Technical Memorandum

Date:	October 29, 2024
Project:	HWM24-0002 11359 SW Leveton Dr
To:	Tony Doran – Engineering Associate City of Tualatin – Engineering Division
From:	Consor, Emily Flock, PE
Reviewed By:	Brian Ginter, PE
Re:	Water System Capacity Analysis - Lam Tux Expansion, SW Leveton Dr

Introduction

The City of Tualatin requested evaluation of proposed expansion of Lam Tux facilities off SW Leveton Dr, east of SW 108th Ave. This memorandum presents the findings of this analysis for the City's use in assessing water system improvements necessary to meet fire flow and pressure requirements and proposed connection points to best suit City water system operations.

Background

The proposed development consists of approximately 424,000 square feet (sq. ft.) of industrial and office space in three separate buildings. The proposed development is located within the City's existing A-Level pressure zone and is served by the Tualatin Supply Main (TSM) and the A-2 Reservoir. There are multiple existing mains adjacent to the proposed development including an 18-inch diameter, high-pressure main on SW Leveton Dr; a 12-inch diameter, A-Level main on SW Leveton Dr; a 12-inch diameter, A-Level line on Quakenbush Ln; and a 16-inch diameter, A-Level line on SW Tualatin Rd. The high-pressure main on SW Leveton Dr is part of the TSM with a nominal hydraulic grade line of approximately 530 feet above mean sea level (msl). The existing A-Level operates at a nominal HGL of approximately 295 feet above msl.

The 12-inch diameter line on Quakenbush Ln is on private property. The City would like to eliminate public mains that are on private property where possible for access and maintenance purposes. Currently, the 12-inch diameter line provides domestic and fire flow to the JAE Oregon industrial property west of the proposed expansion. The existing Lam facilities do not have any connections to the 12-inch diameter line, but the proposed Lam Tux expansion plans add a service with significant water demand to this line. For City system access and operations, it is recommended the 12-inch diameter line on Quakenbush Ln be converted to a private line with metered connections to the 16-inch diameter main in SW Tualatin Rd. Subsequently, it is recommended the proposed Lam Tux expansion connect to the 16-inch diameter, A-Level line in SW Tualatin Rd rather than the 12-inch diameter line in Quakenbush Ln. **Figure 1** illustrates the proposed development site, existing water system infrastructure, and recommended expansion connections to the existing system.

Figure 1. Proposed Development Site and Existing Water System Infrastructure

Analysis and Findings

The City's water system hydraulic model was used to perform a hydraulic analysis of pressure and fire flow performance in the City's water system under maximum day demand (MDD) conditions with fire flow events evaluated at the site.

A summary of specific model conditions for this analysis is presented below.

- Demand Conditions: 2040 Maximum Day Demand
  - Proposed Lam Tux expansion demands:
    - 550 gpm domestic demand on 16-inch diameter main on SW Tualatin Rd
    - 26 gpm domestic demand on 18-inch diameter main on SW Leveton Dr (high-pressure)
- Fire Flow:
  - Fire flow for the development site is not proposed to change. Planning-level fire flow for industrial property is assumed to be 3,000 gpm from 18-inch diameter main on SW Leveton Dr.
  - Adjacent JAE Oregon industrial building is assumed to be fully sprinkled and have a fire flow requirement of 1,500 gpm per proposed site plan review memo from Tualatin Valley Fire and Rescue (TVFR) (Nov 2019, see Attachment A).

The residual pressures within the area influenced by the fire flow and domestic demands at the proposed development site meet or exceed the minimum pressure criteria of 25 pounds per square inch (PSI) as stated in the WMP during MDD conditions.

Based on the findings of this analysis, additional system improvements are not required to serve domestic and fire flows to the proposed development. However as described earlier, it is recommended the City convert the existing 12-inch diameter line in Quakenbush Ln to a privately-owned line to serve domestic and fire flow (configured to meet the City's Public Works Construction Code) for the JAE Oregon property and have the Lam Tux expansion facilities connect directly to the 16-inch diameter main (A-Level) in SW Tualatin Rd or the 18-inch diameter main (high-pressure) in SW Leveton Dr. Proposed plans for the Lam Tux expansion include replacing the 12-inch line in Quakenbush Ln and relocating a portion of the alignment to accommodate one of the proposed new buildings.

It is the developer's responsibility to size internal (private) fire and domestic mains for adequate service pressure, private hydrants and fire suppression sprinkler systems as these facilities are outside the scope of this analysis.

Please do not hesitate to contact us if you have any questions or comments in this regard. We would be happy to meet with you personally to discuss the findings presented in this memorandum.

Tualatin Valley Fire & Rescue

www.tvfr.com

November 12, 2019

Erin Engman
Associate Planner
City of Tualatin
18880 SW Martinazzi Avenue
Tualatin, Oregon 97062

Re: JAE Oregon
Tax Lot I.D: 2S122BA00200

Dear Erin,

Thank you for the opportunity to review the proposed site plan surrounding the above-named development project. These notes are provided regarding the plans received November 7, 2019 and are based on the current New Construction Guide version 4.2C. There may be more or less requirements needed based upon the final project design, however, Tualatin Valley Fire & Rescue will endorse this proposal predicated on the following criteria and conditions of approval.

FIRE APPARATUS ACCESS:

1. **FIRE APPARATUS ACCESS ROADS:** Access roads shall be provided for every facility, building, or portion of a building hereafter constructed or moved into or within the jurisdiction. **Exception:** Approved agricultural and equine structures complying with ORS 455.315 are not required to have fire apparatus access roads (see New Construction Guide Appendix C). Access roads are not required to be modified for commercial buildings that undergo a change in occupancy, change in use, or conversion from agricultural or equine exempt to non-exempt unless there is a change to the structure's square footage or building footprint. (OFC 503.1.1)

2. **FIRE ACCESS ROAD DISTANCE FROM BUILDINGS:** The access shall extend to within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. (OFC 503.1.1)

3. **DEAD ENDS AND ROADS IN EXCESS OF 150 FEET (TURNAROUNDS):** Dead end fire apparatus access roads or roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams of approved turnarounds can be found in the corresponding guide that is located at http://www.tvfr.com/DocumentCenter/View/1296. (OFC 503.2.5 & Figure D103.1)

   Plans indicate a hammerhead turnaround. Please provide dimensions on the turnaround.

4. **FIRE APPARATUS ACCESS ROAD WIDTH AND VERTICAL CLEARANCE:** Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants (OFC D103.1)) and an unobstructed vertical clearance of not less than 13 feet 6 inches. (OFC 503.2.1 & D103.1)

5. **NO PARKING SIGNS:** Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and

in turnarounds as needed. Signs shall read “NO PARKING - FIRE LANE” and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background. (OFC D103.6)

See Sheet A0.1 for locations of fire lanes.

6. **NO PARKING:** Parking on emergency access roads shall be as follows (OFC D103.6.1-2):
   1. 20-26 feet road width – no parking on either side of roadway
   2. 26-32 feet road width – parking is allowed on one side
   3. Greater than 32 feet road width – parking is not restricted

   Note: For specific widths and parking allowances, contact the local municipality.

   See Sheet A0.1 for locations of fire lanes.

7. **PAINTED CURBS:** Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked “NO PARKING FIRE LANE” at 25 foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background (or as approved). (OFC 503.3)

   See Sheet A0.1 for locations of fire lanes.

8. **FIRE APPARATUS ACCESS ROADS WITH FIRE HYDRANTS:** Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant. (OFC D103.1)

9. **SURFACE AND LOAD CAPACITIES:** Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel load) and 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested. (OFC 503.2.3)

10. **TURNING RADIUS:** The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point. (OFC 503.2.4 & D103.3)

    Please note turning radius on plans.

11. **ACCESS ROAD GRADE:** Fire apparatus access roadway grades shall not exceed 15%. Alternate methods and materials may be available at the discretion of the Fire Marshal (for grade exceeding 15%).

12. **ANGLE OF APPROACH/GRADE FOR TURNAROUNDS:** Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off. (OFC 503.2.7 & D103.2)

13. **GATES:** Gates securing fire apparatus roads shall comply with all of the following (OFC D103.5, and 503.6):
    1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width).
    2. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved.
    3. Electric gates shall be equipped with a means for operation by fire department personnel
    4. Electric automatic gates shall comply with ASTM F 2200 and UL 325.

14. **ACCESS DURING CONSTRUCTION:** Approved fire apparatus access roadways shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. Temporary address signage shall also be provided during construction. (OFC 3309 and 3310.1)

15. **TRAFFIC CALMING DEVICES:** Shall be prohibited on fire access routes unless approved by the Fire Marshal. (OFC 503.4.1). Traffic calming measures linked here: http://www.tvfr.com/DocumentCenter/View/1578

FIREFIGHTING WATER SUPPLIES:

16. **COMMERCIAL BUILDINGS – REQUIRED FIRE FLOW:** The minimum fire flow and flow duration shall be determined in accordance with OFC Table B105.2. The required fire flow for a building shall not exceed the available GPM in the water delivery system at 20 psi residual. (OFC B105.3)
    Note: OFC B106, Limiting Fire-Flow is also enforced, except for the following:
    - The maximum needed fire flow shall be 3,000 GPM, measured at 20 psi residual pressure.
    - Tualatin Valley Fire & Rescue does not adopt Occupancy Hazards Modifiers in section B105.4-B105.4.1

    An assumption of a Type IIB construction type was made. Per Oregon Fire Code this building will require a fire flow of 4,000GPM. If the building will be fully sprinklered then a 75% reduction in required fire flow is allowed. With fire sprinklers a fire flow of 1,500GPM would be required.

17. **FIRE FLOW WATER AVAILABILITY:** Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project. (OFC Appendix B)

    Provide documentation of fire hydrant flow test or modeling.

18. **WATER SUPPLY DURING CONSTRUCTION:** Approved firefighting water supplies shall be installed and operational prior to any combustible construction or storage of combustible materials on the site. (OFC 3312.1)

FIRE HYDRANTS:

19. **FIRE HYDRANTS – COMMERCIAL BUILDINGS:** Where a portion of the building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided. (OFC 507.5.1)
    - This distance may be increased to 600 feet for buildings equipped throughout with an approved automatic sprinkler system.
    - The number and distribution of fire hydrants required for commercial structure(s) is based on Table C105.1, following any fire-flow reductions allowed by section B105.3.1. Additional fire hydrants may be required due to spacing and/or section 507.5 of the Oregon Fire Code.

20. **FIRE HYDRANT(S) PLACEMENT:** (OFC C104)
    - Existing hydrants in the area may be used to meet the required number of hydrants as approved. Hydrants that are up to 600 feet away from the nearest point of a subject building that is protected with fire sprinklers may contribute to the required number of hydrants. (OFC 507.5.1)
    - Hydrants that are separated from the subject building by railroad tracks shall not contribute to the required number of hydrants unless approved by the Fire Marshal.
    - Hydrants that are separated from the subject building by divided highways or freeways shall not contribute to the required number of hydrants. Heavily traveled collector streets may be considered when approved by the Fire Marshal.

- Hydrants that are accessible only by a bridge shall be acceptable to contribute to the required number of hydrants only if approved by the Fire Marshal.

21. **PRIVATE FIRE HYDRANT IDENTIFICATION:** Private fire hydrants shall be painted red in color. Exception: Private fire hydrants within the City of Tualatin shall be yellow in color. (OFC 507)

22. **FIRE HYDRANT DISTANCE FROM AN ACCESS ROAD:** Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal. (OFC C102.1)

23. **REFLECTIVE HYDRANT MARKERS:** Fire hydrant locations shall be identified by the installation of blue reflective markers. They shall be located adjacent and to the side of the center line of the access roadway that the fire hydrant is located on. In the case that there is no center line, then assume a center line and place the reflectors accordingly. (OFC 507)

24. **PHYSICAL PROTECTION:** Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided. (OFC 507.5.6 & OFC 312)

25. **CLEAR SPACE AROUND FIRE HYDRANTS:** A 3 foot clear space shall be provided around the circumference of fire hydrants. (OFC 507.5.5)

26. **FIRE DEPARTMENT CONNECTION (FDC) LOCATIONS:** FDCs shall be located within 100 feet of a fire hydrant (or as approved). Hydrants and FDC's shall be located on the same side of the fire apparatus access roadway or drive aisle, fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved. (OFC 912.2.1 & NFPA 13)
    - Fire department connections (FDCs) shall normally be located remotely and outside of the fall-line of the building when required. FDCs may be mounted on the building they serve, when approved.
    - FDCs shall be plumbed on the system side of the check valve when sprinklers are served by underground lines also serving private fire hydrants.

Indicate location of FDC on plans if the building will be sprinklered.

BUILDING ACCESS AND FIRE SERVICE FEATURES

27. **FIRE PROTECTION EQUIPMENT IDENTIFICATION:** Rooms containing controls to fire suppression and detection equipment shall be identified as "Fire Control Room." Signage shall have letters with a minimum of 4 inches high with a minimum stroke width of 1/2 inch, and be plainly legible, and contrast with its background. (OFC 509.1)

28. **PREMISES IDENTIFICATION:** New and existing buildings shall have approved address numbers; building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property, including monument signs. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. (OFC 505.1)

If you have questions or need further clarification, please feel free to contact me at 503-259-1419.

Sincerely,

Tom Mooney

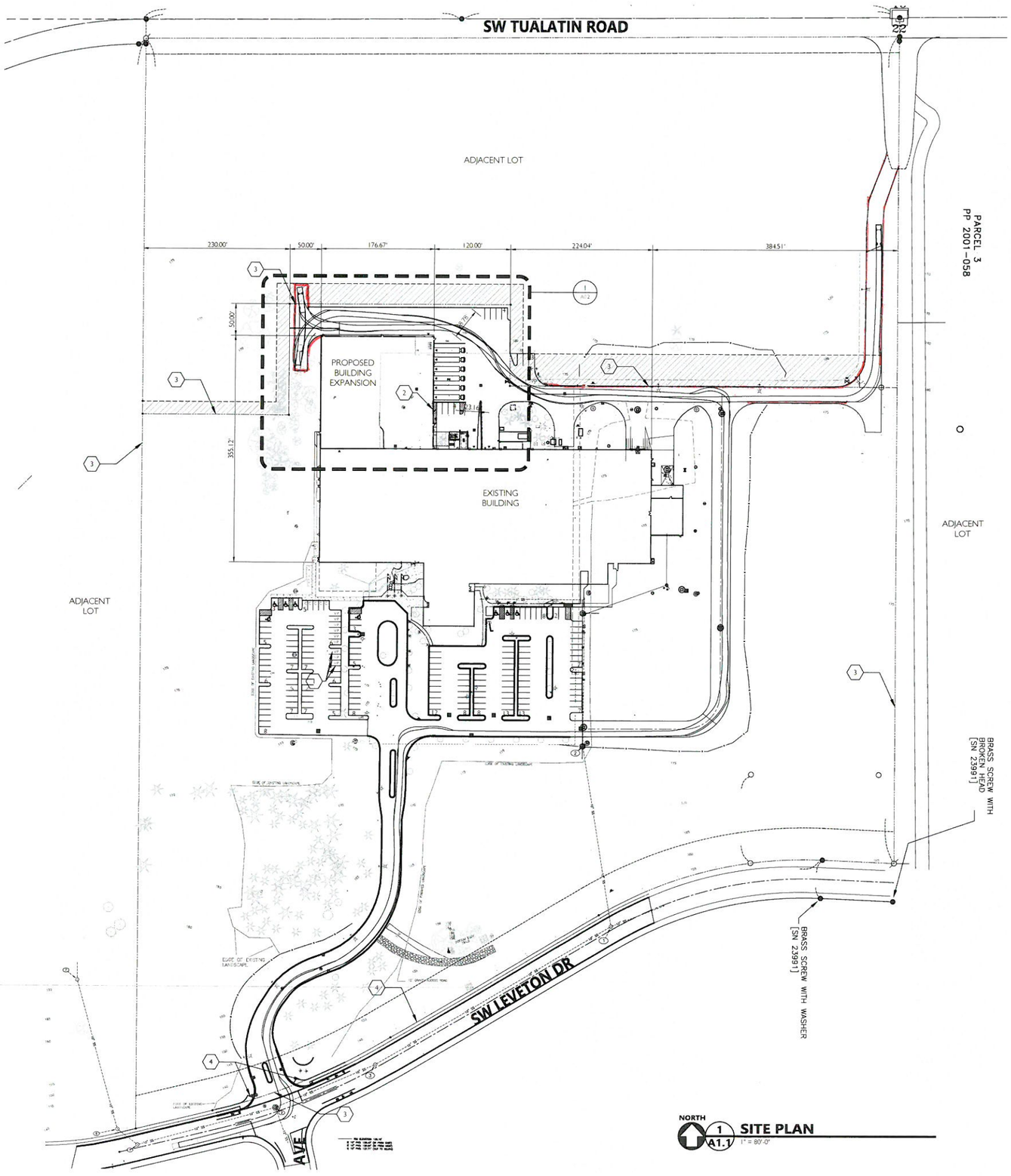
Tom Mooney

Deputy Fire Marshal II

Thomas.mooney@tvfr.com

Cc: File
City of Tualatin

A full copy of the New Construction Fire Code Applications Guide for Commercial and Multi-Family Development is available at http://www.tvfr.com/DocumentCenter/View/1296



NORTH 1 A1.1 **SITE PLAN** 1" = 80'-0"

GENERAL NOTES

- CONTRACTOR SHALL VERIFY AND CONFIRM EXISTING CONDITIONS SHOWN OR IMPLIED ON DRAWINGS PRIOR TO START OF CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.
- TYPICAL CURB RADIUS = 3' UNLESS NOTED OTHERWISE.
- PRIOR TO SITE CLEARING, GRADING OR CONSTRUCTION IN THE VEGETATED CORRIDOR, WATER QUALITY AND SENSITIVE AREAS SHALL BE SURVEYED, STAKED AND TEMPORARILY FENCED. VEGETATED CORRIDOR SHALL REMAIN FENCED AND UNDISTURBED DURING CONSTRUCTION.

LEGAL DESCRIPTION

TAX LOT: 2S122BA00200 - 2010-009 PARTITION PLAT LOT 2

QUARTER SECTION,
TOWNSHIP, RANGE: NE 1/4 NW 1/4 SECTION 22 T2S R1W W.M.

ADDRESS: 11555 SW LEVETON DRIVE
TUALATIN, OR 97062
WASHINGTON COUNTY OREGON

SITE AREA: 2.485 ACRES

BUILDING AREA:
EXISTING
1ST FLOOR 119,814 SF
MEZZANINE 6,882 SF
NEW 1ST FLOOR 31,211 SF
TOTAL: 151,021 SF

LANDSCAPE AREA:
REQUIRED: 162,343.5 SF (35%)
PROPOSED: 611,957 SF (81.2%)

PARKING PROVIDED:

TYPE	SIZE	# PROVIDED
STANDARD	9' X 18.5'	164 STALLS
COMPACT	8.5' X 15'	5 STALLS
H/C ACCESSIBLE	9' X 18.5'	8 STALLS
TOTAL PROVIDED PARKING:		177 STALLS

KEYNOTES

1. NEW VANPOOL PARKING
2. NEW BIKE PARKING INSIDE BUILDING
3. PROPERTY LINE
4. REBUILD (E) SIDEWALK FOR ADA ACCESSIBILITY COMPLIANCE
5. FIRE TRUCK TURN AROUND AREA

LEGEND

- FIRE HYDRANT
- LIGHT POLE
- CATCH BASIN
- (S) SANITARY SEWER LINE
- (W) SANITARY LINE
- DOCK HIGH
- DRIVE IN
- ACCESSIBLE PARKING
- C COMPACT VEHICLE PARKING
- V.P. VANPOOL PARKING
- (E) EXISTING
- DS DOWNSPOUT
- (E) CONIFEROUS TREE
- (E) DECIDUOUS TREE
- SIGN POLE
- PROPERTY BOUNDARY
- PROPERTY EASEMENT
- MANEUVERING, LANDSCAPE AND SLOPE EASEMENT

PRELIMINARY PLAN ONLY-NOT FOR CONSTRUCTION

ISSUED/DATE
1 09.13.2019 ARCHITECTURAL REVIEW SET
2

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SITE PLAN
A0.1
JOB NO. 19017.001