



LAND USE PRE-APPLICATION CONFERENCE

Thursday, May 19, 2016

City Hall
22500 Salamo Road

Willamette Conference Room

1:30 pm Proposed new fire station (Station 55)

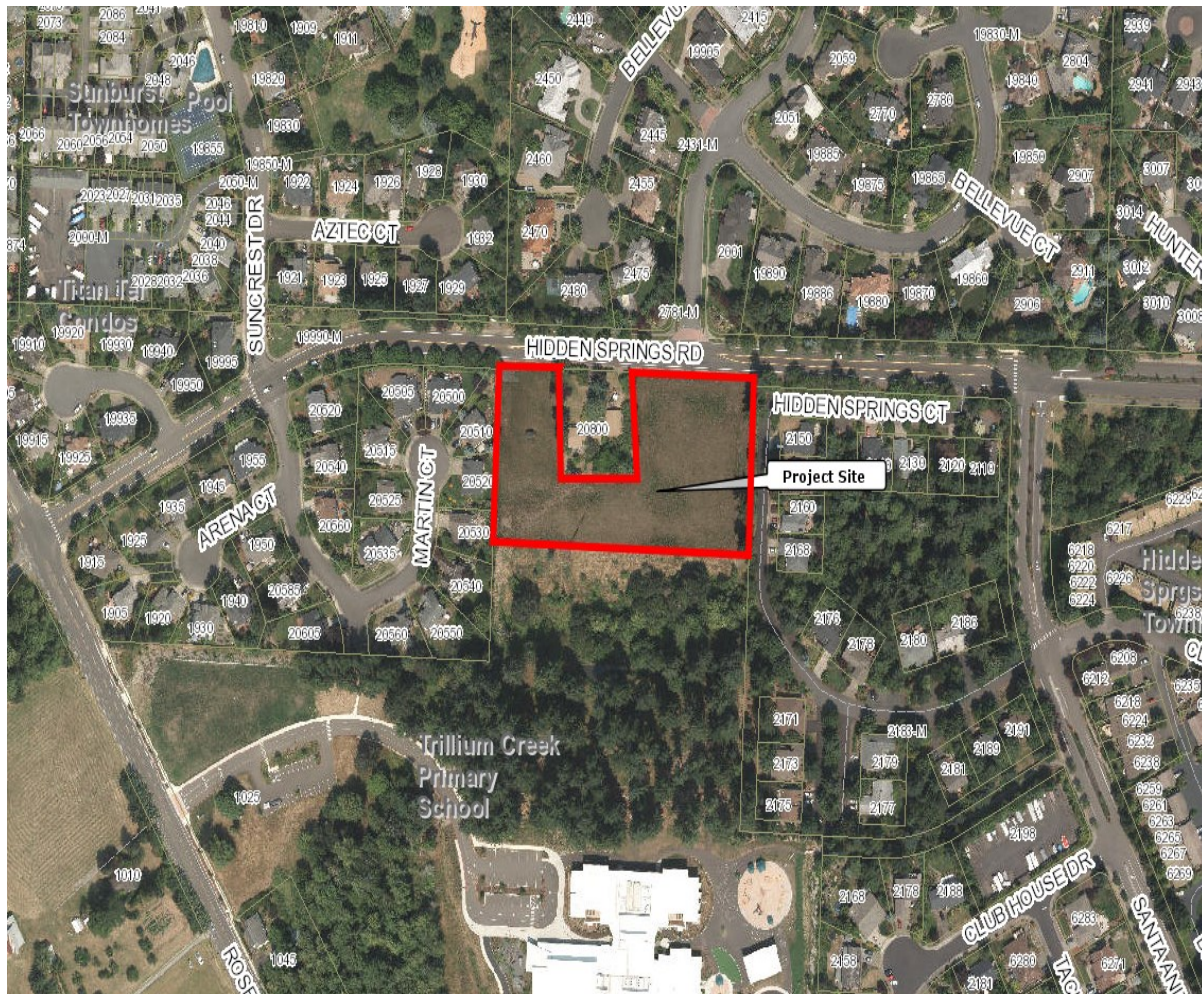
Applicant: Siobhan Kirk, TVF&R

Subject Property Address: surrounding 20800 Hidden Springs Road

Neighborhood Assn: Hidden Springs

Planner: Peter Spir

Project #: PA-16-06





PRE-APPLICATION CONFERENCE

THIS SECTION FOR STAFF COMPLETION		
CONFERENCE DATE:	5-19-16	PROJECT #:
	TIME: 1:30pm	PA-16-06
STAFF CONTACT:	Peter Spiv	FEE:
		\$1000-

Pre-application conferences occur on the first and third Thursdays of each month. In order to be scheduled for a conference, this form including property owner's signature, the pre-application fee, and accompanying materials must be submitted at least 14 days in advance of the conference date. Twenty-four hour notice is required to reschedule.

Address of Subject Property (or map/tax lot): 21E23CD12301 20800 Hidden Springs Rd,

Brief Description of Proposal: New Tualatin Valley Fire & Rescue station (Station 55)

Applicant's Name: Siobhan Kirk, Tualatin Valley Fire & Rescue
Mailing Address: 11945 SW 70th Avenue Tigard, Oregon 97223
Phone No: (503) 259-1219 Email Address: siobhan.kirk@tvfr.com

Please attach additional materials relating to your proposal including a site plan on paper up to 11 x 17 inches in size depicting the following items:

- North arrow
- Scale
- Property dimensions
- Streets abutting the property
- Conceptual layout, design and/or building elevations
- Easements (access, utility, all others)
- Access to and from the site, if applicable
- Location of existing trees, highly recommend a tree survey
- Location of creeks and/or wetlands, highly recommend a wetland delineation
- Location of existing utilities (water, sewer, etc.)

Please list any questions or issues that you may have for city staff regarding your proposal:
Access points to Hidden Springs Rd. / Natural Resource requirements / pedestrian connections

By my signature below, I grant city staff right of entry onto the subject property in order to prepare for the pre-application conference.

Siobhan Kirk, Tualatin Valley Fire & Rescue 4-28-2016
Property owner's signature Date

Property owner's mailing address (if different from above)

Memorandum

Date: May 3, 2016
To: West Linn Planning Department
From: Frank Angelo, Principal
cc: Siobhan Kirk, TVF&R
Bruce Baldwin, AKS Engineering
Todd Mobley, Lancaster Engineering
Jeff Hope, AMA
Re: TVF&R Station 55 Pre-Application Conference – Applicant Questions

Background

As we previously discussed with West Linn staff, the TVF&R Station 55 site (Hidden Springs) is zoned R-10. A Fire Station is allowed as a Conditional Use (listed as a Public Safety Facility use – Code Section 11.060.3). This will require a hearing before the West Linn Planning Commission. The land use application will address, at a minimum, the following sections of the Code:

- Section 55 Design Review
- Section 60 Conditional Uses

A Neighborhood Meeting will be required (Section 99.038) because non-residential uses over 1,500 square feet are required to conduct a Neighborhood Meeting. We have contacted the Hidden Springs Neighborhood Association and our meeting will be held on Tuesday, June 21, 2016 at the HSNA monthly meeting. We are in the process of preparing the required property / site notices and will mail them out and post the site in time to meet the City's requirements.

Pre-Application Conference Questions

We have provided the required information for the Pre-Application Conference – site plan, elevations, draft traffic report, existing conditions, etc... In addition to the standard questions related to development requirements and City review procedures, we have the following questions that we would like to discuss with staff at the Pre-Application Conference:

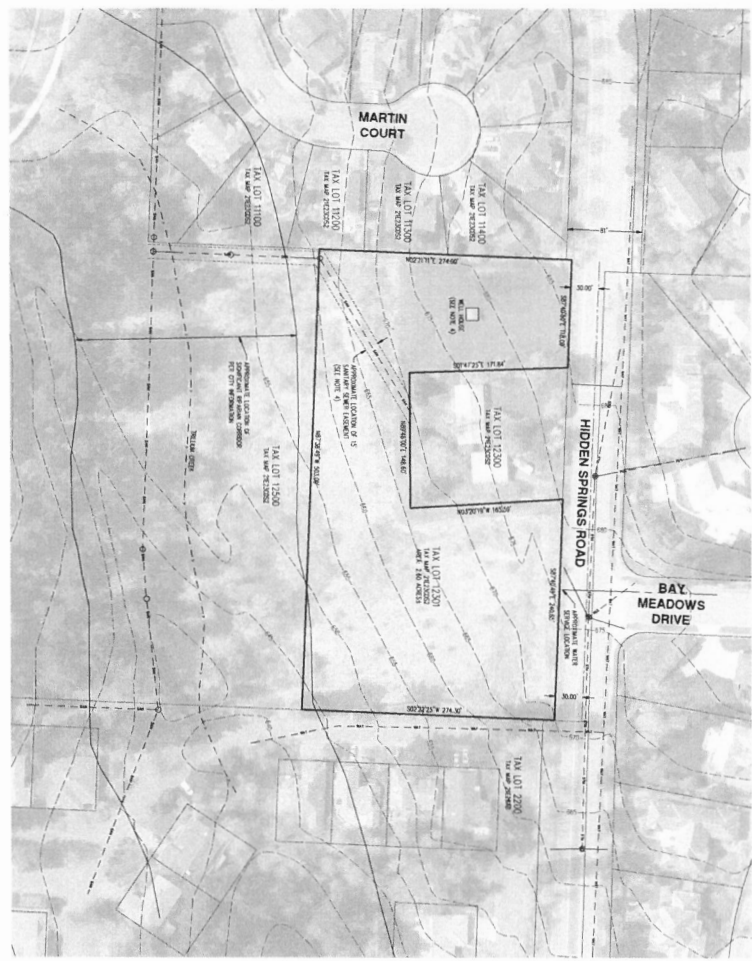
1. We would like to confirm that the site access locations are acceptable.
2. Please confirm what improvements or right-of-way dedications will be required on Hidden Springs Road.
3. Please confirm that the setbacks shown are correct.
4. Will the eaves of the buildings be allowed within the building setbacks?
5. Will retaining walls be allowed within the building setbacks?
6. Is there a maximum height restriction for retaining walls? If so, are there different requirements for walls within and outside of the building setbacks?



7. Please confirm the parking requirements for the development.
8. Are there any known availability/capacity constraints/issues with utilities/services (i.e. sanitary sewer, water, stormwater, etc.)?
9. Is the stormwater facility discharge pipe considered public or private? An easement over the adjacent property to the south will be needed for stormwater discharge. Is this to be a public or private easement?
10. The school district owns the adjacent property to the south and previously completed a wetland delineation. The DSL wetland delineation concurrence has expired. Will the City still allow us to use this delineation for the purposes of our project? At the time the school district developed, the wetland buffer requirements were 50' which is what the school district provided as part of their project. It appears that the City has since changed the buffer requirements to 65'. Since the resource is on the school district property and the buffer was previously provided, does that stand for our project or do we need to provide an additional 15' of buffer? Please confirm wetland buffer requirements.
11. Are there any other environmental zones or overlays for this property?
12. Stormwater discharge pipe will need to be located in a portion of the wetland buffer. This will necessitate temporary construction impacts to install the pipe, and a small permanent impact for rip-rap outlet protection. Please confirm that this is acceptable, what the permitting requirements are, any mitigation, etc.
13. Please confirm whether on-site stormwater detention will be required for this project.
14. Are there any City access/easement requirements for the public sanitary sewer manhole located in the SW corner of the property?
15. Please let us know if there are any other issues or site constraints that you are aware of or any special studies or reports that will be required for this development application.

Thank you and we look forward to meeting with staff at the Pre-Application Conference. If you have any questions prior to the Conference, please contact me at 503-227-3664.

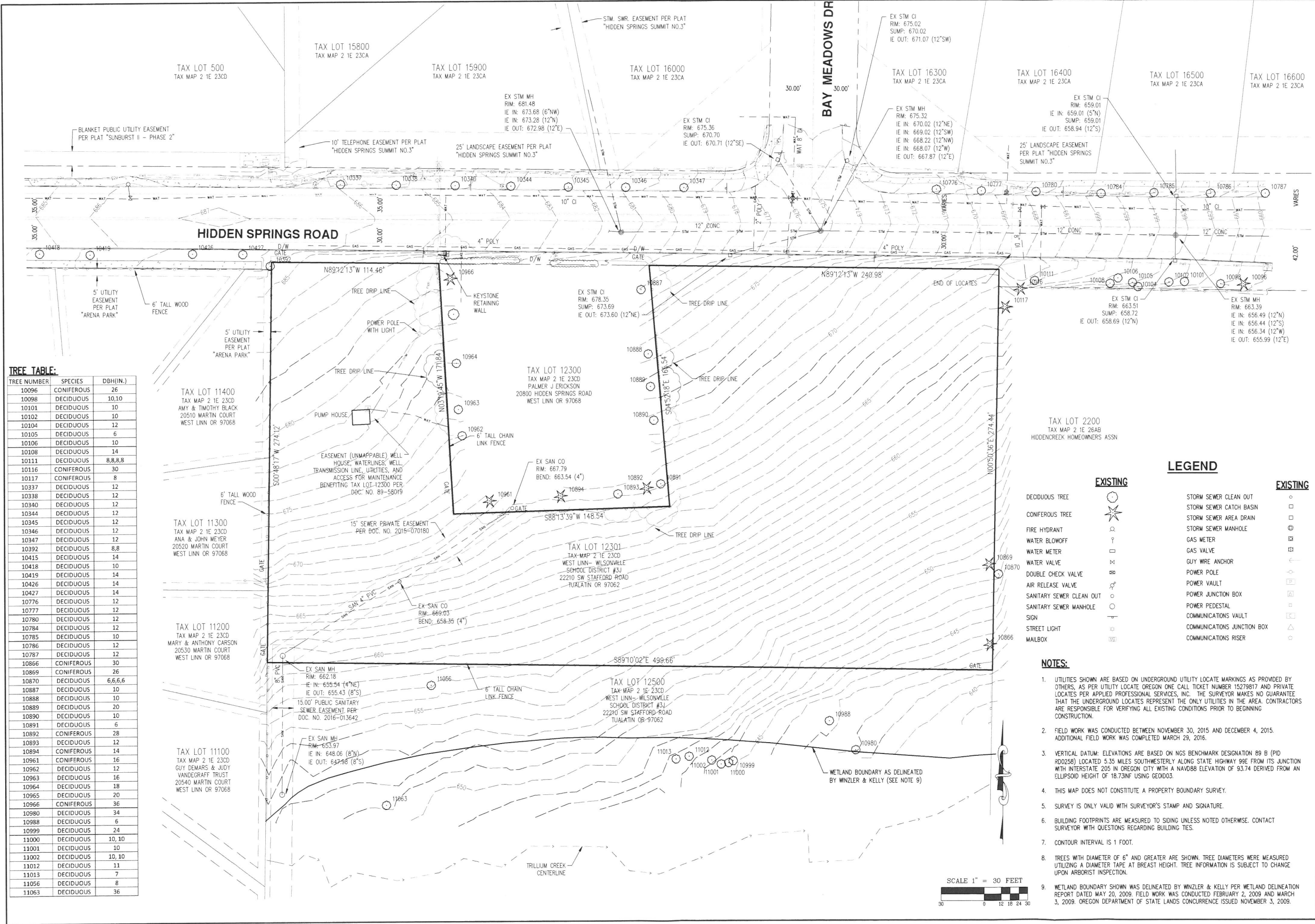
Attachments: Tax Map
Existing Conditions Figure
Site Plan
Building Elevations
Draft Traffic Report



- NOTES**
1. THIS PRELIMINARY MAP IS FOR INFORMATIONAL PURPOSES ONLY AND DOES NOT CONSTITUTE A GUARANTEE OF ACCURACY.
 2. THE INFORMATION ON THIS MAP IS BASED ON THE INFORMATION PROVIDED BY THE CLIENT AND IS NOT TO BE USED FOR ANY OTHER PURPOSES.
 3. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 4. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.
 5. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AGENCIES.



<p>PROJECT NO. _____</p> <p>DATE: _____</p> <p>SCALE: 475/1</p> <p>SHEET: 01</p>	<p>PRELIMINARY FEASIBILITY BASE MAP</p>	<p>TVFR STATION 55 ROSEMONT</p> <p>WEST LINN OREGON</p>	<p>AKS</p> <p>AKS ENGINEERING & FORESTRY, LLC 1000 S. W. 10TH AVE. SUITE 100 SEASIDE, OREGON 97138 P: 503.648.8752 WWW.AKSENG.COM</p> <p>ENGINEERING • SURVEYING • NATURAL RESOURCES FORESTRY • PLANNING • LANDSCAPE ARCHITECTURE</p>
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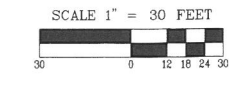
TREE TABLE:

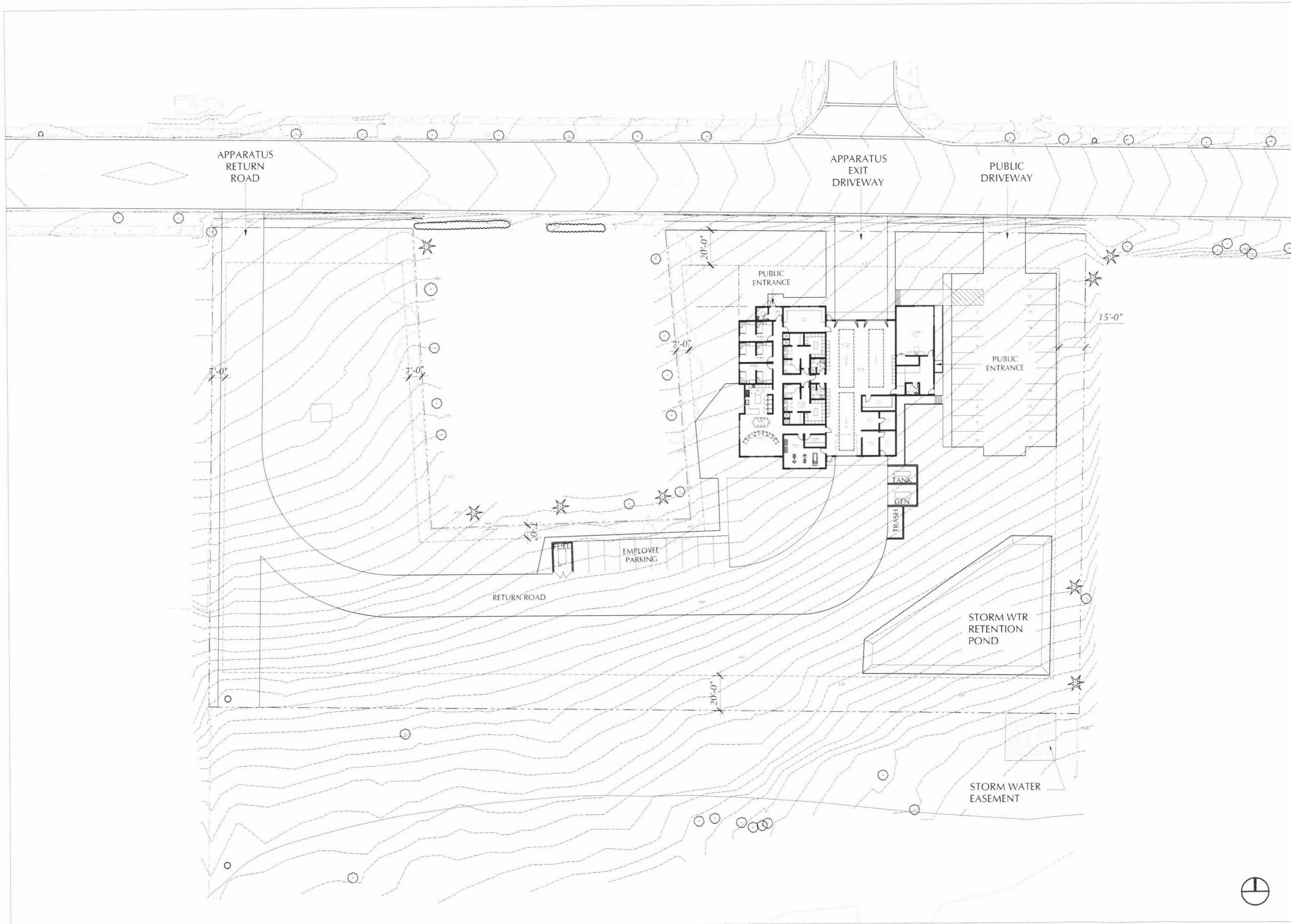
TREE NUMBER	SPECIES	DBH(IN.)
10096	CONIFEROUS	26
10098	DECIDUOUS	10,10
10101	DECIDUOUS	10
10102	DECIDUOUS	10
10104	DECIDUOUS	12
10105	DECIDUOUS	6
10106	DECIDUOUS	10
10108	DECIDUOUS	14
10111	DECIDUOUS	8,8,8,8
10116	CONIFEROUS	30
10117	CONIFEROUS	8
10337	DECIDUOUS	12
10338	DECIDUOUS	12
10340	DECIDUOUS	12
10344	DECIDUOUS	12
10345	DECIDUOUS	12
10346	DECIDUOUS	12
10347	DECIDUOUS	12
10392	DECIDUOUS	8,8
10415	DECIDUOUS	14
10418	DECIDUOUS	10
10419	DECIDUOUS	14
10426	DECIDUOUS	14
10427	DECIDUOUS	14
10776	DECIDUOUS	12
10777	DECIDUOUS	12
10780	DECIDUOUS	12
10784	DECIDUOUS	12
10785	DECIDUOUS	10
10786	DECIDUOUS	12
10787	DECIDUOUS	12
10866	CONIFEROUS	30
10869	CONIFEROUS	26
10870	DECIDUOUS	6,6,6,6
10887	DECIDUOUS	10
10888	DECIDUOUS	10
10889	DECIDUOUS	20
10890	DECIDUOUS	10
10891	DECIDUOUS	6
10892	CONIFEROUS	28
10893	DECIDUOUS	12
10894	CONIFEROUS	14
10961	CONIFEROUS	16
10962	DECIDUOUS	12
10963	DECIDUOUS	16
10964	DECIDUOUS	18
10965	DECIDUOUS	20
10966	CONIFEROUS	36
10980	DECIDUOUS	34
10988	DECIDUOUS	6
10999	DECIDUOUS	24
11000	DECIDUOUS	10, 10
11001	DECIDUOUS	10
11002	DECIDUOUS	10, 10
11012	DECIDUOUS	11
11013	DECIDUOUS	7
11056	DECIDUOUS	8
11063	DECIDUOUS	36


LEGEND

EXISTING		DECIDUOUS TREE		STORM SEWER CLEAN OUT
	CONIFEROUS TREE		STORM SEWER CATCH BASIN	
	FIRE HYDRANT		STORM SEWER AREA DRAIN	
	WATER BLOWOFF		STORM SEWER MANHOLE	
	WATER METER		GAS METER	
	WATER VALVE		GAS VALVE	
	DOUBLE CHECK VALVE		GUY WIRE ANCHOR	
	AIR RELEASE VALVE		POWER POLE	
	SANITARY SEWER CLEAN OUT		POWER VAULT	
	SANITARY SEWER MANHOLE		POWER JUNCTION BOX	
	SIGN		POWER PEDESTAL	
	STREET LIGHT		COMMUNICATIONS VAULT	
	MAILBOX		COMMUNICATIONS JUNCTION BOX	
			COMMUNICATIONS RISER	

- NOTES:**
- UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS, AS PER UTILITY LOCATE OREGON ONE CALL TICKET NUMBER 15279017, AND PRIVATE LOCATES PER APPLIED PROFESSIONAL SERVICES, INC. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
 - FIELD WORK WAS CONDUCTED BETWEEN NOVEMBER 30, 2015 AND DECEMBER 4, 2015. ADDITIONAL FIELD WORK WAS COMPLETED MARCH 29, 2016.
 - VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS BENCHMARK DESIGNATION 89 B (PID RD0258) LOCATED 5.35 MILES SOUTHWESTERLY ALONG STATE HIGHWAY 99E FROM ITS JUNCTION WITH INTERSTATE 205 IN OREGON CITY WITH A NAVD88 ELEVATION OF 93.74 DERIVED FROM AN ELLIPSOID HEIGHT OF 18.73M USING GEOID03.
 - THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
 - SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
 - BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
 - CONTOUR INTERVAL IS 1 FOOT.
 - TREES WITH DIAMETER OF 6" AND GREATER ARE SHOWN. TREE DIAMETERS WERE MEASURED UTILIZING A DIAMETER TAPE AT BREAST HEIGHT. TREE INFORMATION IS SUBJECT TO CHANGE UPON ARBORIST INSPECTION.
 - WETLAND BOUNDARY SHOWN WAS DELINEATED BY WINZLER & KELLY PER WETLAND DELINEATION REPORT DATED MAY 20, 2009. FIELD WORK WAS CONDUCTED FEBRUARY 2, 2009 AND MARCH 3, 2009. OREGON DEPARTMENT OF STATE LANDS CONCURRENCE ISSUED NOVEMBER 3, 2009.

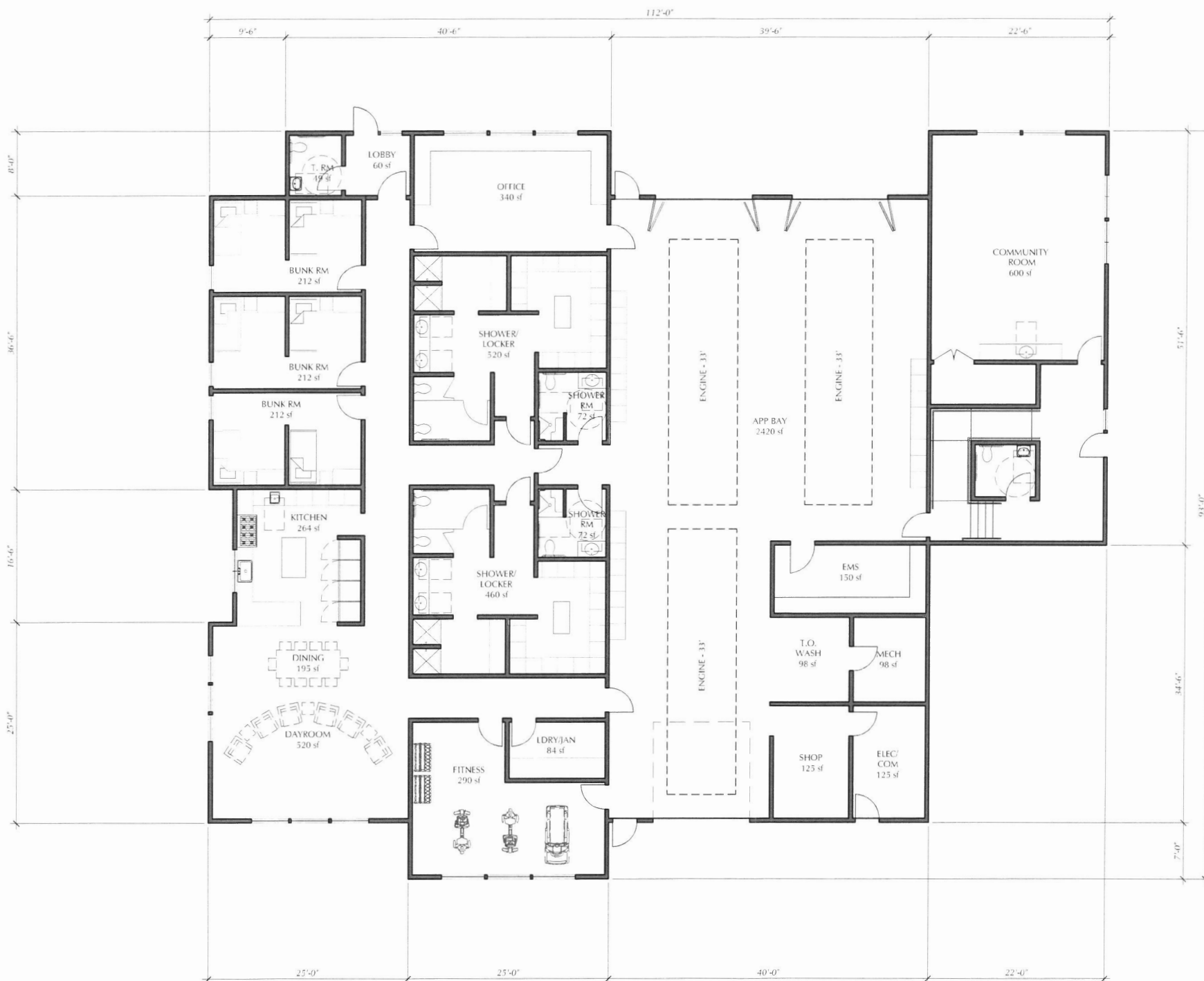





Ankrom Moisan
 6720 SW MACADAM AVE, SUITE 100
 PORTLAND, OR 97219
 T 503-245-7100
 1505 5TH AVE, SUITE 300
 SEATTLE, WA 98101
 T 206.576.1600
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TVFR STATION 55-ROSEMONT
 HIDDEN SPRINGS ROAD
 WEST LINN, OR

PROPOSED SITE PLAN
 PRE APPLICATION CONFERENCE SUBMITTAL
 DATE: 05/02/16
 PROJECT #: 1620420
 SCALE:



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TVFR STATION 55-ROSEMONT
 HIDDEN SPRINGS ROAD
 WEST LINN, OR

GROUND FLOOR
 PLAN

PRE APPLICATION
 CONFERENCE SUBMITTAL

DATE: 05/02/16

PROJECT #: 1620420

SCALE: 1/16"=1'-0"

A2.1

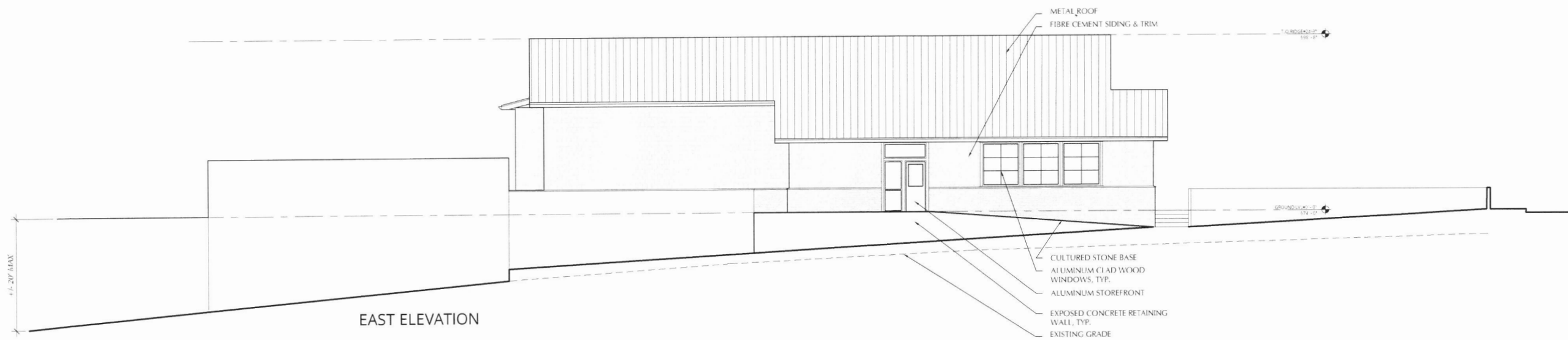


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NORTH ELEVATION



EAST ELEVATION

TVFR STATION 55-ROSEMONT
HIDDEN SPRINGS ROAD
WEST LINN, OR

BUILDING
ELEVATIONS

PRE APPLICATION
CONFERENCE SUBMITTAL

DATE: 05/02/16

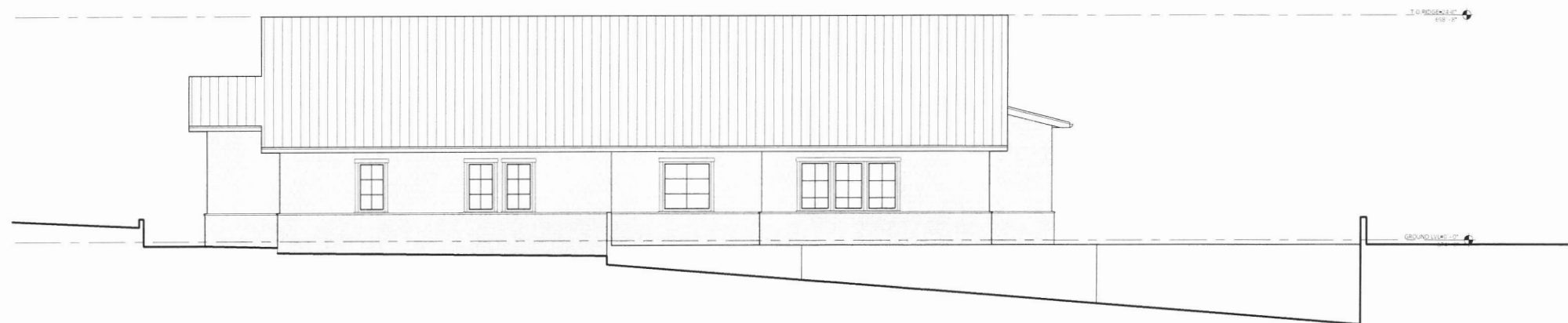
PROJECT #: 1620420

SCALE: 1/16"=1'-0"

A3.1



SOUTH ELEVATION



WEST ELEVATION



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TVFR STATION 55-ROSEMONT
 HIDDEN SPRINGS ROAD
 WEST LINN, OR

BUILDING
 ELEVATIONS

PRE APPLICATION
 CONFERENCE SUBMITTAL

DATE: 05/02/16

PROJECT #: 1620420

SCALE: 1/16"=1'-0"

A3.2

**TUALATIN VALLEY FIRE & RESCUE STATION #55
HIDDEN SPRINGS
TRAFFIC IMPACT STUDY
WEST LINN, OREGON**

DATE:
May 2, 2016

PREPARED FOR:
Tualatin Valley Fire & Rescue

PREPARED BY:
Daniel Stumpf, EI
Todd Mobley, PE



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EXECUTIVE SUMMARY

1. The Tualatin Valley Fire & Rescue (TVF&R) Station #55 – Hidden Springs, has been proposed for development in West Linn, Oregon. The project site includes tax lot 12301, which encompasses an approximate total of 2.6 acres, and is located south of Hidden Springs Road opposite of Bay Meadows Drive. The site is currently vacant and upon development will include the construction of a fire station and three accesses onto Hidden Springs Road.
2. The trip generation calculations show that the proposed development is projected to generate eight site trips during the morning peak hour, four site trips during the mid-day peak hour, four site trips during the evening peak hour, and a total of 50 weekday trips.
3. Based on the results of the operational analysis, all study intersections are currently operating acceptably per City of West Linn standards and are projected to continue operating acceptably through year 2018 either with or without the addition of site trips from the proposed development. No operational mitigation is necessary or recommended.
4. Based on the most recent five years of crash data, no significant safety hazards were identified at any of the study intersections and no mitigation is recommended.
5. Adequate sight distance is available for the proposed site accesses along Hidden Springs Road given that on-site and roadside foliage located at the northeastern and northwestern sections of the project site, respectively, are removed. No other sight distance mitigation is necessary or recommended.
6. Left-turn lane warrants are met for the southbound approach at the intersection of Rosemont Road at Hidden Springs Road under existing conditions during the mid-day and evening peak hours. Accordingly, a left-turn lane is recommended for the southbound approach at this intersection. Left-turn lane warrants are not projected to be met for any of the other study intersections under any of the year 2018 analysis scenarios. Accordingly, no other new turn lanes are recommended.
7. Traffic signal warrants will not be met for any of the unsignalized study intersections under any analysis scenarios through year 2018.

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PROJECT DESCRIPTION & LOCATION

INTRODUCTION

The Tualatin Valley Fire & Rescue (TVF&R) Station #55 – Hidden Springs has been proposed for development in West Linn, Oregon. The project site includes tax lot 12301, which encompasses an approximate total of 2.6 acres, and is located south of Hidden Springs Road opposite of Bay Meadows Drive. The site is currently vacant and upon development will include the construction of a firehouse and three accesses onto Hidden Springs Road.

This report addresses the transportation impacts of the proposed development on the nearby street system. Based on correspondence with Khoi Le, a Civil Engineer with the City of West Linn, analysis was required at the following intersections:

1. Rosemont Road at Hidden Springs Road;
2. Proposed west access at Hidden Springs Road;
3. Bay Meadow Drive at Hidden Springs Road (site access);
4. Proposed east access at Hidden Springs Road; and
5. Santa Anita Drive at Hidden Springs Road.

The purpose of this study is to determine whether the transportation system in the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level-of-service calculations is included in the appendix to this report.

LOCATION DESCRIPTION

The project site is located south of Hidden Springs Road opposite of Bay Meadows Drive in West Linn, Oregon. The site is currently vacant and undeveloped.

The subject site is located in a predominantly residential area. More specifically, single-family detached homes are located to the north, east and west of the site and forested lands are located to the south. One notable development within a half-mile walking/biking distance from the project site includes Trillium Creek Primary School, which is located south of the site.

VICINITY STREETS

Hidden Springs Road is classified by the City of West Linn as a Minor Arterial. The roadway has a two-lane cross-section and has a posted speed of 25 mph. Curbs and bicycle lanes are provided along both sides of the roadway. Sidewalks are provided along the north side and are intermittent along the south side.

Rosemont Road is classified by the City of West Linn as a Minor Arterial. The roadway has a two-lane cross-section north of and a three-lane cross-section, with one travel lane in each direction and a center two-way left-turn lane, south of Hidden Springs Road. It has a posted speed of 40 mph within

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the site vicinity. A school speed zone is in effect during school hours between Hidden Springs Road and Bay Meadows Drive. Curbs, sidewalks, and a bicycle lane are provided along the east side of the roadway.

Bay Meadows Drive is classified by the City of West Linn as a Local Road. The roadway has a two-lane cross-section, without centerline striping delineating directional travel lanes, and has a posted speed of 25 mph. On-street parking is permitted along both sides of the roadway. Curbs and sidewalks are provided along both sides of the roadway.

Santa Anita Drive is classified by the City of West Linn as a Minor Arterial. The roadway has a three-lane cross-section, with one travel lane in each direction and a center raised median, and has a posted speed of 25 mph. Curbs, and bicycle lanes are provided along both sides of the roadway while sidewalks are only intermittently provided.

STUDY INTERSECTIONS

The intersection of Rosemont Road at Hidden Springs Road is a four-legged intersection that is stop-controlled for the eastbound approach of S Wisteria Road and the westbound approach of Hidden Springs Road. The southbound and eastbound approaches each have one shared lane for all turning movements. The northbound and westbound approaches each have one shared lane for all turning movements and a bicycle lane to the right of each standard travel lane. A crosswalk is marked across the eastern intersection leg.

The intersection of Bay Meadows Drive at Hidden Springs Road is currently a three-legged intersection that is stop-controlled for the southbound approach of Bay Meadows Drive. The southbound approach has one shared lane for all turning movements. The eastbound approach has one left-turn lane, one through lane, and one bicycle lane to the right of the outermost standard travel lane. The westbound approach has one shared lane for all turning movements and a bicycle lane to the right of the standard travel lane. One of the crosswalks is marked across the northern intersection leg. Upon development of the site the intersection will be converted to a four-legged intersection that will be stop-controlled for the northbound and southbound approaches. The northbound approach will serve outbound emergency response vehicles only.

The intersection of Santa Anita Drive at Hidden Springs Road is a three-legged intersection that is stop-controlled for the northbound approach of Santa Anita Drive. The northbound approach has one left-turn lane and one right-turn lane. The eastbound approach has one shared lane for all turning movements and a bicycle lane to the right of the standard travel lane. The westbound approach has one left-turn lane, one through lane, and one bicycle lane to the right of the outermost standard travel lane. A crosswalk is marked across the western intersection leg.

A vicinity map displaying the project site, vicinity streets, and the study intersections with their associated lane configurations is shown in Figure 1 on page 7.

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TRAFFIC COUNTS

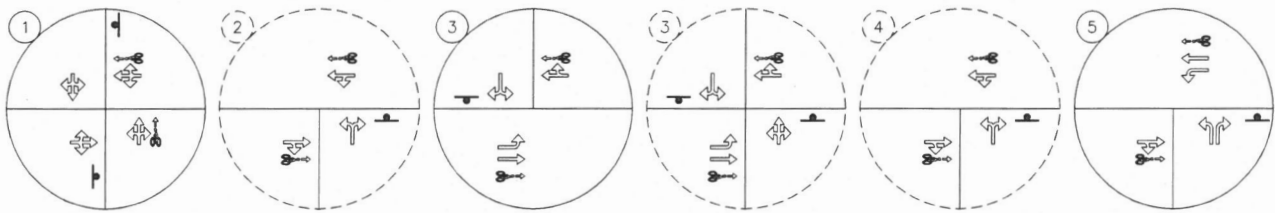
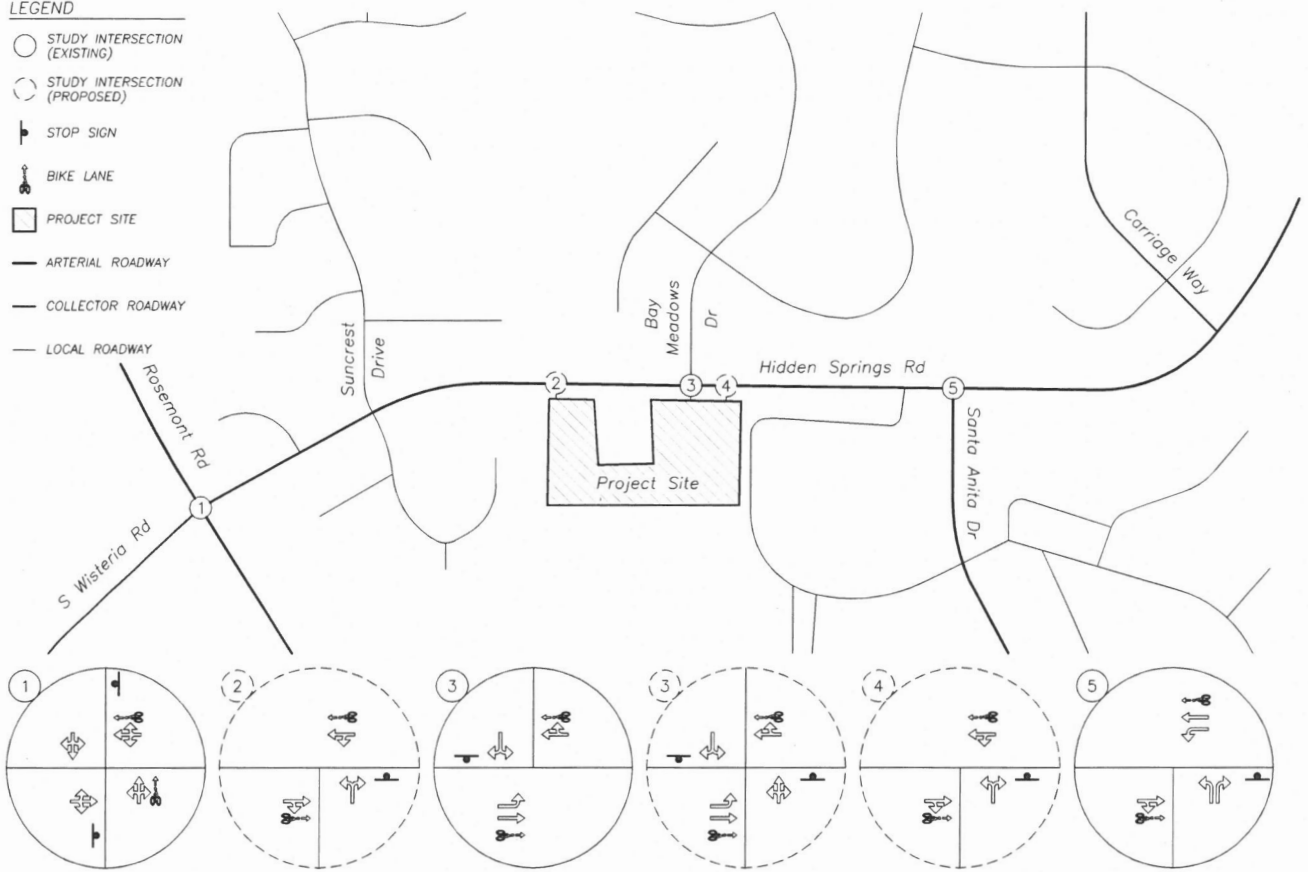
Traffic counts were conducted at the study intersections on Tuesday, April 5th, 2016, from 7:00 AM to 9:00 AM, 1:30 PM to 3:30 PM, and 4:00 PM to 6:00 PM. Data was used from each intersection's respective morning, mid-day, and evening peak hours.

Figure 2 on page 8 shows the existing morning, mid-day, and evening peak hour traffic volumes at the study intersections.

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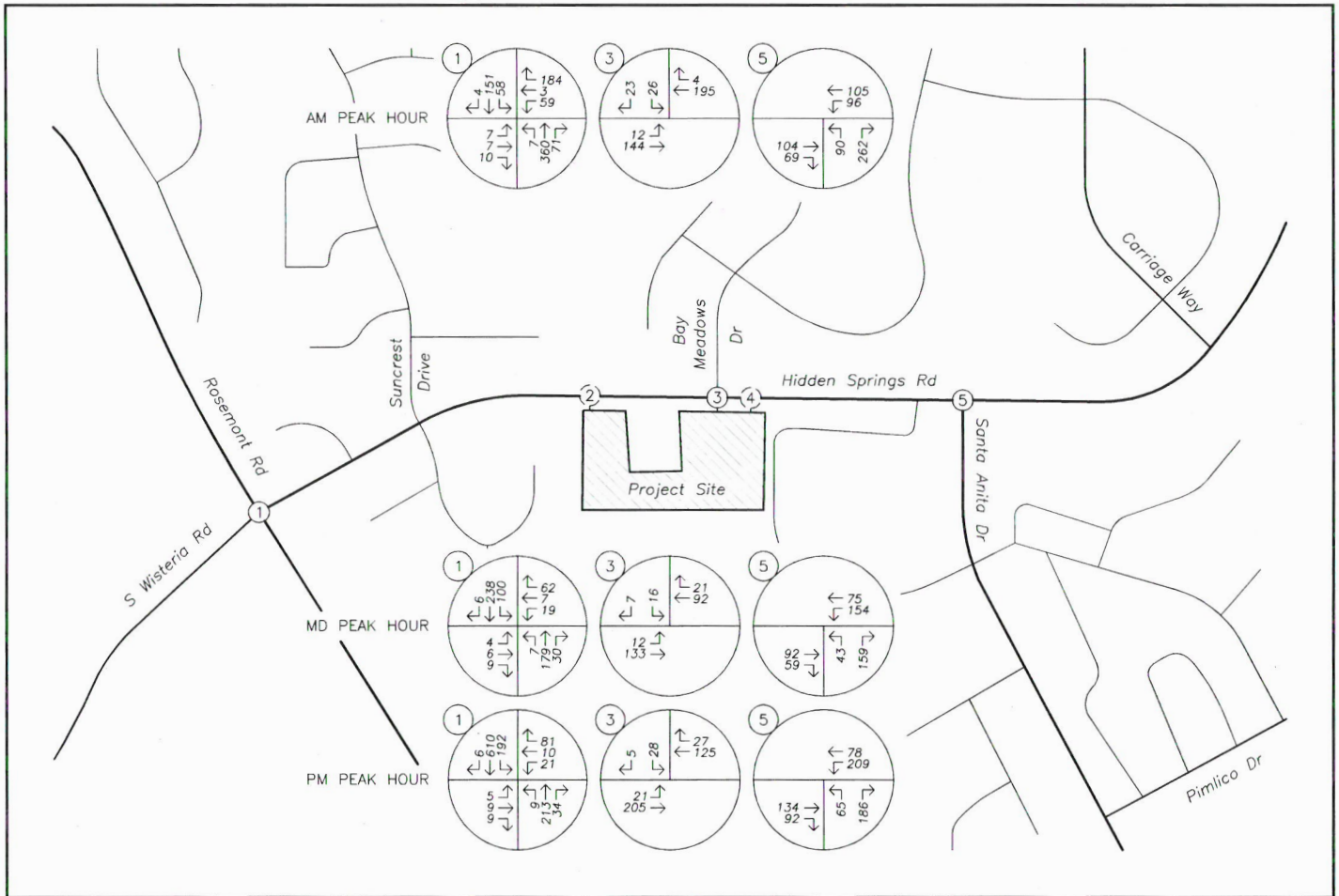
- STUDY INTERSECTION (EXISTING)
- STUDY INTERSECTION (PROPOSED)
- ⊥ STOP SIGN
- 🚲 BIKE LANE
- ▭ PROJECT SITE
- ARTERIAL ROADWAY
- COLLECTOR ROADWAY
- LOCAL ROADWAY



VICINITY MAP



FIGURE
1
PAGE
7



Te TRAFFIC VOLUMES
Existing Conditions
AM, MD, PM Peak Hours



26

SITE TRIPS

TRIP GENERATION

No comparable land-use category exists in the *TRIP GENERATION MANUAL*¹ for fire stations; therefore, the size and operation of the facility was examined in order to best estimate the trip generation of the station. The trip generation calculations shown below are supported by trip data collected at other similar TVF&R stations. The proposed Station 55 is planned to have four full-time staff. Shifts for full-time staff are 24 hours in duration and shift changes will occur at 7:00 AM. The majority of site trips during the morning peak hour are typically from staff. Other trips will also be made, such as visitors, deliveries, and calls for emergency services.

It is estimated that the proposed station would generate a total of eight trips during the morning peak hour, with four employees entering the site and four exiting. During the mid-day and evening peak hours, there are no trips expected to occur for the employees, although two trips entering and two trips exiting were included to account for visitors, deliveries, or other miscellaneous traffic. Usage of the Community Room is typically after the evening peak hour, so while this contributes to the daily trip total, it does not affect operation during the peak hour.

The trip generation calculations show that the proposed development is projected to generate eight site trips during the morning peak hour, four site trips during the mid-day peak hour, four site trips during the evening peak hour, and a total of 50 weekday trips. The trip generation estimates are summarized in Table 1 and detailed trip generation calculations are included in the technical appendix to this report.

Table 1 - Trip Generation Summary

Size	Morning Peak Hour			Mid-day Peak Hour			Evening Peak Hour			Weekday
	In	Out	Total	In	Out	Total	In	Out	Total	Total
Proposed TVF&R #55										
Employee Shift Change	4	4	8	0	0	0	0	0	0	8
Community Room	0	0	0	0	0	0	0	0	0	20
Emergency Calls	0	0	0	0	0	0	0	0	0	8
Non-Emergency Calls,	0	0	0	0	0	0	0	0	0	4
Visitors, Deliveries, etc.	0	0	0	2	2	4	2	2	4	10
Net New	4	4	8	2	2	4	2	2	4	50

TRIP DISTRIBUTION

TVF&R Station #55 – Hidden Springs will predominately serve residents in the surrounding areas of West Linn and unincorporated Clackamas County. It should be noted that the majority of peak-hour traffic to and from the station will not be from emergency response vehicles, but from employees, visitors, deliveries, etc. Detailed information about incident volume and response areas is included in the attached Technical Appendix. The directional distribution of peak hour site trips to/from the

¹ Institute of Transportation Engineers (ITE), *TRIP GENERATION MANUAL*, 9th Edition, 2012.

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proposed development was estimated based on locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at study intersections.

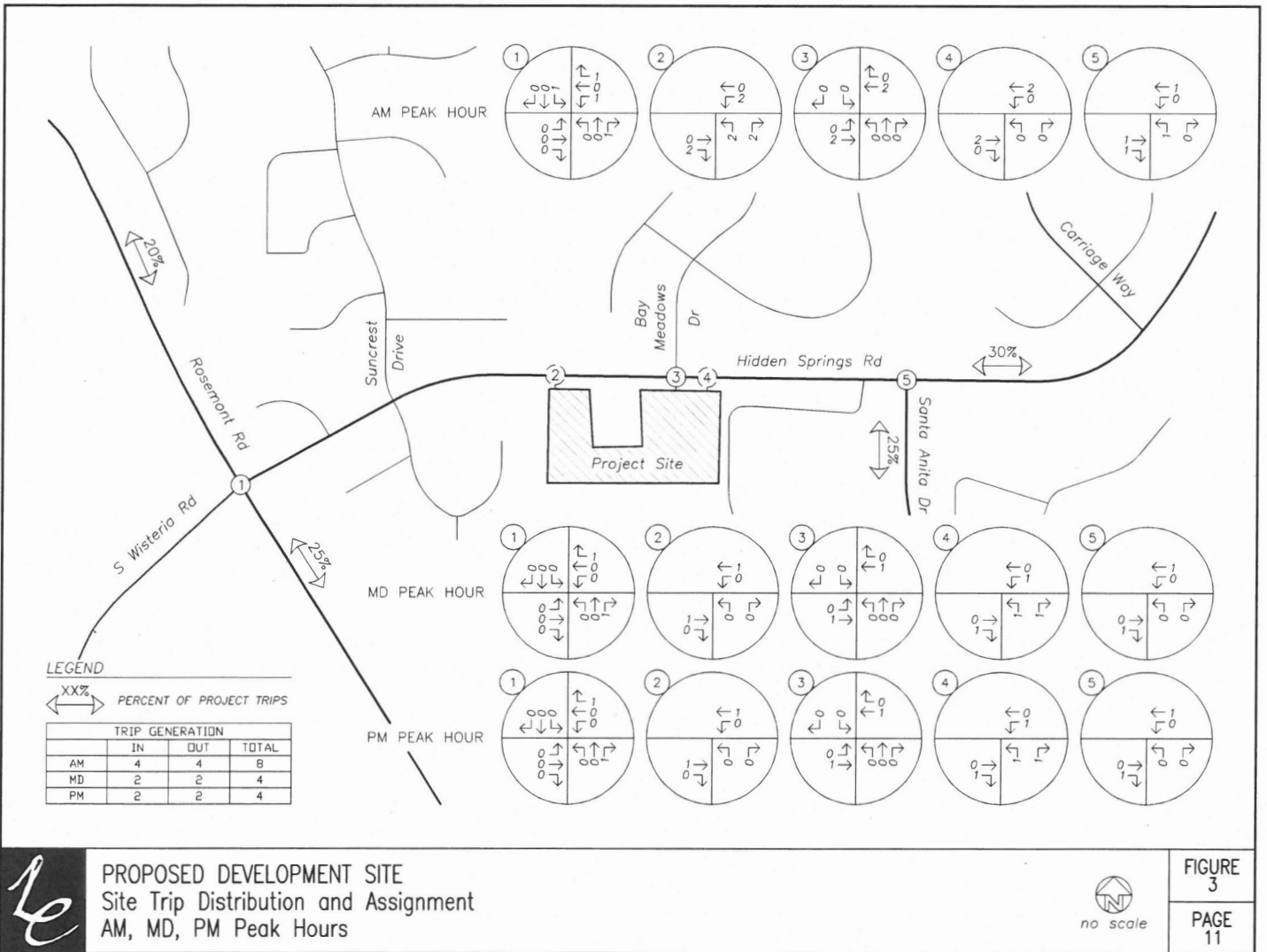
The following trip distribution was estimated and used for analysis:

- 30 percent of site trips will travel to/from the east along Hidden Springs Road;
- 25 percent of site trips will travel to/from the south along Santa Anita Drive;
- 25 percent of site trips will travel to/from the south along Rosemont Road; and
- 20 percent of site trips will travel to/from the north along Rosemond Road.

Trips to and from the proposed development are anticipated to utilize three site accesses. The west access will serve inbound emergency response vehicles and employees arriving to and departing from the site. The proposed access at the intersection of Bay Meadows Drive at Hidden Springs Road will serve outbound emergency response vehicles. The east access will serve the general public. Based on the site layout and access characteristics, site trips are anticipated to utilize site accesses accordingly.

- All morning peak hour trips will utilize the west access; and
- All mid-day and evening peak hour trips will utilize the east access.

The trip assignment for the site trips generated by the proposed development during the morning, mid-day, and evening peak hours is shown in Figure 3 on page 11.



PROPOSED DEVELOPMENT SITE
 Site Trip Distribution and Assignment
 AM, MD, PM Peak Hours



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OPERATIONAL ANALYSIS

BACKGROUND VOLUMES

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. In order to calculate the future traffic volumes, a compounded growth rate of two percent per year for an assumed build-out condition of two years was applied to the measured existing traffic volumes to approximate year 2018 background conditions.

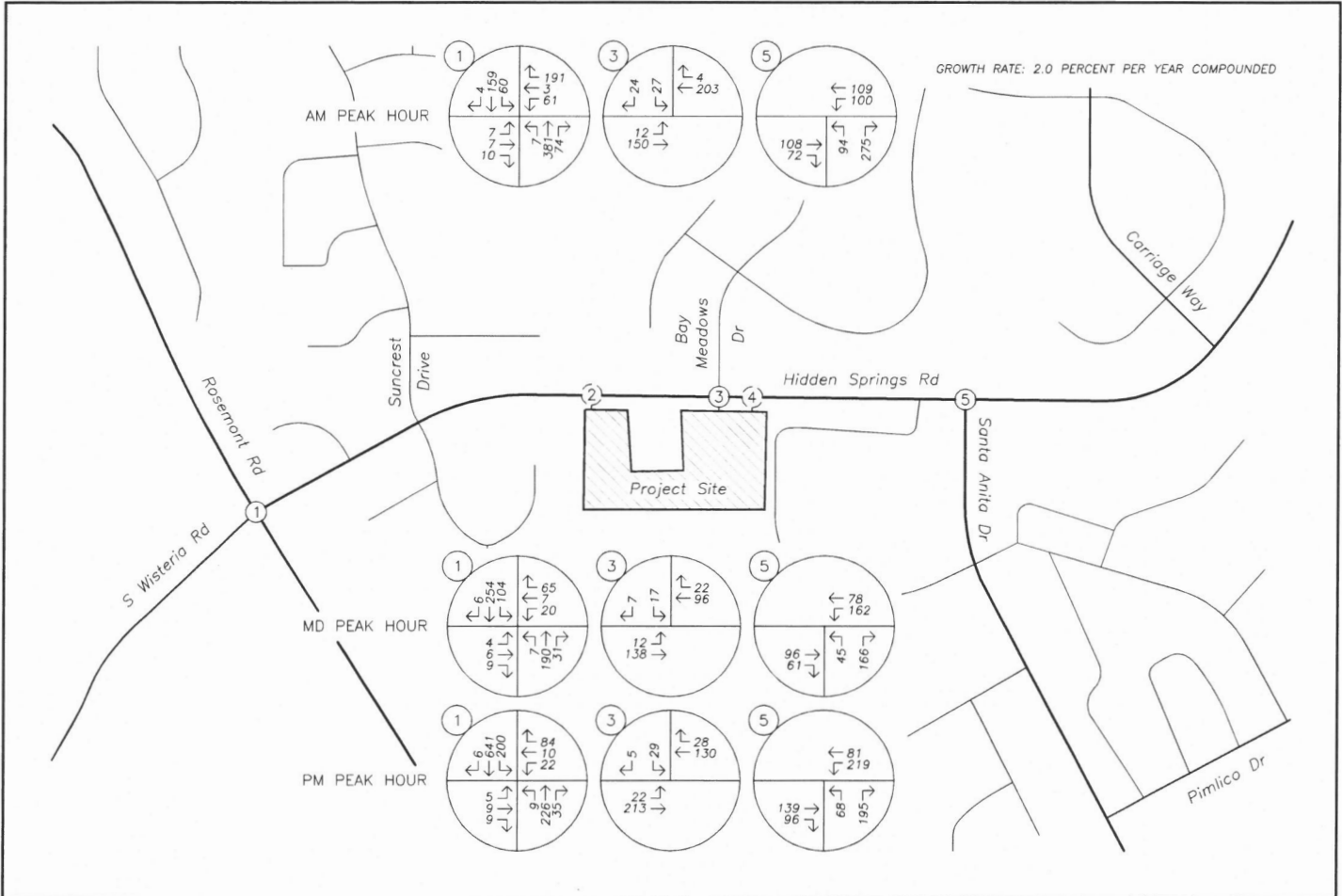
In addition to the traffic volume growth described above, there is one in-process development near the proposed project vicinity that is currently not contributing trips to the transportation system but is anticipated to by the 2018 build-out year of the proposed development. The Tanner Ridge at Rosemont Subdivision proposes the construction of 52 single-family detached homes. Based on the transportation impact study prepared for this development, additional in-process trips are included at applicable study intersections.

Figure 4 on page 13 shows the projected year 2018 background traffic volumes for the morning, mid-day, and evening peak hours at the study intersections.

BACKGROUND VOLUMES PLUS SITE TRIPS

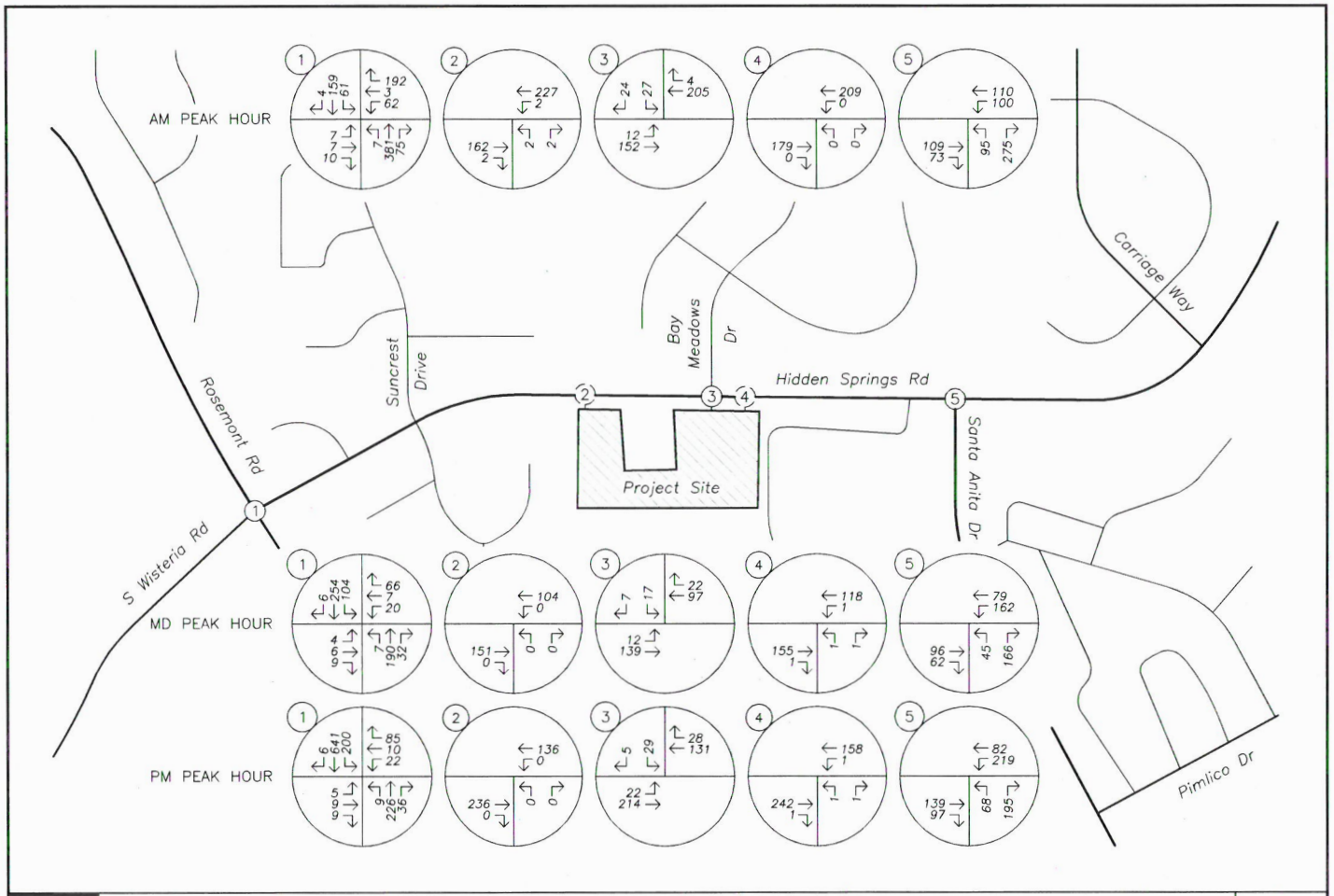
Peak hour trips calculated to be generated from the proposed development, as described earlier within the Site Trips section, were added to the projected year 2018 background traffic volumes to obtain the expected year 2018 background volumes plus site trips.

Figure 5 on page 14 shows the projected year 2018 peak hour background traffic volumes plus proposed development site trips at the study intersections.



TRAFFIC VOLUMES
 Year 2018 Background Conditions
 AM, MD, PM Peak Hours





TRAFFIC VOLUMES
 Year 2018 Background plus Site Trips
 AM, MD, PM Peak Hours



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CAPACITY ANALYSIS

A capacity and delay analysis was conducted for each of the study intersections. The analysis was conducted according to the unsignalized intersection analysis methodologies in the *HIGHWAY CAPACITY MANUAL* (HCM) published by the Transportation Research Board. According to the City of West Linn's Transportation System Plan (TSP), intersections are required to operate at level-of-service (LOS) D or better, except principal arterial facilities which are required to operate at LOS E or better. The LOS of an intersection can range from A, which indicates very little or no delay experienced by vehicles, to F, which indicates a high degree of congestion and delay.

The intersection of Rosemont Road at Hidden Springs Road operates at LOS D during the morning peak hour, LOS C during the mid-day peak hour, and LOS D during the evening peak under all analysis scenarios through year 2018.

Upon build-out of the proposed development, the west access intersection at Hidden Springs Road is projected to operate at LOS B during the morning peak hour and at LOS A during the mid-day and evening peak hours.

The intersection of Bay Meadows Drive at Hidden Springs Road operates at LOS B during the morning, mid-day, and evening peak hours under all analysis scenarios through year 2018.

Upon build-out of the proposed development, the east access intersection at Hidden Springs Road is projected to operate at LOS A during the morning and mid-day peak hours and at LOS B during the evening peak hour.

The intersection of Santa Anita Drive at Hidden Springs Road operates at LOS C during the morning, mid-day, and evening peak hours under all analysis scenarios through year 2018, except under existing conditions during the mid-day peak hour where it currently operates at LOS B.

The v/c, delay, and LOS results of the capacity analysis are shown in Table 2 for the morning, mid-day, and evening peak hours. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

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Table 2 - Capacity Analysis Summary									
	AM Peak Hour			MD Peak Hour			PM Peak Hour		
	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
Rosemont Rd at Hidden Springs Rd									
Existing Conditions	D	26	0.67	C	15	0.19	D	31	0.39
2018 Background Conditions	D	32	0.74	C	16	0.21	D	34	0.44
2018 Background plus Site Conditions	D	33	0.75	C	16	0.21	D	35	0.45
West Access at Hidden Springs Rd									
2018 Background plus Site Conditions	B	11	0.14	A	0	0.11	A	0	0.15
Bay Meadows Dr at Hidden Springs Rd									
Existing Conditions	B	13	0.17	B	11	0.10	B	12	0.13
2018 Background Conditions	B	13	0.18	B	11	0.10	B	12	0.14
2018 Background plus Site Conditions	B	13	0.18	B	11	0.10	B	12	0.14
East Access at Hidden Springs Rd									
2018 Background plus Site Conditions	A	0	0.15	A	10	0.11	B	11	0.16
Santa Anita Dr at Hidden Springs Rd									
Existing Conditions	C	16	0.38	B	15	0.20	C	19	0.23
2018 Background Conditions	C	17	0.40	C	15	0.21	C	20	0.24
2018 Background plus Site Conditions	C	17	0.40	C	15	0.21	C	20	0.24

Based on the results of the operational analysis, all study intersections are currently operating acceptably per City of West Linn standards and are projected to continue operating acceptably through year 2018 either with or without the addition of site trips from the proposed development. No operational mitigation is necessary or recommended.

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SAFETY ANALYSIS

CRASH DATA ANALYSIS

Using data obtained from the Oregon Department of Transportation's (ODOT) Crash Analysis and Reporting Unit, a review of the most recent available five years of crash history (January 2010 to December 2014) at the study intersections was performed. The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for the intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated using the common assumption that traffic counted during the evening peak period represents ten percent of average daily traffic (ADT) at the intersection. Crash rates in excess of one to two crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

The intersection of Rosemont Road at Hidden Springs Road had two reported crashes during the analysis period. The crashes consisted of one rear-end collision and one fixed-object collision where the driver of a passenger car was driving too fast for conditions and made a wide turn off the road. One of the reported crashes was classified as "Property Damage Only" (*PDO*) and the other was classified as "Non-Incapacitating Injury" (*Injury-B*). The crash rate at the intersection was calculated to be 0.09.

The intersection of Bay Meadows Drive at Hidden Springs Road had no reported crashes during the analysis period.

The intersection of Santa Anita Drive at Hidden Springs Road had four reported crashes during the analysis period. The crashes consisted of two turning-movement collisions, one rear-end collision, and one collision involving a bicyclist where the driver of a passenger car failed to yield right-of-way to an eastbound bicyclist while making a westbound left-turn. Of the crashes reported two were classified as *PDO*, one was classified as "Possible Injury – Complaint of Pain" (*Injury-C*), and one was classified as *Injury-B*.

Based on the most recent five years of crash data, no significant safety hazards were identified at any of the study intersections and no mitigation is recommended.

SIGHT DISTANCE

Intersection sight distance was examined for the proposed new driveways along Hidden Springs Road in accordance with the standards established in *A Policy on Geometric Design of Highways and Streets*². According to AASHTO and the City of West Linn's *Design & Construction Standards Section 5 – Street Requirements* the driver's eye is assumed to be 15 feet from the near edge of the

² American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

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nearest lane of the intersecting street and at a height of 3.5 feet above the approach street pavement. Vehicle/object height is assumed to be 3.5 feet above the cross-street pavement.

Based on the posted speed of 25 mph on Hidden Springs Road, a minimum intersection sight distance of 280 feet is required to the east and west of each proposed site access.

Sight distance at the proposed west access intersection with Hidden Springs Road was measured to be in excess of 500 feet to the east, limited by a crest in the vertical curvature of the roadway. A sight distance of 293 feet to the west, which would be limited by a crest in the vertical curvature of the roadway, may be attained if roadside foliage, located at the end of the sidewalk that stubs the western property line of the project site, is removed upon development.

Sight distance at the proposed access located at the intersection of Bay Meadows Drive at Hidden Springs Road was measured to be in excess of 400 feet to the east and west. In both cases sight distances were obstructed by crests in the vertical curvature of the roadway.

Sight distance at the proposed east access intersection with Hidden Springs Road was measured to be in excess of 500 feet to the west, limited by a crest in the vertical curvature of the roadway. Upon development of the site and removal of on-site foliage, adequate sight distance to the east may be achieved. Upon removal of on-site foliage sight distance would be in excess of 400 feet, limited by a crest in the vertical curvature of the roadway.

The two easternmost proposed site access are located along a segment of Hidden Springs Road where roadway grades are greater than three percent. According to AASHTO stopping sight distance must be evaluated at these locations to ensure safe operation between vehicles entering these intersections from the site accesses and through traffic along Hidden Springs Road. Stopping sight distance is the distance that allows an oncoming driver to see a hazard on the roadway, react, and come to a complete stop if necessary to avoid a collision. Conversely, intersection sight distance is an operational measure intended to provide sufficient line of sight along the major street so that a driver could turn onto the major street without impeding traffic flow.

Based on a measured 85th percentile speed of 31.3 mph and using a downhill grade of five percent to the east, a minimum of 225 feet of stopping sight distance is required for eastbound vehicles and 197 feet for westbound vehicles. Sight distances were measured to be well above these required stopping sight distances at each of the proposed site accesses. Accordingly, adequate stopping sight distances to ensure safe operation are provided at all proposed site access locations.

Based on the detailed analysis, adequate sight distance is available for the proposed site accesses along Hidden Springs Road given that on-site and roadside foliage located at the northeastern and northwestern sections of the project site, respectively, are removed. No other sight distance mitigation is necessary or recommended.

WARRANT ANALYSIS

Left-turn lane and traffic signal warrants were examined for the study intersections where such treatments would be applicable.

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A left-turn refuge is primarily a safety consideration for the major street, removing left-turning vehicles from the through traffic stream. The left-turn lane warrants examined used the methodology outlined in the National Cooperative Highway Research Project's (NCHRP) Report 457. The left-turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles and the travel speed of the roadway.

Left-turn lane warrants are met for the southbound approach at the intersection of Rosemont Road at Hidden Springs Road under existing conditions during the mid-day and evening peak hours. Accordingly, a left-turn lane is recommended for the southbound approach at this intersection. The left-turn lane could be installed without road widening, but by restriping the intersection.

Left-turn lane warrants are not projected to be met for any of the other study intersections under any of the year 2018 analysis scenarios. Accordingly, no other new turn lanes are recommended.

Traffic signal warrants were examined for all unsignalized study intersections to determine whether the installation of a new traffic signal will be warranted at the intersections upon completion of the proposed development. Due to insufficient main and side-street traffic volumes, traffic signal warrants will not be met for any of the unsignalized study intersections under any analysis scenarios through year 2018.

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CONCLUSIONS

Based on the results of the operational analysis, all study intersections are currently operating acceptably per City of West Linn standards and are projected to continue operating acceptably through year 2018 either with or without the addition of site trips from the proposed development. No operational mitigation is necessary or recommended.

Based on the most recent five years of crash data, no significant safety hazards were identified at any of the study intersections and no mitigation is recommended.

Based on the detailed analysis, adequate sight distance is available for the proposed site accesses along Hidden Springs Road given that on-site and roadside foliage located at the northeastern and northwestern sections of the project site, respectively, are removed. No other sight distance mitigation is necessary or recommended.

Left-turn lane warrants are triggered for the southbound approach at the intersection of Rosemont Road at Hidden Springs Road under existing conditions during the mid-day and evening peak hours. Accordingly, a left-turn lane is recommended for the southbound approach at this intersection. Left-turn lane warrants are not projected to be met for any of the other study intersections under any of the year 2018 analysis scenarios. Accordingly, no other new turn lanes are recommended.

Due to insufficient main and side-street traffic volumes, traffic signal warrants will not be met for any of the unsignalized study intersections under any analysis scenarios through year 2018.

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APPENDIX

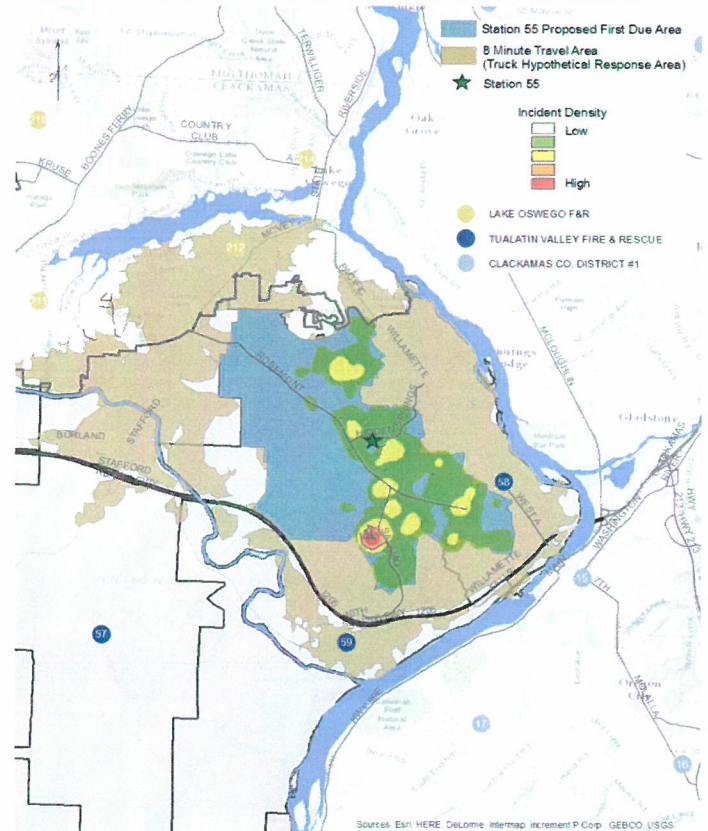
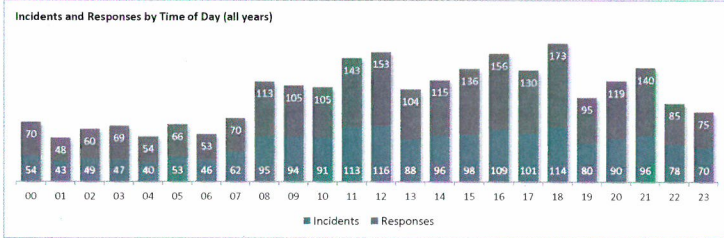
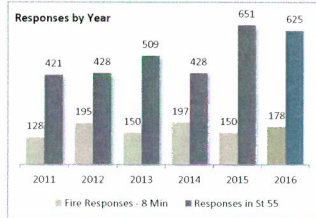
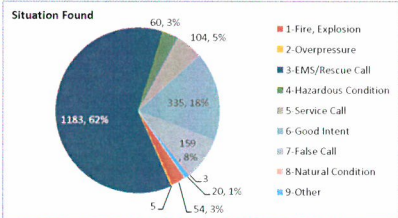
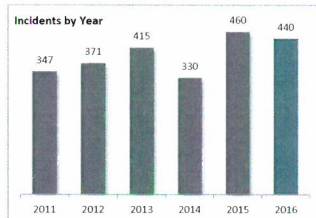
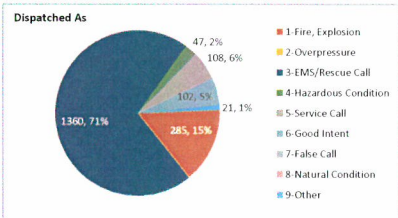
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Total Incidents in Station 55 First Due Area* 1,923
 63% of incidents had at least one unit dispatched as Code 3
 Total Responses (units dispatched) 2,437

Approximate Incidents per Day: 1
 Approximate Responses per Day: 1.3
 (1,826 days in date range)

Incidents are a single count of a 9-1-1 call
 Responses are a count of all units dispatched to an incident, and included cancelled en route



* First Due Area has not been finalized. This is a theoretical service area based on travel time, incident counts, street network, and surrounding stations. This service area may change after additional analysis is conducted.

Non-TVF&R units are included in response count to indicate potential traffic effect.

Fire Responses by Year in graph above are units dispatched to fire incident types within the 8 minute travel area, to indicate potential truck responses to fires. This 8-minute area includes other TVF&R first due areas as well as Lake Oswego Fire District.

Mobile Health Care incidents excluded from total incident counts
 Test incidents, move ups within boundary are excluded