



MECHANICAL AND AUTOMATED CAR PARKING TECHNICAL STANDARD

Vancouver Fire Department, Washington

Effective September 11, 2023

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1. INTRODUCTION

- A. This document outlines and clarifies minimum requirements for the design, installation, and acceptance testing of mechanical parking car stackers (dependent access) and automated car parking systems (independent access). This standard shall be used in conjunction with the latest published edition of the International Fire Code (IFC) and International Building Code (IBC) as amended by the State of Washington (WSFC, WSBC). Where a specific code edition is referenced, the edition referenced shall be used.
- B. Example diagrams are provided in Appendix A.

2. SCOPE AND PURPOSE

The scope and purpose of this document is to outline City of Vancouver Fire Department (VFD) design requirements for outdoor and indoor use of mechanical parking systems, such as Automated Guided Vehicle Systems, (AGV), Automated Rack and Rail Systems, Automated Car Stacker Systems, Carousel Parking Systems, and Semi-Automated or Puzzle Parking Systems.

3. DEFINITIONS

The following words and terms shall, for the purposes of this chapter and as used elsewhere, have the meanings shown herein:

- A. Access Road. A designated way for vehicular travel, which provides access from a public street or alley to buildings or structures upon the premises.
- B. Anti-Fall System. A safety system used to prevent the fall of platforms in the event of a cable or chain break while in the raised position.
- C. Anti-Sway Devices. Mechanical and Automated Parking Systems using a suspended platform must provide an anti-sway device to prevent a platform from swaying into other platforms or vehicles while being lowered.
- D. Automated Guided Vehicle Systems (AGV). Robots that store vehicles in a multi-level parking storage area with continuous floors that move in common drive aisles or under vehicles. AGV systems can either use pallets or comb technologies to handle vehicles. Vehicles are dropped off in loading bays by users and then transferred to the parking storage area by the AGVs and Vertical Reciprocating Conveyors (VRCs).
- E. Automated Rack and Rail Systems. Multi-level automated parking systems commonly integrated into a building structure typically with an open atrium or multi-tiered open storage racks and shuttle ways. The system uses common Vertical Reciprocating Conveyors (VRCs)², shuttles, and dollies to transfer vehicles from common loading bays to the parking storage area. Public occupancy is typically prohibited in the parking storage area with a maximum floor area allowance per occupant of 500 or less.
- F. Car Stacker Pile. A floor area of a single array of mechanical, semi-automated parking systems, and carousel parking systems separated from other car stacker piles by main aisles, fire separation walls or occupancy separations. A car stacker pile shall be limited to 50,000 cubic square feet. Every building must be fully sprinklered.

- G. Carousel Parking Systems. Mechanical equipment consisting of an open steel structure typically two parking spaces wide that supports 6 to 12 movable platforms for the stacking of vehicles vertically. The platforms are connected together and move vertically and rotate around a vertical carousel. A trained operator will perform the functions. Carousel systems may be installed as a single unit or in an array of units sharing common supports between units. Carousel systems are electric and can be installed indoors or outdoors. Carousel systems are an independent access system.
- H. Catwalk. A horizontal walkway with a minimum clear width of 36" and maximum length of 150' for outdoor installations and 100' for indoor installations. Catwalks shall be provided at 3rd levels and higher of mechanical car stackers measured from ground level (not including pit level stacks), semi-automated parking systems, and carousel systems. Catwalks must have a fixed ladder at each end of the Catwalk (See Diagram 1A). Where a catwalk does not abut a parking stall on both sides the catwalks must be provided with guardrails at 42" and 21" on the open side.
- I. Stacker E-Stop. A safety mechanism used to shut-off a device or equipment in an emergency in which the device cannot be shut down in the usual manner.
- J. Vehicle Charger E-Stop. A safety mechanism used to shut-off vehicle electrical charging equipment in an emergency in which the device cannot be shut down in the usual manner.
- K. Fire Department Access Aisles. (See Diagram 1B and 2B)
- L. Main Aisle. An unobstructed way of egress in front of a mechanical car stacker, semi-automated system, carousel system, or pit system. The main aisle is used as a drive aisle for attendants to load and unload vehicles. A main aisle must have a minimum clearance per Table 1A between vehicle envelopes and a maximum length of a 150' for outdoor installation and 100' for indoor installations.
- M. Side Aisle. An unobstructed secondary way transecting the main aisle. A side aisle must have a minimum clearance per Table 1A. Side aisle may be reduced to 3'-0" if not separating other car stacker piles.
- N. Access Aisle. An unobstructed secondary way required in front of or behind tandem parking to provide fire department access to the back row.
- O. Fire Lane. A roadway that is required to provide access for fire department apparatus and conforms to all requirements of Vancouver Municipal Code Title 16.
- P. Loading Bay. Typically located at the ground floor of automated parking systems, loading bays are equivalent to a 1½ car garage where the driver leaves their vehicle in an automated parking system. The loading bay is equipped with sensors to measure the vehicle and verify that the loading bay is unoccupied prior to activating the automated parking system.
- Q. Mechanical Car Stacker. Mechanical equipment consisting of an open steel structure that supports one, two, or three movable platforms for the stacking of vehicles vertically. A trained operator operates the equipment. Stackers may be installed as a single unit or in an array of units sharing common supports between units. A suspended platform-type system may also be hung from the ceiling of a structure. Mechanical car stackers are either hydraulic or electric and can be installed indoors or outdoors. Mechanical car stackers are a dependent access system.
- R. Parking Storage Area. An area of a site or building where mechanical or automated parking systems are to be used, including the area of the equipment and the fire department access aisles.

Car stacker piles within a parking storage area must be separated by main aisles, shuttle ways, side aisles, fire separation walls, or occupancy separations.

- S. Pit Systems. A pit system is an in-ground multi-level stacker consisting of an open steel structure for storing of cars below grade. The device lowers vehicles on fixed platforms up to three levels into a concealed pit so that additional cars can be parked above. Pit systems can be either an independent or dependent access system depending on vertical clearance for indoor installations. Pit systems must provide an access aisle in the pit with a minimum 18" anti-crush space located under the lower platform to prevent injury to maintenance personnel. Hydrogen and other compressed gas vehicles are prohibited below grade.
- T. Platform. A solid steel platform that is typically suspended from a steel support structure by cables or chains and used to store vehicles vertically. Maximum height from ground floor to finish floor of the top platform shall not exceed 25' - 0".
- U. Semi-Automated or Puzzle Parking Systems. Mechanical equipment consisting of a multi-level open steel structure that supports an array of suspended platforms 2, 3, or 4 levels high vertically and horizontally. The top row of platforms moves vertically while other rows move horizontally right or left one space and move vertically. Lower rows have one open space in the array. The system will automatically shuffle the spaces horizontally to allow an upper platform to lower to grade. Semi-automated parking systems can be combined with pit systems. A trained operator operates the equipment. Semi-automated systems are typically installed in an array of units sharing common supports between units. Semi-automated systems are either hydraulic or electric and can be installed indoors or outdoors.
- V. Shuttle Ways. Common pathways in automated parking systems used for moving stored vehicles. In parking storage areas, shuttle ways must have a solid metal or heavy gauge screen catwalk capable of providing fall protection and a means of egress on every level. For automated rack and rail systems where public occupancy is prohibited, the minimum width of shuttle ways shall be equal to the width of the vehicle envelopes (See Diagrams 2A-2D).
- W. Tandem Parking. Tandem parking in parking storage areas shall be limited to two rows of parking, one behind the other.

EXCEPTION: Additional rows of tandem parking may be approved by the fire department with additional requirements for fire department access aisles and fire sprinklers (on a case-by-case submittal).
- X. Vehicle Envelope. The length and width dimensions of a vehicle allowed to park on a platform. The vehicle envelope may not extend beyond the length of the suspended equipment platform. The minimum vehicle envelope shall be 8' x 15'. The back row of tandem mechanical parking shall have a minimum vehicle envelope of 8' x 18'.
- Y. Vertical Reciprocating Conveyors. Vertical lifts used in automated parking systems to transfer vehicles between floors and multi-tiered open storage racks in a parking storage area. VRCs are designed as storage and retrieval machines and shall remain unoccupied when in motion.

4. QUALIFICATIONS AND RESPONSIBILITIES

- A. Design Team. The building owner shall engage a fire protection engineer or other qualified engineer to establish the Mechanical and Automated Car Parking Basis of Design and prepare the associated Reports. The Report author shall have documented experience in the design of mechanical and automated car parking systems, and the report shall be stamped by a licensed

engineer (also with documented experience in the design of car parking systems) in the state of Washington.

The building owner shall engage an architect, mechanical engineer, fire protection engineer, and electrical engineer as Architect and Engineers-of-Record (AOR / EOR), to prepare the Mechanical and Automated Car Parking design documents. These individuals shall also be designated as the registered design professionals in responsible charge who are responsible for reviewing and coordinating submittal documents, including reports and deferred submittals prepared by others, as they pertain to the smoke control system design. The AOR and EORs are considered the design professional in responsible charge for their respective components of the smoke control system for compliance with the basis of design described in the required Reports. All design professionals must be registered or licensed by the State of Washington in their respective disciplines. Fire alarm system and fire sprinkler system designers must have the appropriate NICET Certification as required by the Washington State Administrative Code.

It is imperative that all parties responsible for the design of the Mechanical and Automated Car Parking systems are retained throughout the project from the Conceptual/Schematic Design phase through the issuance of the Certificate of Occupancy.

- B. Coordination of Effort. Coordinated effort among all parties involved in designing, installing, and testing Mechanical and Automated Parking systems is essential to meet applicable requirements. It cannot be overemphasized that the design professionals, including the AOR / EORs, City reviewers, as well as all applicable must work together to accomplish a fully functional and compliant Mechanical and Automated Car Parking system.
- C. Coordination Letters. A signed statement must be provided from design professionals responsible for system design deemed critical to this Standard. This is detailed further in the Submittal Requirements section of this standard. A signed statement is not required for the design professional who authored the report.

5. DESIGN CONSIDERATIONS

5.1 FIRE DEPARTMENT ACCESS

5.1.A AISLE REQUIREMENTS

Table 1A

Car Stackers	Main Aisle	Side Aisle	Access Aisle
2- high	12'-0"	4'-0"	36" Clear
3- high	18'-0"	7'-0"	36" Clear
4- high+	20'-0"	8'-0"	36" Clear

All aisle dimensions are measured from the vehicle envelope or equipment, whichever is greater.

5.1.B SITE ACCESS

- A. Any person owning or having control of any facility, structure, group of structures or premises using a mechanical or automated parking system shall maintain fire department access in accordance with International Fire Code (IFC), Chapter 5 and Vancouver Municipal Code (VMC) Title 16.

- B. Parking storage area shall be in compliance with IFC, 503.1.1.

Access: In addition, to 503.1.1, the access road shall be within 150' of the building entrance.

503.1.1 Buildings and facilities. "Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150' (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility."

5.1.C OUTDOOR PARKING SYSTEMS

- A. For mechanical car stackers, semi-automated systems, carousel systems, or pit systems each platform must be directly accessible from a main aisle, fire lane, access aisle or side aisle.
- B. Projects using tandem mechanical parking must provide access to the back row of platforms via side aisles and catwalks. Engine compartment must face main aisle or access aisle.

EXCEPTION: Where there are a mix of vehicle stacking heights in the same fire area, two-level tandem mechanical parking installations do not require catwalks, but must maintain minimum vehicle envelope requirements. Only one 3'-0" access aisle is required to the back row of tandem parking.

- C. For mechanical car stackers, semi-automated systems, carousel systems, or pit systems architectural screening that prevents direct access from a main aisle or fire lane must provide a catwalk.
- D. If any portion of the parking storage area is more than 150' from the edge of the roadway of an approved street, an approved fire lane shall be provided so that such portion is within 150' of the edge of the fire lane.
- E. Side aisles for car stacker piles shall be provided at property lines. Where car stacker piles are not impeded at the property line, side aisle measurement may be taken to centerline of street, alley, or public way.

EXCEPTIONS:

1. Where there are a mix of vehicle stacking heights in the same fire area, a single row of two-level mechanical car stackers shall not be required to provide an access aisle or side aisle separation from property lines, streets, alleys, or public ways.
 2. When fire sprinklers are provided the required separation to adjoining properties, streets, alleys or public ways may be reduced upon fire department review and approval.
- F. Where there are a mix of vehicle stacking heights in the same fire area, two-level car stacker piles shall be located a minimum of 10' from property lines and from exterior walls of buildings of less than one-hour fire resistive construction. Three or more level car stacker piles shall be located a minimum 15' from property lines and from exterior walls of buildings of less than 2-hour fire resistive construction. All openings in rated exterior walls shall be protected as required by code.

EXCEPTIONS:

1. A 3-hour fire resistive Concrete Masonry Unit (CMU) wall may be provided to reduce the setback from adjacent property lines.

2. Setback not required at property lines abutting a street, alley, or public way.

5.1.D INDOOR PARKING SYSTEMS

- A. Indoor installations of mechanical or automated parking systems must meet requirements for Outdoor Parking Systems A through C (see Section 5.1.C).
- B. Standpipe outlets shall be provided in enclosed rated stairways. Where the most remote portion of a floor or story is more than 150' from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations. The distance from a hose connection shall be measured along the path of travel.
- C. Indoor parking storage areas must provide a minimum of two exits (a garage entry drive aisle is not an exit) with a maximum travel distance limited to 250' in addition to the International Building Code (IBC), Chapter 10 Requirements.
- D. Structures housing mechanical or automated parking systems shall be classified as S-2 occupancy.
- E. Allowable building heights and area shall be limited per IBC Table 503 for S-2 occupancy requirements for open or enclosed parking structures. Allowable area shall be calculated using the sum of each tier of the parking storage area.
- F. Parking storage areas and loading bay shall be separated from other uses by a minimum of a 2-hour fire barrier.
- G. A smoke exhaust system designed to provide a minimum of six air changes per hour shall be provided for indoor parking areas with piles more than two high. The smoke exhaust system shall meet all requirements in IBC/IFC, Section 910 and the VFD Smoke Control Technical Standard (SCTS). Additionally, a separate permit shall be required for systems that control smoke in accordance with the VFD SCTS as published on the Vancouver Fire Department's web page.
- H. Parking storage areas shall provide a drainage system in accordance with the Uniform Plumbing Code (UPC). The drainage system shall be sized to carry the volume of the fire protection water including fire sprinkler design discharge and hose stream allowance.
- I. Where required, emergency access ladders and catwalks shall be part of the design package.

5.2 EQUIPMENT REQUIREMENTS

- A. Each suspended platform in a mechanical or puzzle parking automated parking system shall be equipped with anti-fall devices.
- B. Pit systems shall provide a full height barrier to prevent falling into the pit when the system is in motion.
- C. Portable fire extinguishers shall be provided, installed, and distributed in parking storage areas sized to a minimum of 40A:20B:C due to concentrated vehicle storage containing flammable liquids.
- D. Access to sprinkler valves, standpipes, and other fire protection equipment provided in parking storage areas shall be served by either a main aisle or side aisle.
- E. Aisles shall be kept free from parked vehicles at all times, except for the temporary shuffling of vehicles between levels. No vehicles shall be parked in a side aisle.
- F. Stacker E-stops and Vehicle Charger E-stops. Parking storage areas shall be equipped with e-stops and power-disconnect switches as follows:

1. Where electric vehicle charging stations are provided for charging of vehicles within mechanical or automatic parking systems, emergency shut down switches and/or e-stops switches shall be provided to disconnect power the automatic parking system and to electric vehicle charging systems. Switches shall be clearly identified and shall be in a location approved by the Fire Code Official.
2. All emergency shut down switches and e-stop switches at the stackers shall be clearly identified and shall be in a location approved by the Fire Code Official.
3. Location and means of lock-out tag-out shall be provided in a manner approved by the Fire Code Official.
4. Mechanical car stackers shall be equipped with an on/off keyed switch and operation shall be through an emergency shutdown station. Each hydraulic power unit shall have a power disconnect switch within 10' of the unit.
5. Remote Stacker E-stops and Vehicle Charger E-stops shall at a location approved by the Fire Code Official.
6. Pit systems shall be equipped with an e-stop located within 10' of the operating device. Each hydraulic power unit or main control panel must have a power disconnect switch within 10' of the unit. An e-stop shall be located in any access or service areas in the pit.
7. Automated rack and rail and AGV systems: Automated and semi-automated parking systems shall be equipped with an e-stop at each operator station where applicable. Each main control panel controlling the electric motors or hydraulic power unit shall have an integrated power disconnect or power disconnect switch within 10' of the unit.
8. Automated parking systems must be equipped with e-stops throughout the parking storage area and loading bays. E-stops shall be located at points of entry to the parking storage area, or evenly distributed throughout the parking storage area at a minimum of 75' intervals. Each loading bay shall be equipped with a minimum of (2) two e-stops. Loading bay e-stops may consist of door contactors that shut down the equipment when the door is open, or may be located in a locked enclosure accessible to the fire department. A power disconnect switch shall be provided at the automated systems main control panels, VRC, shuttles, power rails, conveyor systems, AGV charging stations and any other equipment within the system. Location of power disconnects shall comply with the electrical code requirements.
9. Automated parking shall shut down upon fire alarm and sprinkler activation and shall be provided with manual shut down at access points in automated parking areas.
10. Hydraulic power units shall be installed in a one hour rated room. The room shall have secondary spill containment and the access door shall be properly placarded.
11. Warning devices at automated parking access points/entry portals must be activated upon re-starting of equipment. Installation shall comply with the following requirements:
 - i. Visual warning devices cannot be integrated with fire alarm devices. Non-fire alarm equipment must be on its own system.
 - ii. Visual warning devices shall have different tones/lights from fire alarm devices.
 - iii. Visual warning devices shall be located within 10' of any access points/entry portals.
 - iv. Visual warning devices shall be provided no more than 50 linear feet apart down the center of the main aisles.

- v. Visual warning devices shall be on standby power.
 - vi. Audio warning signals shall be distinctively different in sound than fire alarm signals.
- G. Occupancy Sensors: Automated parking systems shall provide a means of sensing occupancy in the loading bays and at each entrance into the parking storage area. Sensors shall prevent unauthorized access into the system. Activation of the occupancy sensors shall stop or prevent activation of the system.
- H. Warning Signs/Labels/Placards: Approved warning signs indicating the danger involved and necessary precautions shall be posted on all doors and entrances to the premises. Parking storage area shall have approved warning signs on equipment indicating hazards such as danger high voltage, caution low head clearance, hazardous materials, and other dangers. Obstructions below 6'-6" or protruding more than 4" into a fire department access aisle shall be clearly marked with signage and shall be marked with contrasting yellow and luminous material with alternating bands.
- I. Exit path of travel/VFD access walkways that are to be clear of moving vehicles shall be marked with yellow reflective paint.
- J. Fire Alarm System:
 - 1. Visual notification devices shall be provided along the catwalks, driveways, and mechanical equipment rooms.
 - 2. Signage at Fire Alarm Control Panel (FACP) and all access points into automated area to warn all persons of automated system.
- K. Two means of egress, at a minimum, shall be provided via an enclosed and rated stairway. Provide stairwells with a minimum 2-hour rated enclosure with 90-minute rated openings.
- L. Manual reset of fire alarm and sprinkler activation for mechanical or automated parking must be provided at the fire alarm control panel fire department access point. Manual re-start of automated parking equipment shall be prevented until after manual reset of fire alarm and sprinkler.
- M. Emergency lighting shall be provided throughout automated parking/equipment locations. Provide 1' candela e-lighting throughout for operational purposes.
- N. Path of travel/VFD walkways must be provided with raised border or post to protect and keep hose lines out of the automated equipment movement area.
- O. Automated parking equipment shall require manual re-start after fire alarm activation to prevent persons from starting equipment while VFD are in the area.
- P. Audible warning tone required upon re-starting of parking equipment.
- Q. Visual warning device at automated parking access points activated upon re- starting of equipment.
- R. For installations into existing buildings, the water storage tank must be sized for Extra Hazard Group II with respect to NFPA 13.
- S. Fusible links for fire door release shall be installed per NFPA 80.
- T. Installation of mechanical or automated parking system shall comply with the applicable provisions of International Building, Mechanical, and Fire Codes as well as the Uniform Plumbing and National Electric Codes.

5.3 FIRE SPRINKLER REQUIREMENTS

- A. Where Commercial Parking Garages Containing Mechanical and Automated Parking that exceeds two levels of storage, an approved automatic sprinkler system shall be provided throughout buildings used for the storage of motor vehicles in parking garages containing mechanical and/or automated parking. The portion of the building that contains the mechanical and/or automated parking shall be protected with a specially engineered automatic sprinkler system meeting.
- B. Specially engineered automatic sprinkler system shall have fire sprinkler design documents and calculations prepared and stamped by a fire protection engineer licensed in the State of Washington.
- C. The specially engineered automatic sprinkler system design shall incorporate, at a minimum, the following design guidance:
 - 1. The specially engineered automatic sprinkler system shall be protected by an automatic wet-pipe sprinkler system.

EXCEPTION: Dry-pipe systems can be approved where one of the following is provided:

- 1. System size is limited to a volume not to exceed 500 gallons and a listed quick-opening device is provided for each system that protects mechanical and/or automated parking.
 - 2. Water delivery for each system that protects mechanical and/or automated parking is calculated and demonstrates water delivery within 45 seconds from the time the 4 most remote sprinklers initially open in accordance with NFPA 13 (2022), 8.2.3.6. The calculation program and method shall be listed by a nationally recognized testing laboratory.
- 2. In accordance with NFPA 13 (2022), 19.1.2(1) requirements for “Adjacent Hazards or Design Methods”, the sprinkler design criteria for the specially engineered automatic sprinkler system must extend 15 feet into adjacent areas that do not contain mechanical and/or automated parking.
- 3. The Extra Hazard Group 2 hydraulic calculation design criteria shall include all ceiling-level sprinklers within a minimum 2,500 square feet area of sprinkler operation (before reductions), or the maximum area containing car stackers/lift systems extending 15 feet into adjacent areas that do not contain car stackers/lift systems, whichever is less, but not less than 2,000 SF.
- 4. Ceiling level sprinklers shall be large-orifice sprinklers. Ceiling level sprinklers should be placed longitudinally centered above parking stalls.
- 5. Non-extended coverage standard-response sidewall sprinklers, listed for Ordinary Hazard Group 2 (OH2), shall be provided for use to cover under each parking lift platform, including the bottom level, if the stacker is provided with a pit. In addition, a total of not fewer than six (6) sidewall sprinklers under lift platforms shall be included in the area of sprinkler operation. The design density for the sidewall sprinklers shall be Ordinary Hazard Group 2 (OH2). The sidewall sprinkler flow shall be from two (2) sidewall sprinklers covering under the top-level parking lift platform at three (3) adjacent stalls or areas with car stacker/lift platforms. The EH2 design area can be reduced from 2,500SF to NOT LESS than 2,000 SF if high-temp sprinklers or K-11.2 sprinklers are used at the ceiling per NFPA 13 (2022) Sections 19.2.3.2.6 or 19.2.3.2.7.

6. For a high-rise building, car stacker sprinkler systems will cause the secondary water supply capacity to increase. For water supply and secondary water supply capacity purposes, the system is to be considered as an Extra Hazard System. The secondary water supply shall be designed for the largest car stacking sprinkler system demand plus a hose allowance of 100 gpm for 90 minutes. If the available city main flow at 20 psi is not adequate to provide this requirement, the secondary water supply shall become the primary water supply. For this case, the secondary/primary water supply capacity must meet the above requirements and the requirements specified in NFPA 13 (2022) and NFPA 22 (currently adopted edition with respect to WSFC).

For a low-rise building, if the city main cannot provide the required flow at a residual pressure of 20 psi, a primary water supply tank and fire pump must be provided. The capacity of the tank shall meet the above requirements and the specific applicable requirements listed in NFPA 13 (2022) and NFPA 22 (currently adopted edition with respect to WSFC).

7. The design shall include calculations for storage water tank capacity, depletion and replenishment rates, and the duration of water supply using the design area and the hose stream demand.
8. Parking drive aisles or other areas with loft or column-less car stacking/lift platforms shall follow all of the criteria outlined in this section.

6. SUBMITTAL REQUIREMENTS

A. Preliminary Car Parking Systems Submittal (PCPSS)

1. For projects with mechanical and/or automated car parking systems that fall within the scope and purpose of this standard, a PCPSS report shall be submitted and is subject to approval by the fire official.
2. The report shall be prepared by a qualified individual, as defined in Section 4 of this standard.
3. The PCPSS submittal shall include the following:
4. A written statement acknowledging the applicability of this standard and signed by the AOR/EOR.
5. A written description of the proposed systems that fall within the scope and purpose of this standard.

B. Detailed Car Parking Systems Submittal (DCPSS)

1. For projects with mechanical and/or automated car parking systems that fall within the scope and purpose of this standard, a DCPSS report shall be submitted and is subject to approval by the fire official.
2. The report shall be prepared by a qualified individual, as defined in Section 4 of this standard.
3. The DCPS submittal shall include the following:
4. A detailed plan
5. A detailed report.
6. A product data submission that includes information on the products intended for use.

7. Between the detailed plan and detailed report, the submittal shall address all applicable sections of this standard.
8. Provide a letter prepared by each discipline potentially affected by the requirements of this Standard stating that they have reviewed the Mechanical and Automated Car Parking Technical Standard. A single letter signed by all disciplines is acceptable.

7. PERMIT TIMING

- A. The Preliminary Car Parking Systems Submittal shall be submitted prior to, or concurrent with building construction permits either as part of the construction permit or as a deferred submittal. Car stacking systems can dictate construction features that may not be addressed under the construction permit alone.
- B. The Detailed Car Parking Systems Submittal shall receive Fire Department approval prior to the issuance of the CMI building construction permit.

8. OTHER SUBMITTAL REQUIREMENTS

In addition to the information that is typically provided, the following details must be included in the Architectural/Civil, Electrical, Fire Alarm, Fire Sprinkler, and Fire Response Site Plan submittals.

- A. Provide a letter prepared by each design discipline potentially affected by the requirements of this Standard stating that their design satisfies the requirements of the Mechanical and Automated Car Parking Technical Standard. A single letter signed by all disciplines is acceptable. Any proposed deviations from the technical standard shall be clearly noted in this letter.
- B. Architectural/Civil Plan Submittal
 1. Clearly indicate the location and provide a description of the mechanical equipment.
 2. As part of the architectural/civil drawing submittal, provide dimensioned plans to clearly indicate all required access and aisle clearances have been met.
 3. Clearly indicate location of any required catwalks and/or ship ladders.
 4. Car stackers themselves may not be engineered to support ladders and catwalks. Consult your design professional regarding this requirement where applicable.
- C. Electrical Plan Submittal
 1. As part of the electrical plan submittals, provide sufficient detail on the plans to indicate any relevant requirements noted in this standard have been met.
 2. Provide relevant product cut sheets as applicable.
- D. Fire Alarm Plan Submittal
 1. As part of the fire alarm plan submittals, provide sufficient detail on the plans to indicate any relevant requirements noted in this standard have been met.
 2. Provide relevant product cut sheets as applicable.
- E. Fire Sprinkler Plan Submittal
 1. As part of the fire sprinkler plan submittals, provide sufficient detail on the plans to indicate any relevant requirements noted in this standard have been met.

2. Provide relevant product cut sheets as applicable.

F. Fire Response Site Plan Submittal

1. Clearly indicate location of any required fire department access features. (e.g. aisles, access lanes, etc.)
2. Clearly indicate location of any required catwalks and/or ship ladders.
3. Clearly indicate location of any fire protection hose valves near the Parking Storage Area.
4. Clearly indicate the location of all required e-stops.

Mechanical/Smoke Control Submittal

- A. Where manually operated smoke evacuation is required, a separate (FRI) permit is required for the review of manual smoke control features and calculations. This would be in addition to automatic CO detection and removal covered under the CMI construction permit for the parking garage.

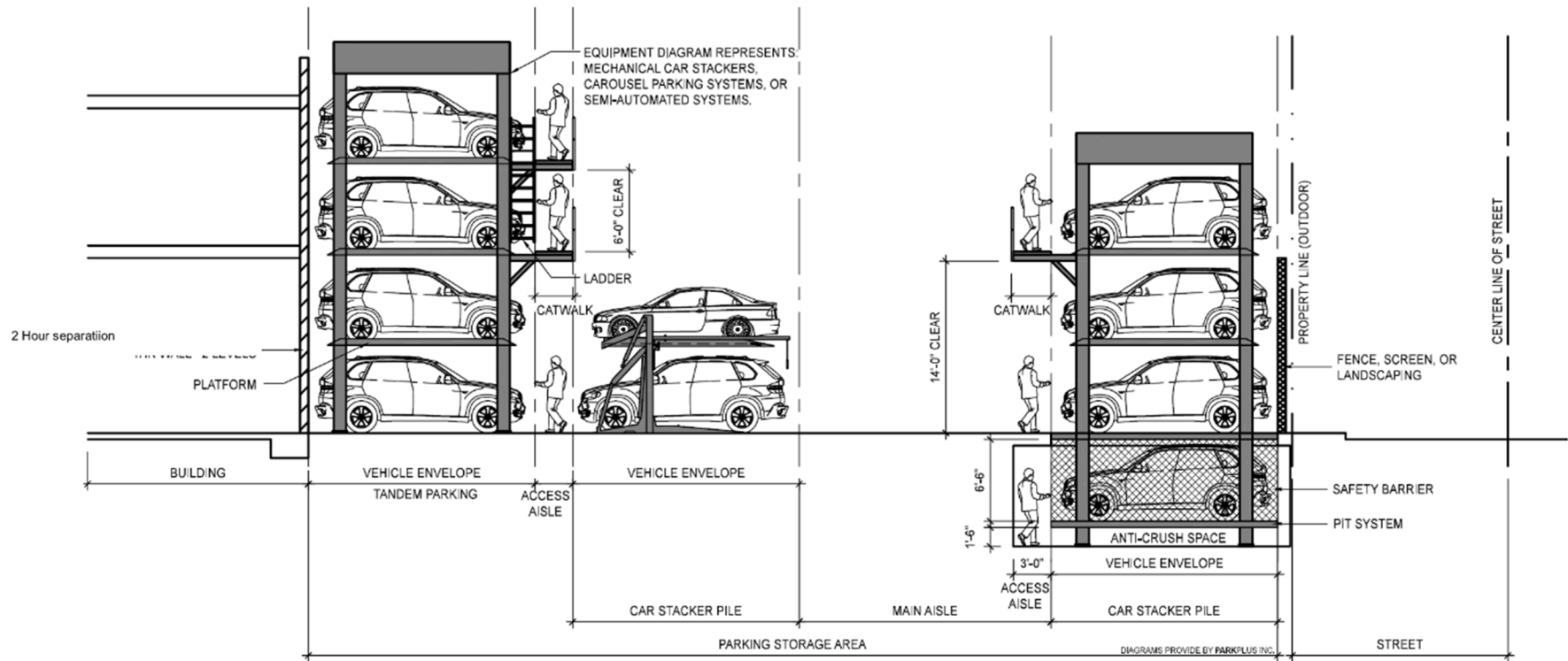
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APPENDIX A – EXAMPLE DIAGRAMS

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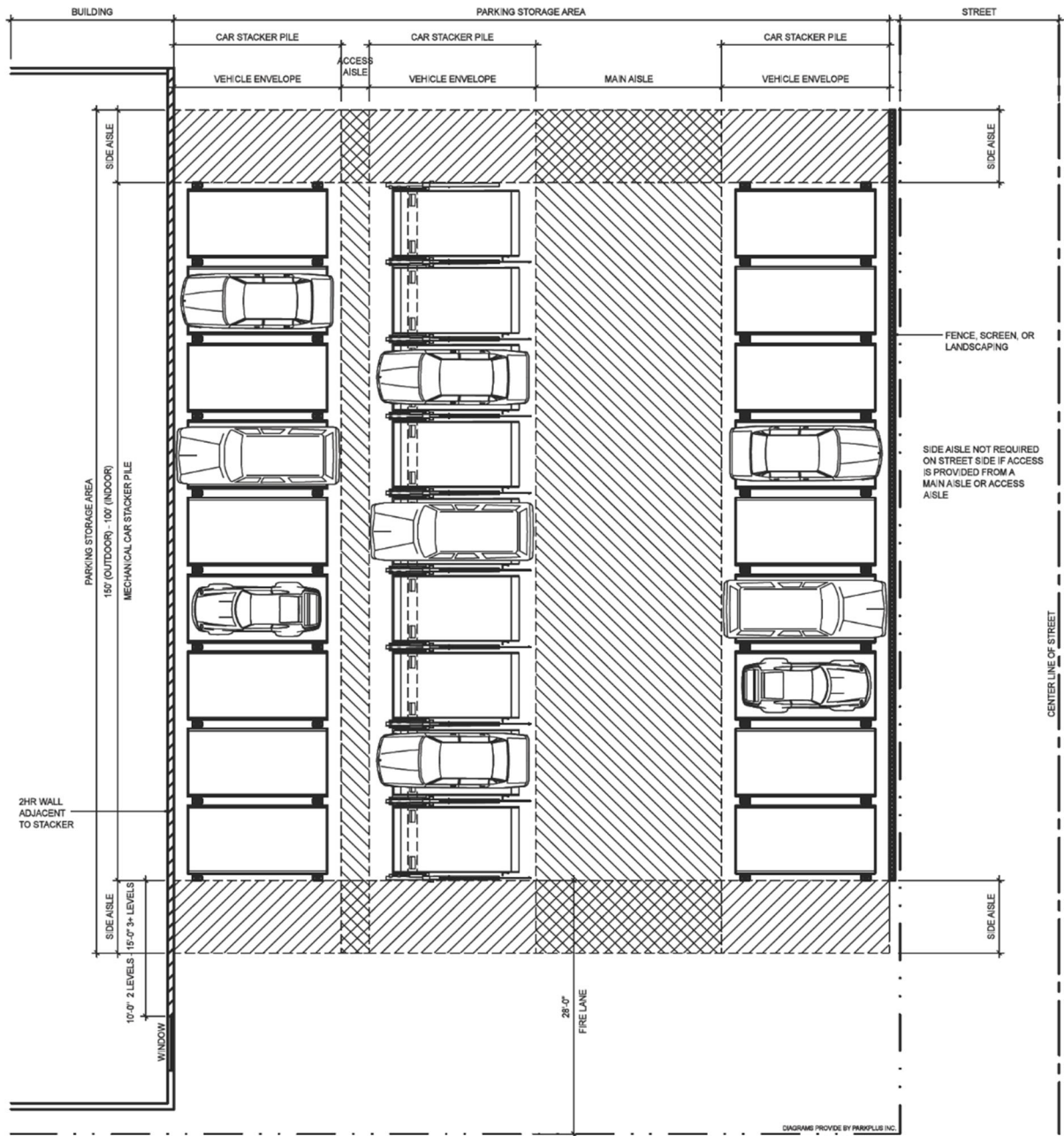
A.1 DIAGRAM 1A

DIAGRAM 1A



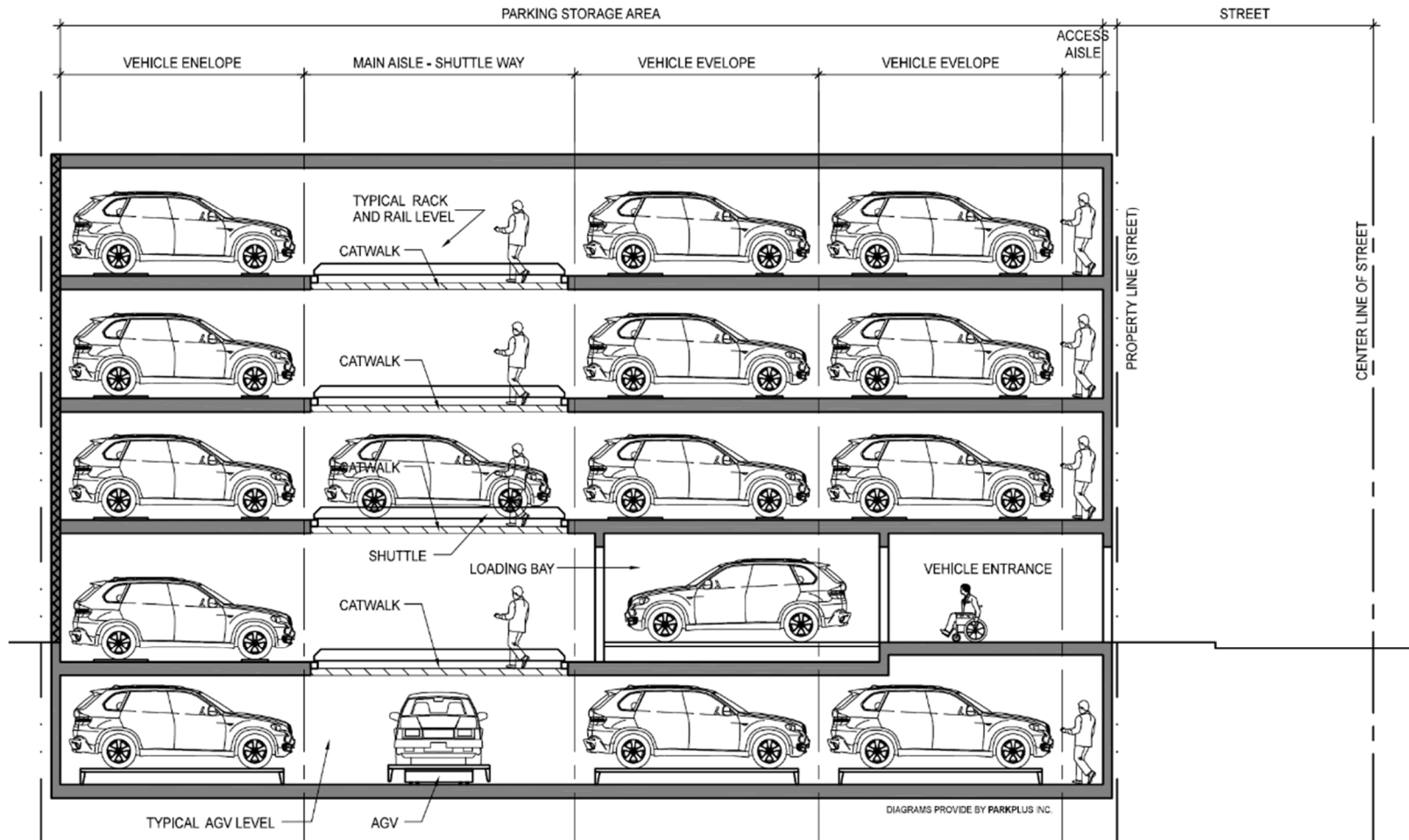
A.2 DIAGRAM 1B

DIAGRAM 1B



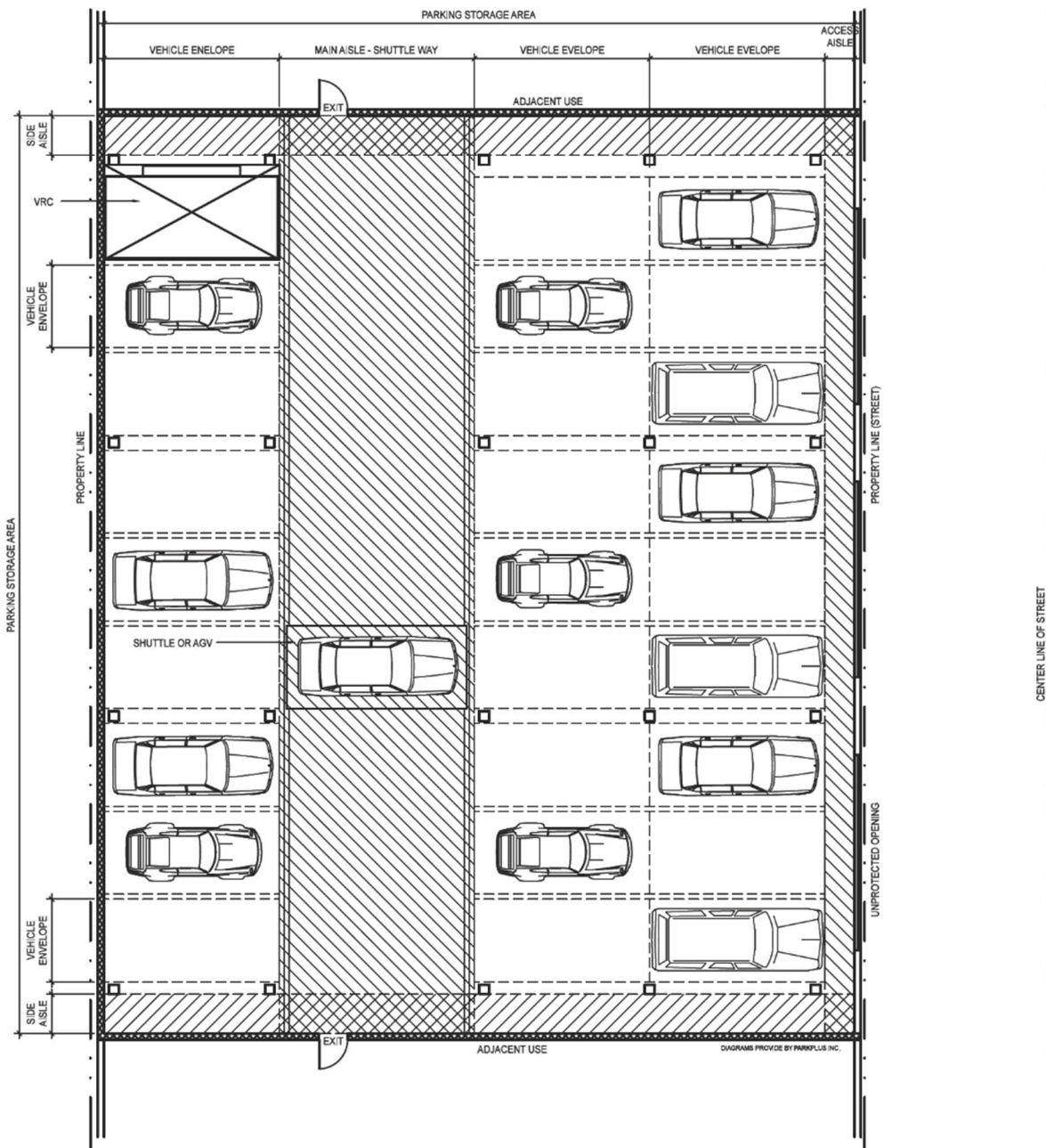
A.3 DIAGRAM 2A

DIAGRAM 2A



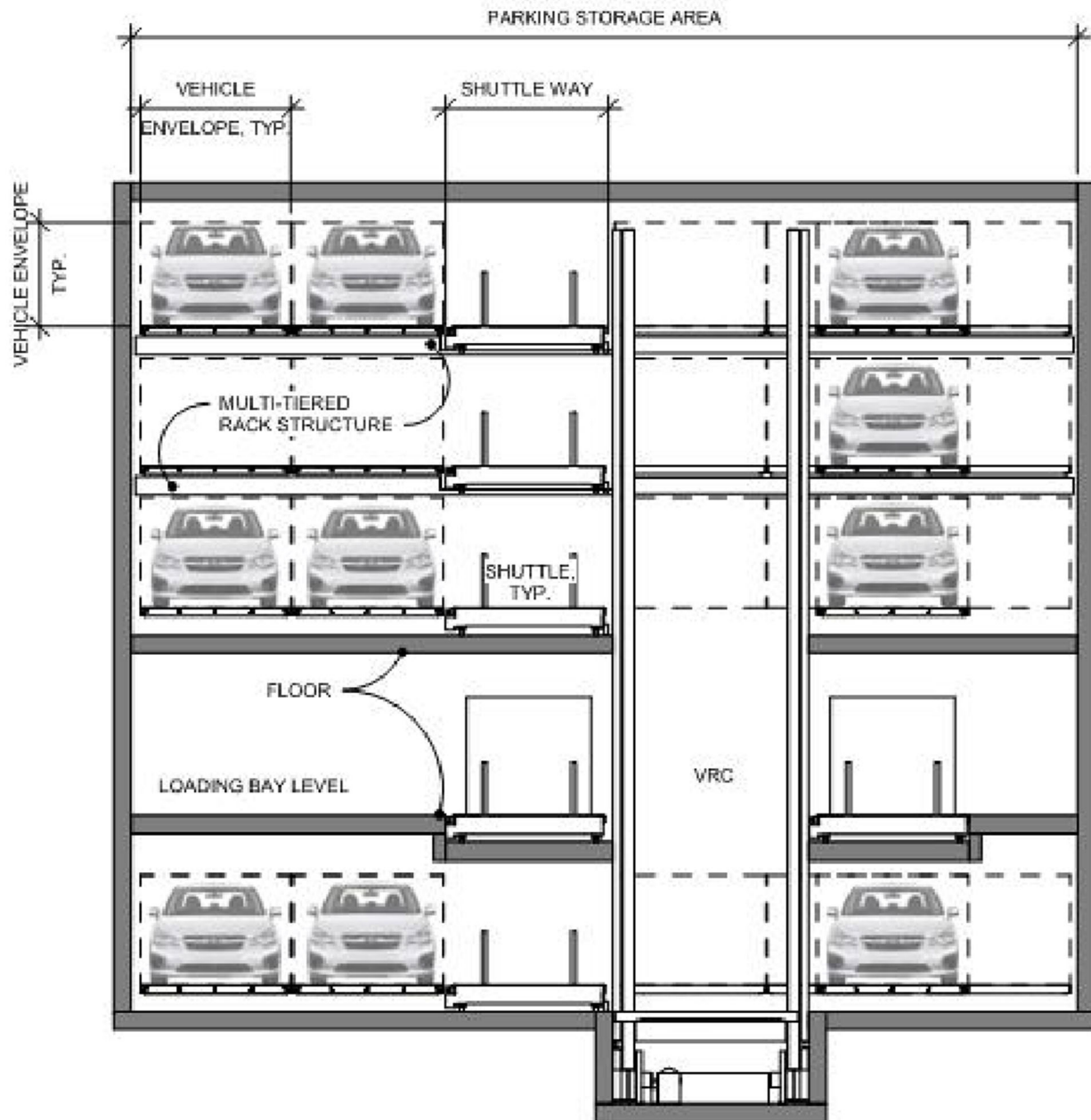
A.4 DIAGRAM 2B

DIAGRAM 2B



A.5 DIAGRAM 2C

DIAGRAM 2C



A.6 DIAGRAM 2D

DIAGRAM 2D

