 | 1149 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.72 | 0.50 | 0.43 | 0.81 | 0.33 | 0.37 | 0.92 | 0.51 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



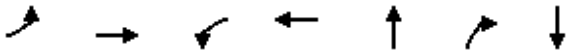
| Lane Group | EBL | EBT | WBL | WBT | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 191 | 1175 | 23 | 1298 | 112 | 77 | 162 |
| v/c Ratio | 0.79 | 0.43 | 0.31 | 0.56 | 1.14 | 0.92 | 0.58 |
| Control Delay | 65.5 | 2.3 | 62.1 | 10.6 | 167.6 | 130.3 | 19.6 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 65.5 | 2.3 | 62.1 | 10.6 | 167.6 | 130.3 | 19.6 |
| Queue Length 50th (ft) | 135 | 81 | 18 | 321 | ~75 | 60 | 14 |
| Queue Length 95th (ft) | m175 | m12 | m38 | 475 | #169 | #120 | 78 |
| Internal Link Dist (ft) | | 2649 | | 1493 | 476 | | 1308 |
| Turn Bay Length (ft) | 155 | | 155 | | | 150 | |
| Base Capacity (vph) | 319 | 2729 | 75 | 2300 | 208 | 229 | 515 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.60 | 0.43 | 0.31 | 0.56 | 0.54 | 0.34 | 0.31 |

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

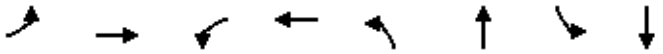
m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBT | NBR | SBT |
|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 5 | 1286 | 283 | 1219 | 163 | 248 | 42 |
| v/c Ratio | 0.07 | 0.60 | 0.76 | 0.46 | 0.74 | 0.55 | 0.17 |
| Control Delay | 54.2 | 13.5 | 65.3 | 7.8 | 66.9 | 9.8 | 37.1 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 54.2 | 13.5 | 65.3 | 7.8 | 66.9 | 9.8 | 37.1 |
| Queue Length 50th (ft) | 4 | 175 | 111 | 152 | 122 | 0 | 24 |
| Queue Length 95th (ft) | m9 | 271 | 155 | 334 | 184 | 67 | 53 |
| Internal Link Dist (ft) | | 1493 | | 1019 | 2421 | | 207 |
| Turn Bay Length (ft) | 70 | | 135 | | | 120 | |
| Base Capacity (vph) | 75 | 2141 | 441 | 2644 | 326 | 548 | 369 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.07 | 0.60 | 0.64 | 0.46 | 0.50 | 0.45 | 0.11 |

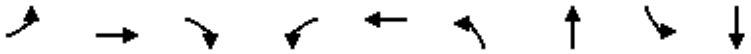
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



| Lane Group | EBL | EBT | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 109 | 543 | 52 | 230 | 296 | 397 | 14 | 355 |
| v/c Ratio | 0.31 | 0.83 | 0.50 | 0.35 | 0.59 | 0.44 | 0.04 | 0.75 |
| Control Delay | 22.8 | 35.1 | 41.2 | 21.0 | 17.9 | 16.6 | 13.5 | 39.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 22.8 | 35.1 | 41.2 | 21.0 | 17.9 | 16.6 | 13.5 | 39.4 |
| Queue Length 50th (ft) | 40 | 233 | 21 | 83 | 83 | 113 | 3 | 166 |
| Queue Length 95th (ft) | 90 | 411 | 68 | 157 | 165 | 270 | 14 | 294 |
| Internal Link Dist (ft) | | 632 | | 880 | | 625 | | 2421 |
| Turn Bay Length (ft) | 150 | | 150 | | 150 | | 150 | |
| Base Capacity (vph) | 514 | 926 | 150 | 957 | 537 | 1028 | 372 | 711 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.21 | 0.59 | 0.35 | 0.24 | 0.55 | 0.39 | 0.04 | 0.50 |

Intersection Summary



| Lane Group | EBL | EBT | EBR | WBL | WBT | NBL | NBT | SBL | SBT |
|---|---|---|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 124 | 343 | 223 | 124 | 269 | 235 | 1033 | 52 | 826 |
| v/c Ratio | 0.72 | 0.88 | 0.50 | 0.76 | 0.75 | 0.73 | 0.61 | 0.50 | 0.67 |
| Control Delay | 73.9 | 68.8 | 16.9 | 80.9 | 58.4 | 59.3 | 28.2 | 71.8 | 35.4 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 73.9 | 68.8 | 16.9 | 80.9 | 58.4 | 59.3 | 28.2 | 71.8 | 35.4 |
| Queue Length 50th (ft) | 95 | 258 | 44 | 94 | 194 | 163 | 257 | 40 | 271 |
| Queue Length 95th (ft) | 153 | 349 | 113 | #184 | 290 | m261 | 419 | 82 | 371 |
| Internal Link Dist (ft) | | 1126 | | | 850 | | 3606 | | 1274 |
| Turn Bay Length (ft) | | | 110 | 125 | | 190 | | 105 | |
| Base Capacity (vph) | 262 | 490 | 520 | 183 | 389 | 321 | 1705 | 118 | 1229 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.47 | 0.70 | 0.43 | 0.68 | 0.69 | 0.73 | 0.61 | 0.44 | 0.67 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

| Lane Group | EBL | EBT | WBL | WBT | NBT | SBT |
|---|---|---|---|---|---|---|
| Lane Group Flow (vph) | 13 | 602 | 114 | 457 | 437 | 50 |
| v/c Ratio | 0.04 | 0.67 | 0.37 | 0.39 | 0.67 | 0.26 |
| Control Delay | 14.2 | 19.7 | 17.7 | 18.3 | 27.5 | 30.7 |
| Queue Delay | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay | 14.2 | 19.7 | 17.7 | 18.3 | 27.5 | 30.7 |
| Queue Length 50th (ft) | 4 | 83 | 33 | 74 | 162 | 16 |
| Queue Length 95th (ft) | 14 | 143 | 66 | 141 | #376 | 52 |
| Internal Link Dist (ft) | | 2792 | | 1118 | 789 | 271 |
| Turn Bay Length (ft) | 95 | | 95 | | | |
| Base Capacity (vph) | 459 | 1417 | 365 | 1452 | 655 | 707 |
| Starvation Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Storage Cap Reductn | 0 | 0 | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio | 0.03 | 0.42 | 0.31 | 0.31 | 0.67 | 0.07 |

Intersection Summary

# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX G

# GHG WORKSHEETS

CITY OF Vancouver WASHINGTON

## Alternatives Annual Greenhouse Gas Emissions

| | Lifespan Emissions (MTCO2e)[1] | | | | Average Life Span[2] | Yearly Emissions (MTCO2e) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Existing Development | No Action Base Alternative | No Action High Alternative | Project Alternative | | **Existing Development** | **No Action Base Alternative** | **No Action High Alternative** | **Project Alternative** |
| Single-Family Home..... | 3124 | 3124 | 3124 | 64035 | 57.9 | 54 | 54 | 54 | 1106 |
| Multi-Family Unit in Large Building. | 32359 | 254253 | 1941567 | 2067537 | 80.5 | 402 | 3158 | 24119 | 25684 |
| Multi-Family Unit in Small Building. | 303036 | 303036 | 303036 | 303036 | 80.5 | 3764 | 3764 | 3764 | 3764 |
| Mobile Home..... | 0 | 0 | 0 | 0 | 57.9 | 0 | 0 | 0 | 0 |
| Education..... | 152379 | 152431 | 143544 | 125980 | 62.5 | 2438 | 2439 | 2297 | 2016 |
| Food Sales..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Food Service..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Health Care Inpatient..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Health Care Outpatient..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Lodging..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Retail (Other Than all)..... | 192136 | 190151 | 155986 | 168669 | 62.5 | 3074 | 3042 | 2496 | 2699 |
| Office..... | 300499 | 297396 | 243962 | 263797 | 62.5 | 4808 | 4758 | 3903 | 4221 |
| Public Assembly..... | 134378 | 134424 | 126587 | 111098 | 62.5 | 2150 | 2151 | 2025 | 1778 |
| Public Order and Safety..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Religious Worship..... | 73756 | 73781 | 69480 | 60978 | 62.5 | 1180 | 1180 | 1112 | 976 |
| Service..... | 131768 | 131813 | 124129 | 108940 | 62.5 | 2108 | 2109 | 1986 | 1743 |
| Warehouse and Storage..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Other ..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Vacant ..... | 0 | 0 | 0 | 0 | 62.5 | 0 | 0 | 0 | 0 |
| Pavement..... | 108800 | 108800 | 108800 | 108800 | 50.0 | 2176 | 2176 | 2176 | 2176 |
| | | | | | Total Annual Emissions | 22,155 | 24,833 | 43,932 | 46,161 |
| | | | | | **Increase Over Existing Development** | n/a | **2,678** | **21,777** | **24,006** |

[1] See attached worksheets.

[2] Average life span of building types per attached worksheets. Average life span of pavement per the Athena Institute (Athena Institute 2006).

## Existing Development - *Land Use Assumptions for GHG Emissions Worksheet*

| Heights District Subarea Plan | | | GHG Emissions Worksheet | | |
|---|---|---|---|---|---|
| **Land Use Category** | **# Units** | **Square Feet** | **Land Use Category** | **# Units** | **Square Feet** |
| Institutional (churches, schools, community centers, and government services) | | 583,000 | Religious Worship | | 145,750 |
| | | | Education | | 145,750 |
| | | | Public Assembly | | 145,750 |
| | | | Service | | 145,750 |
| Commercial (retail, office, and hospitality) | | 445,500 | Retail (Other than Mall) | | 222,750 |
| | | | Office | | 222,750 |
| Pavement | | 2,176,000 | Pavement | | 2,176,000 |
| Single-Family Home | 2 | | Single-Family | 2 | |
| Multi-Family Home in Duplex/Fourplex | 202 | | Multi-Family Unit in Small Building | 202 | |
| Multi-Family Home in 5+ Unit Building | 28 | | Multi-Family Unit in Large Building | 28 | |

*Footnotes*

*(1) 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones.*

*(2) Pavement is estimated based on the Interim Report, and was assumed to be comparable between existing conditions, No Action Alternatives, and Project Alternative.*


**Section I: Buildings**

| Type (Residential) or Principal Activity (Commercial) | # Units | Square Feet (in thousands of square feet) | Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied | Energy | Transportation | **Lifespan Emissions (MTCO2e)** |
|---|---|---|---|---|---|---|
| Single-Family Home | 2 | | 98 | 672 | 792 | **3124** |
| Multi-Family Unit in Large Building | 28 | | 33 | 357 | 766 | **32359** |
| Multi-Family Unit in Small Building | 202 | | 54 | 681 | 766 | **303036** |
| Mobile Home | 0 | | 41 | 475 | 709 | **0** |
| Education | | 145.8 | 39 | 646 | 361 | **152379** |
| Food Sales | | | 39 | 1,541 | 282 | **0** |
| Food Service | | | 39 | 1,994 | 561 | **0** |
| Health Care Inpatient | | | 39 | 1,938 | 582 | **0** |
| Health Care Outpatient | | | 39 | 737 | 571 | **0** |
| Lodging | | | 39 | 777 | 117 | **0** |
| Retail (Other Than Mall) | | 222.7 | 39 | 577 | 247 | **192136** |
| Office | | 222.7 | 39 | 723 | 588 | **300499** |
| Public Assembly | | 145.8 | 39 | 733 | 150 | **134378** |
| Public Order and Safety | | | 39 | 899 | 374 | **0** |
| Religious Worship | | 145.8 | 39 | 339 | 129 | **73756** |
| Service | | 145.8 | 39 | 599 | 266 | **131768** |
| Warehouse and Storage | | | 39 | 352 | 181 | **0** |
| Other | | | 39 | 1,278 | 257 | **0** |
| Vacant | | | 39 | 162 | 47 | **0** |

**Section II: Pavement**

| | | | | | | |
|---|---|---|---|---|---|---|
| Pavement | | 2,176.00 | | | | **108800** |

**Total Project Emissions:** **1432234**

Data entry fields

## No Action Base Alternative - *Land Use Assumptions for GHG Emissions Worksheet*

| Heights District Subarea Plan | | | GHG Emissions Worksheet | | |
|---|---|---|---|---|---|
| **Land Use Category** | **# Units** | **Square Feet** | **Land Use Category** | **# Units** | **Square Feet** |
| Institutional (churches, schools, community centers, and government services) | | 583,000 | Religious Worship | | 145,750 |
| | | | Education | | 145,750 |
| | | | Public Assembly | | 145,750 |
| | | | Service | | 145,750 |
| Commercial (retail, office, and hospitality) | | 440,700 | Retail (Other than Mall) | | 220,350 |
| | | | Office | | 220,350 |
| Pavement | | 2,176,000 | Pavement | | 2,176,000 |
| Single-Family Home | 2 | | Single-Family | 2 | |
| Multi-Family Home in Duplex/Fourplex | 202 | | Multi-Family Unit in Small Building | 202 | |
| Multi-Family Home in 5+ Unit Building | 220 | | Multi-Family Unit in Large Building | 220 | |

*Footnotes*

*(1) 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones.*

*(2) Pavement is estimated based on the Interim Report, and was assumed to be comparable between existing conditions, No Action Alternatives, and Project Alternative.*

*(3) All new residential units (192) assumed to be large multi-family (5 or more units) based on recently submitted projects in commercial zones.*


**Section I: Buildings**

| Type (Residential) or Principal Activity (Commercial) | # Units | Square Feet (in thousands of square feet) | Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied | Energy | Transportation | **Lifespan Emissions (MTCO2e)** |
|---|---|---|---|---|---|---|
| Single-Family Home | 2 | | 98 | 672 | 792 | **3124** |
| Multi-Family Unit in Large Building | 220 | | 33 | 357 | 766 | **254253** |
| Multi-Family Unit in Small Building | 202 | | 54 | 681 | 766 | **303036** |
| Mobile Home | 0 | | 41 | 475 | 709 | **0** |
| Education | | 145.8 | 39 | 646 | 361 | **152431** |
| Food Sales | | | 39 | 1,541 | 282 | **0** |
| Food Service | | | 39 | 1,994 | 561 | **0** |
| Health Care Inpatient | | | 39 | 1,938 | 582 | **0** |
| Health Care Outpatient | | | 39 | 737 | 571 | **0** |
| Lodging | | | 39 | 777 | 117 | **0** |
| Retail (Other Than Mall) | | 220.4 | 39 | 577 | 247 | **190151** |
| Office | | 220.4 | 39 | 723 | 588 | **297396** |
| Public Assembly | | 145.8 | 39 | 733 | 150 | **134424** |
| Public Order and Safety | | | 39 | 899 | 374 | **0** |
| Religious Worship | | 145.8 | 39 | 339 | 129 | **73781** |
| Service | | 145.8 | 39 | 599 | 266 | **131813** |
| Warehouse and Storage | | | 39 | 352 | 181 | **0** |
| Other | | | 39 | 1,278 | 257 | **0** |
| Vacant | | | 39 | 162 | 47 | **0** |

**Section II: Pavement**

| | | | | | | |
|---|---|---|---|---|---|---|
| Pavement | | 2,176.00 | | | | **108800** |

**Total Project Emissions:** **1649209**

Data entry fields

## No Action High Alternative - *Land Use Assumptions for GHG Emissions Worksheet*

| Heights District Subarea Plan | | | GHG Emissions Worksheet | | |
|---|---|---|---|---|---|
| **Land Use Category** | **# Units** | **Square Feet** | **Land Use Category** | **# Units** | **Square Feet** |
| Institutional (churches, schools, community centers, and government services) | | 549,000 | Religious Worship | | 137,250 |
| | | | Education | | 137,250 |
| | | | Public Assembly | | 137,250 |
| | | | Service | | 137,250 |
| Commercial (retail, office, and hospitality) | | 361,581 | Retail (Other than Mall) | | 180,791 |
| | | | Office | | 180,791 |
| Pavement | | 2,176,000 | Pavement | | 2,176,000 |
| Single-Family Home | 2 | | Single-Family | 2 | |
| Multi-Family Home in Duplex/Fourplex | 202 | | Multi-Family Unit in Small Building | 202 | |
| Multi-Family Home in 5+ Unit Building | 1680 | | Multi-Family Unit in Large Building | 1680 | |

*Footnotes*

*(1) 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones.*

*(2) Pavement is estimated based on the Interim Report, and was assumed to be comparable between existing conditions, No Action Alternatives, and Project Alternative.*

*(3) All new residential units (1,652) assumed to be large multi-family (5 or more units) based on recently submitted projects in commercial zones.*


**Section I: Buildings**

| Type (Residential) or Principal Activity (Commercial) | # Units | Square Feet (in thousands of square feet) | Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied | Energy | Transportation | **Lifespan Emissions (MTCO2e)** |
|---|---|---|---|---|---|---|
| Single-Family Home | 2 | | 98 | 672 | 792 | **3124** |
| Multi-Family Unit in Large Building | 1680 | | 33 | 357 | 766 | **1941567** |
| Multi-Family Unit in Small Building | 202 | | 54 | 681 | 766 | **303036** |
| Mobile Home | 0 | | 41 | 475 | 709 | **0** |
| Education | | 137.3 | 39 | 646 | 361 | **143544** |
| Food Sales | | 0.0 | 39 | 1,541 | 282 | **0** |
| Food Service | | 0.0 | 39 | 1,994 | 561 | **0** |
| Health Care Inpatient | | 0.0 | 39 | 1,938 | 582 | **0** |
| Health Care Outpatient | | 0.0 | 39 | 737 | 571 | **0** |
| Lodging | | 0.0 | 39 | 777 | 117 | **0** |
| Retail (Other Than Mall) | | 180.8 | 39 | 577 | 247 | **155986** |
| Office | | 180.8 | 39 | 723 | 588 | **243962** |
| Public Assembly | | 137.3 | 39 | 733 | 150 | **126587** |
| Public Order and Safety | | 0.0 | 39 | 899 | 374 | **0** |
| Religious Worship | | 137.3 | 39 | 339 | 129 | **69480** |
| Service | | 137.3 | 39 | 599 | 266 | **124129** |
| Warehouse and Storage | | 0.0 | 39 | 352 | 181 | **0** |
| Other | | 0.0 | 39 | 1,278 | 257 | **0** |
| Vacant | | 0.0 | 39 | 162 | 47 | **0** |

**Section II: Pavement**

| | | | | | | |
|---|---|---|---|---|---|---|
| Pavement | | 2,176.00 | | | | **108800** |

**Total Project Emissions:** **3220214**

Data entry fields

## Project Alternative - *Land Use Assumptions for GHG Emissions Worksheet*

| Heights District Subarea Plan | | | GHG Emissions Worksheet | | |
|---|---|---|---|---|---|
| **Land Use Category** | **# Units** | **Square Feet** | **Land Use Category** | **# Units** | **Square Feet** |
| Institutional (churches, schools, community centers, and government services) | | 482,000 | Religious Worship | | 120,500 |
| | | | Education | | 120,500 |
| | | | Public Assembly | | 120,500 |
| | | | Service | | 120,500 |
| Commercial (retail, office, and hospitality) | | 391,000 | Retail (Other than Mall) | | 195,500 |
| | | | Office | | 195,500 |
| Pavement | | 2,176,000 | Pavement | | 2,176,000 |
| Single-Family Home | 41 | | Single-Family | 41 | |
| Multi-Family Home in Duplex/Fourplex | 202 | | Multi-Family Unit in Small Building | 202 | |
| Multi-Family Home in 5+ Unit Building | 1789 | | Multi-Family Unit in Large Building | 1789 | |

*Footnotes*

*(1) 50 percent of the commercial space will develop as retail and 50 percent as office, which is consistent with the recently submitted projects in commercial zones.*

*(2) Pavement is estimated based on the Interim Report, and was assumed to be comparable between existing conditions, No Action Alternatives, and Project Alternative.*

*(3) New residential units outside of the Redevelopment Area (500 units) are assumed to be large multi-family (5 or more units) based on recently submitted projects in commercial zones.*

*(4) Of the new residential units inside of the Redevelopment Area (1300 units), 39 units (3 percent) will be single-family townhouses (3 percent); and 1261 units (97 percent) will be in multi-family large buildings (5 or more units).*


**Section I: Buildings**

| Type (Residential) or Principal Activity (Commercial) | # Units | Square Feet (in thousands of square feet) | Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied | Energy | Transportation | **Lifespan Emissions (MTCO2e)** |
|---|---|---|---|---|---|---|
| Single-Family Home | 41 | | 98 | 672 | 792 | **64035** |
| Multi-Family Unit in Large Building | 1789 | | 33 | 357 | 766 | **2067537** |
| Multi-Family Unit in Small Building | 202 | | 54 | 681 | 766 | **303036** |
| Mobile Home | 0 | | 41 | 475 | 709 | **0** |
| Education | | 120.5 | 39 | 646 | 361 | **125980** |
| Food Sales | | 0.0 | 39 | 1,541 | 282 | **0** |
| Food Service | | 0.0 | 39 | 1,994 | 561 | **0** |
| Health Care Inpatient | | 0.0 | 39 | 1,938 | 582 | **0** |
| Health Care Outpatient | | 0.0 | 39 | 737 | 571 | **0** |
| Lodging | | 0.0 | 39 | 777 | 117 | **0** |
| Retail (Other Than Mall) | | 195.5 | 39 | 577 | 247 | **168669** |
| Office | | 195.5 | 39 | 723 | 588 | **263797** |
| Public Assembly | | 120.5 | 39 | 733 | 150 | **111098** |
| Public Order and Safety | | 0.0 | 39 | 899 | 374 | **0** |
| Religious Worship | | 120.5 | 39 | 339 | 129 | **60978** |
| Service | | 120.5 | 39 | 599 | 266 | **108940** |
| Warehouse and Storage | | 0.0 | 39 | 352 | 181 | **0** |
| Other | | 0.0 | 39 | 1,278 | 257 | **0** |
| Vacant | | 0.0 | 39 | 162 | 47 | **0** |

**Section II: Pavement**

| | | | | | | |
|---|---|---|---|---|---|---|
| Pavement | | 2,176.00 | | | | **108800** |

**Total Project Emissions:** **3382871**

Data entry fields


Definition of Building Types

| Type (Residential) or Principal Activity (Commercial) | Description |
|---|---|
| Single-Family Home | Unless otherwise specified, this includes both attached and detached buildings |
| Multi-Family Unit in Large Building | Apartments in buildings with more than 5 units |
| Multi-Family Unit in Small Building | Apartments in building with 2-4 units |
| Mobile Home | |
| Education | Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly." |
| Food Sales | Buildings used for retail or wholesale of food. |
| Food Service | Buildings used for preparation and sale of food and beverages for consumption. |
| Health Care Inpatient | Buildings used as diagnostic and treatment facilities for inpatient care. |
| Health Care Outpatient | Buildings used as diagnostic and treatment facilities for outpatient care. Doctor's or dentist's office are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building). |
| Lodging | Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings. |
| Retail (Other Than Mall) | Buildings used for the sale and display of goods other than food. |
| Office | Buildings used for general office space, professional office, or administrative offices. Doctor's or dentist's office are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building). |
| Public Assembly | Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls. |
| Public Order and Safety | Buildings used for the preservation of law and order or public safety. |
| Religious Worship | Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples). |
| Service | Buildings in which some type of service is provided, other than food service or retail sales of goods |
| Warehouse and Storage | Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage). |
| Other | Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category. |
| Vacant | Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace. |

Sources: .....

Residential 2001 Residential Energy Consumption Survey
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Commercial Commercial Buildings Energy Consumption Survey (CBECS),
Description of CBECS Building Types
http://www.eia.doe.gov/emeu/cbecs/pba99/bldgtypes.html


Embodied Emissions Worksheet

**Section I: Buildings**

| Type (Residential) or Principal Activity (Commercial) | # thousand sq feet/ unit or building | Life span related embodied GHG missions (MTCO2e/ unit) | Life span related embodied GHG missions (MTCO2e/ thousand square feet) - See calculations in table below |
|---|---|---|---|
| Single-Family Home | 2.53 | 98 | 39 |
| Multi-Family Unit in Large Building | 0.85 | 33 | 39 |
| Multi-Family Unit in Small Building | 1.39 | 54 | 39 |
| Mobile Home | 1.06 | 41 | 39 |
| Education | 25.6 | 991 | 39 |
| Food Sales | 5.6 | 217 | 39 |
| Food Service | 5.6 | 217 | 39 |
| Health Care Inpatient | 241.4 | 9,346 | 39 |
| Health Care Outpatient | 10.4 | 403 | 39 |
| Lodging | 35.8 | 1,386 | 39 |
| Retail (Other Than Mall) | 9.7 | 376 | 39 |
| Office | 14.8 | 573 | 39 |
| Public Assembly | 14.2 | 550 | 39 |
| Public Order and Safety | 15.5 | 600 | 39 |
| Religious Worship | 10.1 | 391 | 39 |
| Service | 6.5 | 252 | 39 |
| Warehouse and Storage | 16.9 | 654 | 39 |
| Other | 21.9 | 848 | 39 |
| Vacant | 14.1 | 546 | 39 |

**Section II: Pavement**

| | | | |
|---|---|---|---|
| All Types of Pavement | | | 50 |

| | Columns and Beams | Intermediate Floors | Exterior Walls | Windows | Interior Walls | Roofs | | |
|---|---|---|---|---|---|---|---|---|
| Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building | 5.3 | 7.8 | 19.1 | 51.2 | 5.7 | 21.3 | | |
| Average Materials in a 2,272-square foot single family home | 0.0 | 2269.0 | 3206.0 | 285.0 | 6050.0 | 3103.0 | Total Embodied Emissions (MTCO2e) | Total Embodied Emissions (MTCO2e/ thousand sq feet) |
| MTCO2e | 0.0 | 8.0 | 27.8 | 6.6 | 15.6 | 30.0 | 88.0 | 38.7 |

**Sources**

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Residential floorspace per unit
2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html

Floorspace per building
EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Average GWP (lbs CO2e/sq ft): Vancouver, Low Rise Building
Athena EcoCalculator
Athena Assembly Evaluation Tool v2.3- Vancouver Low Rise Building
Assembly Average GWP (kg) per square meter
http://www.athenasmi.ca/tools/ecoCalculator/index.html
Lbs per kg 2.20
Square feet per square meter 10.76

Average Materials in a 2,272-square foot single family home
Buildings Energy Data Book: 7.3 Typical/Average Household
Materials Used in the Construction of a 2,272-Square-Foot Single-Family Home, 2000
http://buildingsdatabook.eren.doe.gov/?id=view_book_table&TableID=2036&t=xls
See also: NAHB, 2004 Housing Facts, Figures and Trends, Feb. 2004, p. 7.

Average window size
Energy Information Administration/Housing Characteristics 1993
Appendix B, Quality of the Data. Pg. 5.

ftp://ftp.eia.doe.gov/pub/consumption/residential/rx93hcf.pdf

Pavement Emissions Factors
MTCO2e/thousand square feet of asphalt
or concrete pavement 50 (see below)

**Embodied GHG Emissions……Worksheet Background Information**

*Buildings*
Embodied GHG emissions are emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass).

Estimating embodied GHG emissions is new field of analysis; the estimates are rapidly improving and becoming more inclusive of all elements of construction and development.

The estimate included in this worksheet is calculated using average values for the main construction materials that are used to create a typical family home. In 2004, the National Association of Home Builders calculated the average materials that are used in a typical 2,272 square foot single-family household. The quantity of materials used is then multiplied by the average GHG emissions associated with the life-cycle GHG emissions for each material.

This estimate is a rough and conservative estimate; the actual embodied emissions for a project are likely to be higher. For example, at this stage, due to a lack of comprehensive data, the estimate does not include important factors such as landscape disturbance or the emissions associated with the interior components of a building (such as furniture).

King County realizes that the calculations for embodied emissions in this worksheet are rough. For example, the emissions associated with building 1,000 square feet of a residential building will not be the same as 1,000 square feet of a commercial building. However, discussions with the construction community indicate that while there are significant differences between the different types of structures, this method of estimation is reasonable; it will be improved as more data become available.

Additionally, if more specific information about the project is known, King County recommends two online embodied emissions calculators that can be used to obtain a more tailored estimate for embodied emissions: www.buildcarbonneutral.org and www.athenasmi.ca/tools/ecoCalculator/.

*Pavement*
Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle. For specifics, see the worksheet.

**Special Section: Estimating the Embodied Emissions for Pavement**

Four recent life cycle assessments of the environmental impacts of roads form the basis for the per unit embodied emissions of pavement. Each study is constructed in slightly different ways; however, the aggregate results of the reports represent a reasonable estimate of the GHG emissions that are created from the manufacture of paving materials, construction related emissions, and maintenance of the pavement over its expected life cycle.

The results of the studies are presented in different units and measures; considerable effort was undertaken to be able to compare the results of the studies in a reasonable way. For more details about the below methodology, contact matt.kuharic@kingcounty.gov.

The four studies, Meil (2001), Park (2003), Stripple (2001) and Treolar (2001) produced total GHG emissions of 4-34 MTCO2e per thousand square feet of finished paving (for similar asphalt and concrete based pavements). This estimate does not including downstream maintenance and repair of the highway. The average (for all concrete and asphalt pavements in the studies, assuming each study gets one data point) is ~17 MTCO2e/thousand square feet.

Three of the studies attempted to thoroughly account for the emissions associated with long term maintenance (40 years) of the roads. Stripple (2001), Park et al. (2003) and Treolar (2001) report 17, 81, and 68 MTCO2e/thousand square feet, respectively, after accounting for maintenance of the roads.

Based on the above discussion, King County makes the conservative estimate that 50 MTCO2e/thousand square feet of pavement (over the development's life cycle) will be used as the embodied emission factor for pavement until better estimates can be obtained. This is roughly equivalent to 3,500 MTCO2e per lane mile of road (assuming the lane is 13 feet wide).

It is important to note that these studies estimate the embodied emissions for roads. Paving that does not need to stand up to the rigors of heavy use (such as parking lots or driveways) would likely use less materials and hence have lower embodied emissions.

Sources:

Meil, J. A Life Cycle Perspective on Concrete and Asphalt Roadways: Embodied Primary Energy and Global Warming Potential. 2006. Available: http://www.cement.ca/cement.nsf/eee9ec7bbd630126852566c40052107b/6ec79dc8ae03a782852572b90061b914/$FILE/ATTK0WE3/athena%20report%20Feb.%202%202007.pdf

Park, K, Hwang, Y., Seo, S., M.ASCE, and Seo, H. , "Quantitative Assessment of Environmental Impacts on Life Cycle of Highways," Journal of Construction Engineering and Management , Vol 129, January/February 2003, pp 25-31, (DOI: 10.1061/(ASCE)0733-9364(2003)129:1(25)).

Stripple, H. Life Cycle Assessment of Road. A Pilot Study for Inventory Analysis. Second Revised Edition. IVL Swedish Environmental Research Institute Ltd. 2001. Available: http://www.ivl.se/rapporter/pdf/B1210E.pdf

Treloar, G., Love, P.E.D., and Crawford, R.H. Hybrid Life-Cycle Inventory for Road Construction and Use. Journal of Construction Engineering and Management. P. 43-49. January/February 2004.


Energy Emissions Worksheet

| Type (Residential) or Principal Activity (Commercial) | Energy consumption per building per year (million Btu) | Carbon Coefficient for Buildings | MTCO2e per building per year | Floorspace per Building (thousand square feet) | MTCE per thousand square feet per year | MTCO2e per thousand square feet per year | Average Building Life Span | Lifespan Energy Related MTCO2e emissions per unit | Lifespan Energy Related MTCO2e emissions per thousand square feet |
|---|---|---|---|---|---|---|---|---|---|
| Single-Family Home | 107.3 | 0.108 | 11.61 | 2.53 | 4.6 | 16.8 | 57.9 | 672 | 266 |
| Multi-Family Unit in Large Building | 41.0 | 0.108 | 4.44 | 0.85 | 5.2 | 19.2 | 80.5 | 357 | 422 |
| Multi-Family Unit in Small Building | 78.1 | 0.108 | 8.45 | 1.39 | 6.1 | 22.2 | 80.5 | 681 | 489 |
| Mobile Home | 75.9 | 0.108 | 8.21 | 1.06 | 7.7 | 28.4 | 57.9 | 475 | 448 |
| Education | 2,125.0 | 0.124 | 264.2 | 25.6 | 10.3 | 37.8 | 62.5 | 16,526 | 646 |
| Food Sales | 1,110.0 | 0.124 | 138.0 | 5.6 | 24.6 | 90.4 | 62.5 | 8,632 | 1,541 |
| Food Service | 1,436.0 | 0.124 | 178.5 | 5.6 | 31.9 | 116.9 | 62.5 | 11,168 | 1,994 |
| Health Care Inpatient | 60,152.0 | 0.124 | 7,479.1 | 241.4 | 31.0 | 113.6 | 62.5 | 467,794 | 1,938 |
| Health Care Outpatient | 985.0 | 0.124 | 122.5 | 10.4 | 11.8 | 43.2 | 62.5 | 7,660 | 737 |
| Lodging | 3,578.0 | 0.124 | 444.9 | 35.8 | 12.4 | 45.6 | 62.5 | 27,826 | 777 |
| Retail (Other Than Mall) | 720.0 | 0.124 | 89.5 | 9.7 | 9.2 | 33.8 | 62.5 | 5,599 | 577 |
| Office | 1,376.0 | 0.124 | 171.1 | 14.8 | 11.6 | 42.4 | 62.5 | 10,701 | 723 |
| Public Assembly | 1,338.0 | 0.124 | 166.4 | 14.2 | 11.7 | 43.0 | 62.5 | 10,405 | 733 |
| Public Order and Safety | 1,791.0 | 0.124 | 222.7 | 15.5 | 14.4 | 52.7 | 62.5 | 13,928 | 899 |
| Religious Worship | 440.0 | 0.124 | 54.7 | 10.1 | 5.4 | 19.9 | 62.5 | 3,422 | 339 |
| Service | 501.0 | 0.124 | 62.3 | 6.5 | 9.6 | 35.1 | 62.5 | 3,896 | 599 |
| Warehouse and Storage | 764.0 | 0.124 | 95.0 | 16.9 | 5.6 | 20.6 | 62.5 | 5,942 | 352 |
| Other | 3,600.0 | 0.124 | 447.6 | 21.9 | 20.4 | 74.9 | 62.5 | 27,997 | 1,278 |
| Vacant | 294.0 | 0.124 | 36.6 | 14.1 | 2.6 | 9.5 | 62.5 | 2,286 | 162 |

**Sources**

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

Energy consumption for residential buildings
2007 Buildings Energy Data Book: 6.1 Quad Definitions and Comparisons (National Average, 2001)
Table 6.1.4: Average Annual Carbon Dioxide Emissions for Various Functions
http://buildingsdatabook.eren.doe.gov/
Data also at: http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce1-4c_housingunits2001.html

Energy consumption for commercial buildings
and
Floorspace per building
EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

Note: Data in plum color is found in both of the above sources (buildings energy data book and commercial buildings energy consumption survey).

Carbon Coefficient for Buildings
Buildings Energy Data Book (National average, 2005)
Table 3.1.7. 2005 Carbon Dioxide Emission Coefficients for Buildings (MMTCE per Quadrillion Btu)
http://buildingsdatabook.eere.energy.gov/?id=view_book_table&TableID=2057
Note: Carbon coefficient in the Energy Data book is in MTCE per Quadrillion Btu.
To convert to MTCO2e per million Btu, this factor was divided by 1000 and multiplied by 44/12.

Residential floorspace per unit
2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons
http://www.eia.doe.gov/emeu/recs/sqft-measure.html


average lief span of buildings, estimated by replacement time method

| | Single Family Homes | Multi-Family Units in Large and Small Buildings | All Residential Buildings | |
|---|---|---|---|---|
| New Housing Construction, 2001 | 1,273,000 | 329,000 | 1,602,000 | |
| Existing Housing Stock, 2001 | 73,700,000 | 26,500,000 | 100,200,000 | |
| Replacement time: | 57.9 | 80.5 | 62.5 | (national average, 2001) |

Note: Single family homes calculation is used for mobile homes as a best estimate life span.
Note: At this time, KC staff could find no reliable data for the average life span of commercial buildings.
Therefore, the average life span of residential buildings is being used until a better approximation can be ascertained.

Sources:

**New Housing Construction, 2001** Quarterly Starts and Completions by Purpose and Design - US and Regions (Excel)
http://www.census.gov/const/quarterly_starts_completions_cust.xls
See also: http://www.census.gov/const/www/newresconstindex.html

**Existing Housing Stock, 2001** Residential Energy Consumption Survey (RECS) 2001
Tables HC1:Housing Unit Characteristics, Million U.S. Households 2001
Table HC1-4a. Housing Unit Characteristics by Type of Housing Unit, Million U.S. Households, 2001
Million U.S. Households, 2001
http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/housunits/hc1-4a_housingunits2001.pdf


Transportation Emissions Worksheet

| Type (Residential) or Principal Activity (Commercial) | # people/ unit or building | # thousand sq feet/ unit or building | # people or employees/ thousand square feet | vehicle related GHG emissions (metric tonnes CO2e per person per year) | MTCO2e/ year/ unit | MTCO2e/ year/ thousand square feet | Average Building Life Span | Life span transportation related GHG emissions (MTCO2e/ per unit) | Life span transportation related GHG emissions (MTCO2e/ thousand sq feet) |
|---|---|---|---|---|---|---|---|---|---|
| Single-Family Home | 2.8 | 2.53 | 1.1 | 4.9 | 13.7 | 5.4 | 57.9 | 792 | 313 |
| Multi-Family Unit in Large Building | 1.9 | 0.85 | 2.3 | 4.9 | 9.5 | 11.2 | 80.5 | 766 | 904 |
| Multi-Family Unit in Small Building | 1.9 | 1.39 | 1.4 | 4.9 | 9.5 | 6.8 | 80.5 | 766 | 550 |
| Mobile Home | 2.5 | 1.06 | 2.3 | 4.9 | 12.2 | 11.5 | 57.9 | 709 | 668 |
| Education | 30.0 | 25.6 | 1.2 | 4.9 | 147.8 | 5.8 | 62.5 | 9247 | 361 |
| Food Sales | 5.1 | 5.6 | 0.9 | 4.9 | 25.2 | 4.5 | 62.5 | 1579 | 282 |
| Food Service | 10.2 | 5.6 | 1.8 | 4.9 | 50.2 | 9.0 | 62.5 | 3141 | 561 |
| Health Care Inpatient | 455.5 | 241.4 | 1.9 | 4.9 | 2246.4 | 9.3 | 62.5 | 140506 | 582 |
| Health Care Outpatient | 19.3 | 10.4 | 1.9 | 4.9 | 95.0 | 9.1 | 62.5 | 5941 | 571 |
| Lodging | 13.6 | 35.8 | 0.4 | 4.9 | 67.1 | 1.9 | 62.5 | 4194 | 117 |
| Retail (Other Than Mall) | 7.8 | 9.7 | 0.8 | 4.9 | 38.3 | 3.9 | 62.5 | 2394 | 247 |
| Office | 28.2 | 14.8 | 1.9 | 4.9 | 139.0 | 9.4 | 62.5 | 8696 | 588 |
| Public Assembly | 6.9 | 14.2 | 0.5 | 4.9 | 34.2 | 2.4 | 62.5 | 2137 | 150 |
| Public Order and Safety | 18.8 | 15.5 | 1.2 | 4.9 | 92.7 | 6.0 | 62.5 | 5796 | 374 |
| Religious Worship | 4.2 | 10.1 | 0.4 | 4.9 | 20.8 | 2.1 | 62.5 | 1298 | 129 |
| Service | 5.6 | 6.5 | 0.9 | 4.9 | 27.6 | 4.3 | 62.5 | 1729 | 266 |
| Warehouse and Storage | 9.9 | 16.9 | 0.6 | 4.9 | 49.0 | 2.9 | 62.5 | 3067 | 181 |
| Other | 18.3 | 21.9 | 0.8 | 4.9 | 90.0 | 4.1 | 62.5 | 5630 | 257 |
| Vacant | 2.1 | 14.1 | 0.2 | 4.9 | 10.5 | 0.7 | 62.5 | 657 | 47 |

**Sources**

All data in black text — King County, DNRP. Contact: Matt Kuharic, matt.kuharic@kingcounty.gov

# people/ unit — Estimating Household Size for Use in Population Estimates (WA state, 2000 average)
Washington State Office of Financial Management
Kimpel, T. and Lowe, T. Research Brief No. 47. August 2007; http://www.ofm.wa.gov/researchbriefs/brief047.pdf
Note: This analysis combines Multi Unit Structures in both large and small units into one category;
the average is used in this case although there is likely a difference

Residential floorspace per unit — 2001 Residential Energy Consumption Survey (National Average, 2001)
Square footage measurements and comparisons; http://www.eia.doe.gov/emeu/recs/sqft-measure.html

# employees/thousand square feet — Commercial Buildings Energy Consumption Survey commercial energy uses and costs (National Median, 2003)
Table B2 Totals and Medians of Floorspace, Number of Workers, and Hours of Operation for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set1/2003excel/b2.xls

Note: Data for # employees/thousand square feet is presented by CBECS as square feet/employee.
In this analysis employees/thousand square feet is calculated by taking the inverse of the CBECS number and multiplying by 1000.

Vehicle related GHG emissions

Estimate calculated as follows (Washington state, 2006)_

| | |
|---|---|
| 56,531,930,000 | 2006 Annual WA State Vehicle Miles Traveled |
| | Data was daily VMT. Annual VMT was 365*daily VMT. |
| | http://www.wsdot.wa.gov/mapsdata/tdo/annualmileage.htm |
| 6,395,798 | 2006 WA state population |
| | http://quickfacts.census.gov/qfd/states/53000.html |
| 8839 | vehicle miles per person per year |
| 0.0506 | gallon gasoline/mile |
| | This is the weighted national average fuel efficiency for all cars and 2 axle, 4 wheel light trucks in 2005. This includes pickup trucks, vans and SUVs. The 0.051 gallons/mile used here is the inverse of the more commonly known term "miles/per gallon" (which is 19.75 for these cars and light trucks). |
| | Transportation Energy Data Book. 26th Edition. 2006. Chapter 4: Light Vehicles and Characteristics. Calculations based on weighted average MPG efficiency of cars and light trucks. |
| | http://cta.ornl.gov/data/tedb26/Edition26_Chapter04.pdf |
| | Note: This report states that in 2005, 92.3% of all highway VMT were driven by the above described vehicles. |
| | http://cta.ornl.gov/data/tedb26/Spreadsheets/Table3_04.xls |
| 24.3 | lbs CO2e/gallon gasoline |
| | The CO2 emissions estimates for gasoline and diesel include the extraction, transport, and refinement of petroleum as well as their combustion. |
| | Life-Cycle CO2 Emissions for Various New Vehicles. RENew Northfield. |
| | Available: http://renewnorthfield.org/wpcontent/uploads/2006/04/CO2%20emissions.pdf |
| | Note: This is a conservative estimate of emissions by fuel consumption because diesel fuel, |
| 2205 | with a emissions factor of 26.55 lbs CO2e/gallon was not estimated. |
| 4.93 | lbs/metric tonne |
| | vehicle related GHG emissions (metric tonnes CO2e per person per year) |

average lief span of buildings, estimated by replacement time method — See Energy Emissions Worksheet for Calculations

Commercial floorspace per unit — EIA, 2003 Commercial Buildings Energy Consumption Survey (National Average, 2003)
Table C3. Consumption and Gross Energy Intensity for Sum of Major Fuels for Non-Mall Buildings, 2003
http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003excel/c3.xls

**Transportation……...…….Worksheet Background Information**

This section helps estimate the emissions associated with transportation of building occupants. At this time, it is based on average vehicle miles traveled by the average Washington State citizen.

APPENDIX H

# DESCRIPTION OF ESA-LISTED SPECIES

CITY OF Vancouver WASHINGTON

## DESCRIPTION OF ESA LISTED SPECIES

A review of the USFWS IPaC database indicates that five federally listed threatened species have the potential to occur within the project area.

- Bull trout (Salvelinus confluentus)
- Streaked horned lark (Eremophila alpestris strigata)
- Yellow-billed cuckoo (*Coccyzus americanus*)
- Golden paintbrush (*Castilleja levisecta*)
- Water howellia (Howellia aquatilis)

### Bull Trout

The Columbia River DPS of bull trout (*Salvelinus confluentus*) was listed as a threatened species under the ESA in June 2006. Because bull trout are members of the Salmonidae family, their survival requires certain characteristics in their habitat: cold water, stable stream channels, clean gravel for spawning and rearing, complex and diverse color, and unblocked migratory passes (USFWS, 2019e). There are no streams within the study area and therefore no potential habitat for this species; as such, it will not be affected by the proposed project or the No-Action Alternatives.

### Streaked Horned Lark

Streaked horned lark (*Eremophila alpestris strigata*) was listed as a threatened species under the ESA in October 2013. Streaked horned larks prefer expansive areas of flat, open ground to establish breeding territories, particularly (though not exclusively) sites with minimal vegetation and unobstructed views of water (USFWS, 2019f). Critical habitat for streaked horned lark was designated on 3 October 2013 and includes two units and 16 subunits located in Oregon and Washington. The designation includes several sites in and adjacent to the Lower Columbia River. The proposed action does not occur within the designated critical habitat for streaked horned lark. The project area is located in a residential district that meets none of the criteria necessary to support this species.

### Yellow-Billed Cuckoo

The western DPS of yellow-billed cuckoo (*Coccyzus americanus*) was listed as a threatened species under the ESA in November 2014. Critical habitat for yellow-billed cuckoo was proposed on 15 August 2014 and includes 80 units in nine states; none are located in either Oregon or Washington. Therefore, the proposed action does not occur within the designated critical habitat for yellow-billed cuckoo. This species uses wooded habitat with a dense cover of low, scrubby vegetation and a close supply of water (US National Parks Service, 2014). The project area is located within a developed, urban environment, and does not meet these criteria for suitable habitat for this species. The species is highly unlikely to be present and suitable habitat is lacking, so impact to the species is unlikely.

### Golden Paintbrush

Golden paintbrush (*Castilleja levisecta*) was listed as a threatened species under the ESA in 1997. A short vegetation community generally dominated by native grass and forb species is required by this plant for reproductive success. This species prefers open grassland, which is not provided by the project area as it is situated within a developed urban environment (USFWS, 2019g and 2019h). This species is highly unlikely to occur within the project area.

### Water Howellia

Water howellia (*Howellia aquatillis*) was listed as a threatened species under the ESA in July 1994. Water howellia is a small winter annual aquatic plant known to potentially exist in the vicinity of Clark County. This plant reproduces only by seed and requires the drying of occupied ponds during the fall for germination. With these requirements for germination, existing populations of this plant are often associated with former river oxbows and glacial potholes, and prefer the edges of deep ponds with partial cover of deciduous trees (USFWS, 2018i). These habitat requirements are not provided by the project area, and this lack of suitable habitat makes the existence of this plant within the project area highly unlikely.

The WNHP maintains a database of rare and imperiled species and plant communities for the state. A review of the WNHP Element Occurrences GIS spatial dataset indicates that tall bugbane (*Actaea elata* var. *elata*) occurs in the vicinity of the project area, near David Douglas Park to the north, and South Cliff Park/Dubois Park to the southwest. Tall bugbane is state-listed as a vulnerable species. The WNHP dataset does not show this species as occurring within the project area, and it is unlikely that this species would be impacted as a result of either the proposed project or the No-Action Alternatives.

The review of the applicable resources (USFWS website [USFWS, 2019a], the NOAA Fisheries website [NMFS, 2019a], PHS on the Web [WDFW, 2019a] and SalmonScape [WDFW, 2019b]) shows that there are no streams within the project area, and therefore no habitat for or potential presence of special-status fish species within the project area. According to SalmonScape, the nearest fish-bearing streams are Burnt Bridge Creek to the north, and an unnamed stream south of SR 14; neither waterway has the potential to be impacted by any of the alternatives.

## REFERENCES

See DEIS reference list for Plants and Animals.