4/23/14

REGISTERED PROFESSIONAL ENGINEER 54983PE OREGON JULY 10, 2002 MICHAEL T. ARD

EXPIRES: 12/31/15

LANCASTER ENGINEERING

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April 23, 2014

The Springs Living
Attn: Chris R. Shelby
640 NE Third Street
McMinnville, OR 97128

RE: Proposed Expansion of The Springs at Sherwood
Transportation Analysis Letter

Dear Mr. Shelby,

We have completed our transportation analysis for the proposed expansion of The Springs at Sherwood assisted living facility in Sherwood, Oregon. Based on initial trip generation projections, the proposed expansion is not expected to generate enough site trips to warrant a full off-site impact evaluation, which is typically required when a proposed property is expected to generate more than 400 daily trips. Therefore, this Transportation Analysis Letter (TAL) will address the trip generation of the facility expansion, safety and sight distance analysis of the two proposed site access points, site circulation – particularly at the site access in the immediate vicinity of SW Ash Street, and possible pedestrian improvements in the vicinity of the project site.

LOCATION AND PROJECT DESCRIPTION

The subject properties are located on the north side of SW Oregon Street at 15699, 15685, 15667, and 15677 SW Oregon Street, and at 15704 and 15707 SW First Street in Sherwood, Oregon. The proposed development of 70 independent living units, expansion of 20 additional assisted living units, and removal of four single-family homes will take access from the west side of a private roadway along the eastern property lines of the project site approximately 340 feet and 655 feet north of SW Oregon Street as well as approximately 115 feet northeast of the intersection of SW First Street at SW Ash Street. Access to the main parking area will be via the access points along the private roadway that follows the eastern property lines.

SW Oregon Street is under the jurisdiction of the City of Sherwood and is classified as a Local roadway. It is striped with a travel lane in each direction and has a posted speed of 25 mph. Curbs and sidewalks are provided in the vicinity of the project site as a complete network. On-street parking is not allowed. SW First Street along the western edge of the project site and the private roadway along the eastern edge of the project site operate as local roadways with a statutory residential speed limit of 25 mph, and are unstriped. The private roadway east of the project site is wide enough to allow for on-street parking and has sidewalks, curb, and gutter along the west side of the roadway.

Presently, an empty lot and three single-family dwellings exist within the southern portion of the project site where the majority of the facility expansion will occur. A single-family home dwelling is

currently located within the northwestern portion of the project site, where the expansion of the assisted living portion of the facility will occur. The three southern homes take access from SW Oregon Street via individual driveways. All access points will be removed and replaced with curb and gutter. The northernmost home takes access from SW First Street. This access will be reconfigured in relation to the proposed public plaza.

Figure 1 shows the vicinity of the project site, and a copy of the project site plan is included in the appendix of this report.

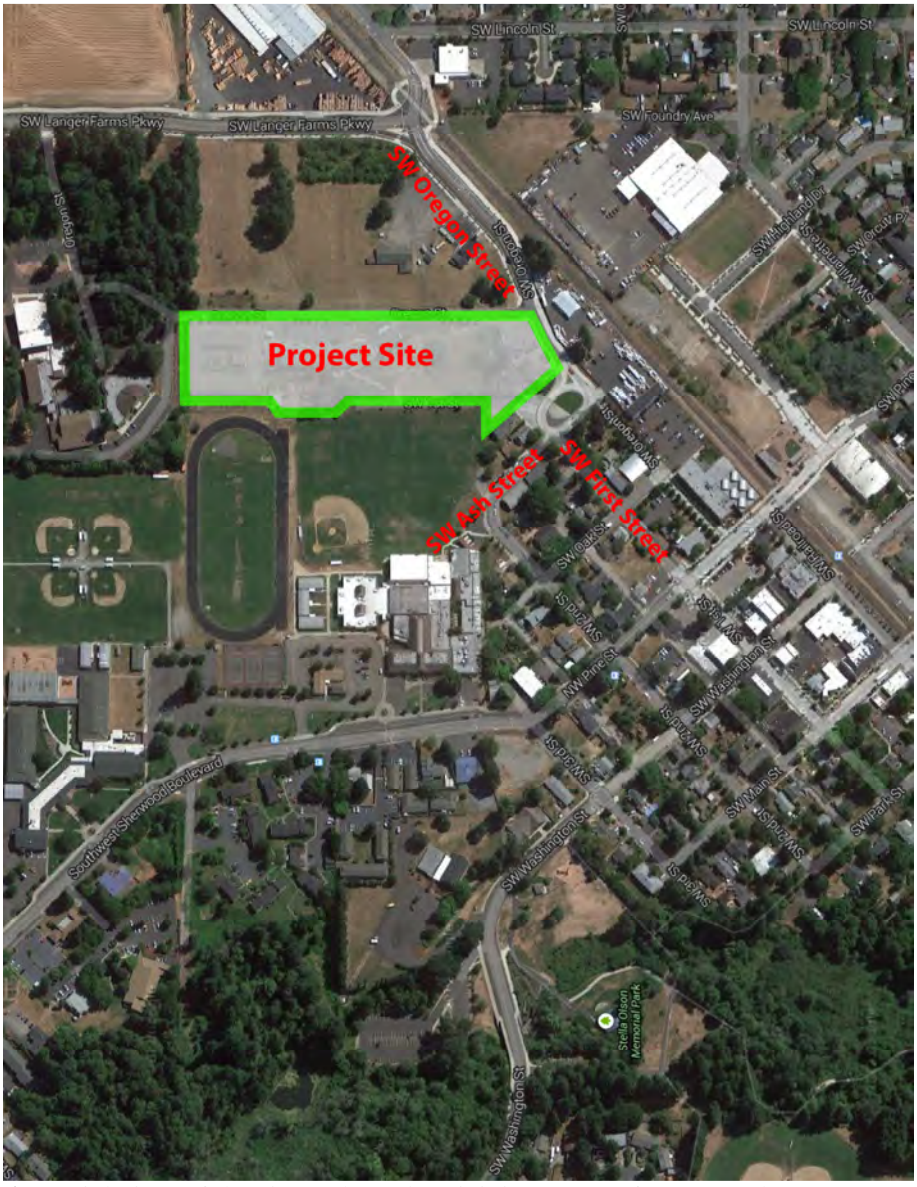

Figure 1: Aerial view of the site and nearby vicinity (Image from Google Maps – North ⇦).

TRIP GENERATION

To project the net increase of trips generated by the proposed expansion of 20 assisted living units, the introduction of 70 independent living units, and the demolition of four single-family detached homes associated with the overall expansion of the existing Springs at Sherwood facility, trip rates and equations from the manual *TRIP GENERATION*, Ninth Edition, published by the Institute of Transportation Engineers (ITE) were used. The land-use code utilized for the single-family detached homes was #210, *Single-Family Detached Housing*, with trip rates based on the number of dwelling units. The land-use code utilized for the independent living units was #252, *Senior Housing-Attached*, with trip rates based on the number of dwelling units. The land-use code utilized for the assisted living units was #254, *Assisted Living*, with trip rates based on the number of beds.

The trip generation calculations show that the proposed development is projected to generate a net increase of 15 additional trips during the morning peak hour with 6 trips entering the site and 9 trips exiting the site. During the evening peak hour a total of 20 additional trips are expected with 11 trips entering the site and 9 exiting. A weekday total of 228 additional trips are expected with half entering and half exiting the site. The following table offers a summary of the trip generation calculations. Detailed trip generation calculations are included in the appendix of this report.

Table 1: Additional Trips Generated by the Project Site

TRIP GENERATION

		Morning Peak Hour			**Evening Peak Hour**			**Weekday**
Land Use Name	Code	Entering	Exiting	Total	Entering	Exiting	Total	Total
Single-Family Detached Homes	210	-1	-2	-3	-3	-1	-4	-38
Senior Housing-Attached	252	5	9	14	11	7	18	230
Assisted Living	254	2	2	4	3	3	6	36
Total	-	**6**	**9**	**15**	**11**	**9**	**20**	**228**

Based on a review of the existing travel patterns, existing transportation facilities within the vicinity of the project site, and nearby destination points, it is projected that 40% of all site trips will travel along SW First Street to/from areas west and south of the project site, 40% of all site trips will travel along SW Oregon Street to/from areas east of the intersection of SW Oregon Street at SW Langer Farms Parkway, and the remaining 20% of all site trips travel along SW Langer Farms Parkway to/from areas north of the project site.

With the projected volumes below the allowed daily trip threshold of 400 generated trips from the proposed expansion, the proposed site access points and nearby intersections are projected to operate acceptably through the full build-out of the proposed project.

SAFETY ANALYSIS OF THE PROPOSED SITE ACCESS POINTS

Three access points currently serve the site and will remain at their existing locations following completion of the proposed development.

The southwestern access point will be revised to have its entrance/exit area slightly reduced as the proposed public plaza will create a physical boundary along the east side of the access point with the proposed sidewalks. The reduction in area on the east side of the access point will not impact sight distance. Along the western side of the access point is an existing single-family home that gains access to their driveway through this access point. This creates a point of conflict between people traveling to/from The Springs at Sherwood and people from the single-family home using the access point for a variety of purposes – such as kids/adults traveling to/from their home by walking, bicycling, and/or the use of a motorized vehicle. Ideally, sight distance at this point of conflict will be retained as it is currently. Given the existing nature of the traffic circle with low speed traffic and low speed entering/departing maneuvers, the access point is expected to operate acceptably, as it does today.

Safety in regards to intersection sight distance of the two revised access points is described in the following section.

SIGHT DISTANCE ANALYSIS OF THE TWO PROPOSED SITE ACCESS POINTS

Intersection sight distance requirements were taken from *A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS*, published in 2011 by the American Association of State Highway and Transportation Officials (AASHTO). Sight distance requirements are based on the design speed of traffic on the major street and the sight distance measurements are based on an eye height of 3.5 feet and an approaching driver's eye height of 3.5 feet above the road, with the entering driver's eye 15 feet behind the edge of the near-side travel lane.[1] Additionally, the City of Sherwood specifies within its *Engineering Design and Standard Details Manual*, adopted in 2009 and revised in 2010, that its Intersection Sight Distance Policy should be based on AASHTO Cases B2 and B3.

Based on the 25 mph statutory residential speed limit on the private roadway along the east side of the property, the required intersection sight distance is 240 feet.[2] Based on the 20 mph design speed of westbound traffic entering the traffic circle at the intersection of SW Oregon Street at SW First Street, the required intersection sight distance is 195 feet.

Intersection sight distance from the proposed access location on the private roadway immediately east of the subject property is 610 feet to the north (see Figure 2 on page 5) and 325 feet to the south (see Figure 3 on page 6). Intersection sight distance from the proposed access location at the northeast corner of the intersection of SW Oregon Street at SW First Street is 156 feet to the east (see Figure 4 on page 6), limited by existing single-family homes and fences. Three concrete artistic

[1] (American Association of State Highway and Transportation Officials (AASHTO) Page 3-14 - 3-15)
[2] (AASHTO Table 9-8 Page 9-41)

monuments that are greater than 12-inches in width are within the range of required sight distance. The homes, fences, and artistic monuments are currently within the proposed development's project site footprint. The homes and fences will be removed as part of development of a public plaza, and it is recommended that the artistic monuments be removed or relocated in order to maintain adequate sight distance. Upon removal of the homes, fences, and artistic monuments, sight distance east of the proposed site access roadway will be greater than the required 195 feet. When designing the public plaza, the developer should ensure that no objects will be installed within the public plaza that will impact sight distance to the proposed access point within 195 feet of travel distance from the access point to the east.

The available sight distance, following the removal of the homes, fences, and artistic monuments on the subject properties as well as proper design of the proposed public plaza, is projected to be adequate for safe and efficient operation of the site access.

Figure 2: View looking south toward the proposed access on the project site's private roadway along the eastern portion of the property.

Figure 3: View looking north toward the proposed access on the project site's private roadway along the eastern portion of the property.

Figure 4: View looking northwest toward the proposed access at the intersection of SW Oregon Street at SW First Street.

SITE CIRCULATION

The proposed site plan includes two points of access to the existing private roadway on the east side of the subject property and one point of access to the traffic circle east of the intersection of SW First Street and SW Ash Street.

The northerly access on the private roadway east of the subject property will serve entering vehicles only. A one-way drive aisle extends south from the access to an internal traffic circle near the center of the subject property.

The southerly access on the private roadway east of the subject property accommodates entering and exiting vehicles. From this entrance, vehicles can circulate within the traffic circle or turn south into the southern area of the main parking lot. Traffic circulates clockwise within the southern parking area and exits by returning to the internal traffic circle at the central portion of the main parking lot.

Vehicles utilizing the enclosed parking stalls on the southwest portion of the project site will enter and exit via the access point along SW First Street.

Loading areas are available throughout the project site. All three access points provide areas for loading by passenger vehicles and delivery trucks. The northeast access point provides a loading zone along the west side of the parking lot immediately after entering. The access point at the central portion of the main parking lot provides a loading zone along the west side of the traffic circle. Delivery trucks and passenger vehicles accessing the west side of the subject property have a loading zone available near the northern terminus of the driveway. Space for passenger cars and delivery trucks to turn around is also provided at the end of the driveway.

Emergency vehicles will be able to utilize all access points and will be able to efficiently circulate throughout the project site, similar to the delivery truck access and circulation descriptions above.

Site circulation plans were analyzed and are projected to be adequate for safe and efficient operation of the site. A copy of the project site plan is included in the appendix of this report.

POSSIBLE PEDESTRIAN IMPROVEMENTS

It is recommended that a marked crosswalk be installed crossing SW Oregon Street to serve the expected increase in demand by pedestrians of all ages. The crosswalk will allow people to safely cross the roadway in order to reach popular nearby destinations by foot, such as the farmer's market, public library, and City Hall.

In order to attract the most pedestrians from the project site that will predominantly travel to/from areas southwest of the site, it is recommended that the marked crosswalk be installed east of the splitter island, which is east of the traffic circle along SW Oregon Street, so that it connects the southern sidewalk along SW Oregon Street to the curved sidewalk north of SW Oregon Street that is

proposed as part of the public plaza within the project site. Specifically, the markings for the crosswalk are recommended to be installed in the immediate vicinity of the joint between the asphalt pavement and the concrete pavement, with at least half the width of the crosswalk markings on the asphalt pavement to maximize contrast and visibility. It is also recommended that curb ramps be installed at both ends of the crosswalk in conjunction with the crosswalk markings to ensure that people in wheelchairs and people using walking aides are able to be elevated from the roadway to the sidewalk.

A copy of the project site plan with the approximate location of the proposed crosswalk displayed is included in the appendix of this report.

ACCESS SPACING

Three access points currently serve the site and will remain at their existing locations following completion of the proposed development. A figure of the project site with the location, width, and distance to neighboring driveways is included in the appendix of this report.

CONCLUSIONS

The impact to the existing infrastructure created by the trips generated as a result of the proposed development will be minimal and is not expected to significantly alter the operation of the existing facilities.

With the projected volumes below the allowed daily trip threshold of 400 generated trips from the proposed expansion, the proposed site access points and nearby intersections are projected to operate acceptably through the full build-out of the proposed project.

No significant intersection sight distance safety issues arise due to the proposed development. With the removal of the homes, fences, and artistic monuments along the southern properties, sufficient intersection sight distance can be made available for westbound traffic allowing the southwestern revised access point to operate safely. When constructing the public plaza, the developer should ensure that sufficient intersection sight distance is retained.

Site circulation with respect to personal motor vehicles, delivery trucks, and emergency vehicles is sufficient and allows all vehicles to gain access to the site for parking and loading at all access points.

It is recommended that a marked crosswalk with curb ramps be installed east of the splitter island, which is east of the traffic circle along SW Oregon Street, so that it connects the southern sidewalk along SW Oregon Street and to the proposed public plaza and curved sidewalk north of SW Oregon Street. It is further recommended that at least half of the marked crosswalk width be installed on the asphalt pavement for maximum contrast and visibility.

If you have any questions regarding this report or if you need any further assistance, please don't hesitate to contact us.

With Best Regards,

Kirk Paulsen, EI
Transportation Analyst

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PRELIMINARY
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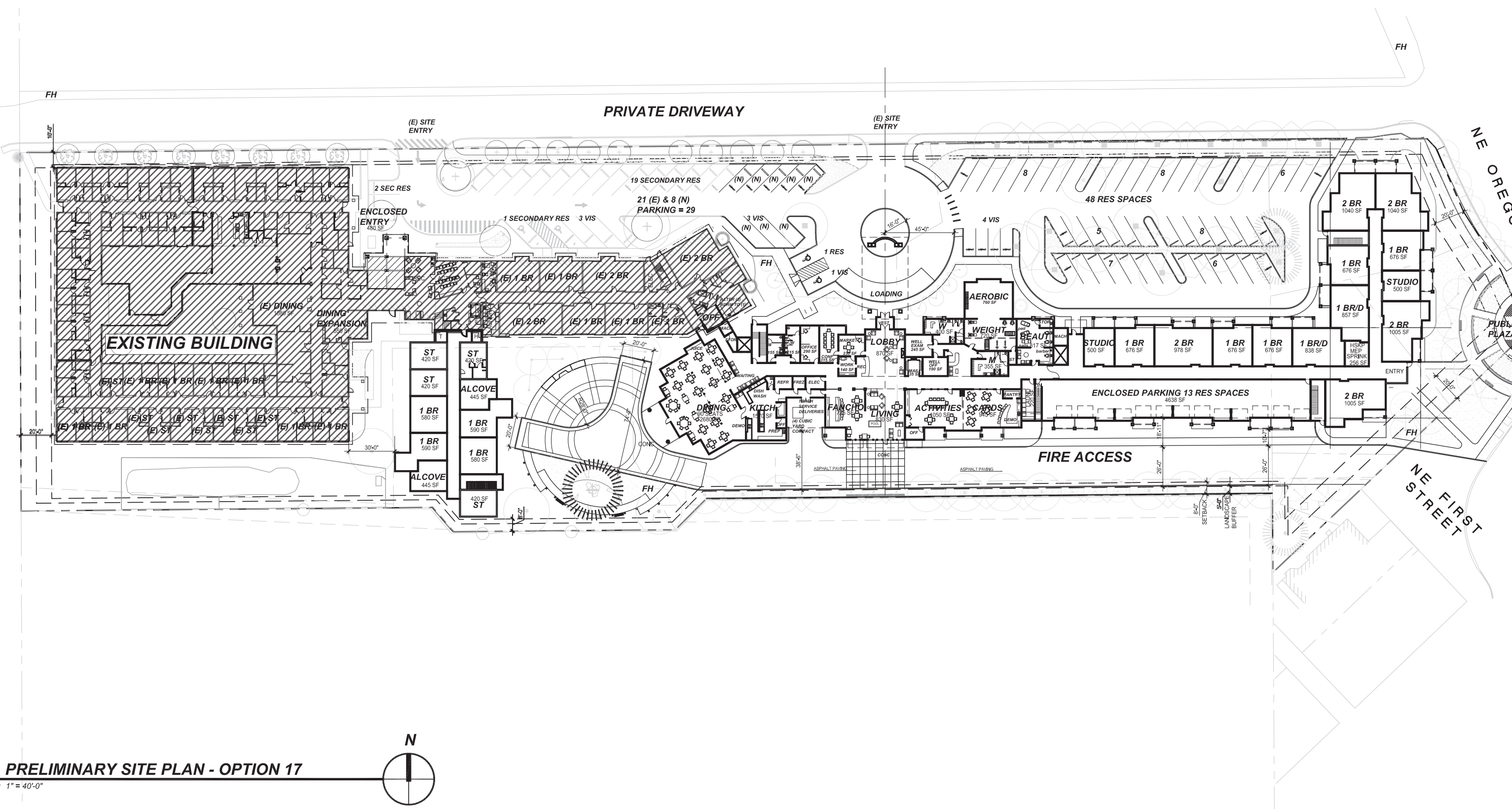
CONSTRUCTION

CONSULTANT:



1. PRELIMINARY SITE PLAN - OPTION 17

SCALE: 1" = 40'-0"

PARKING

(assumed) PREFERRED	REQUIRED	PROVIDED
(31) EXIST. MC UNITS X .5 = 15 SPACES	OFF STREET PARKING NOT REQUIRED FOR ALL PROPERTIES AND USES IN SMOCKVILLE AREA ORD. 2006-009. CALC ONLY FOR UNITS OUTSIDE SMOCKVILLE	EXIST.TO REMAIN = (21) SPACES
(36) EXIST AL UNITS X .5 = 18 SPACES		GARAGE PARKING = (13) SPACES
(20) NEW AL UNITS X .5 = 10 SPACES		PROPOSED ONSITE = (62) SPACES
(70) NEW IL UNITS X 1.2 = 84 SPACES	(13) 2BDRM X 1.5 = 20 SPACES	TOTAL ONSITE = 96 SPACES
TOTAL PREFERRED = 127 SPACES	(28) 1 BDRM X 1.25 = 35 SPACES	
	15% FOR VISITORS = 8 SPACES	RESIDENT PARKING = 84 SPACES VISITOR PARKING = 12 SPACES ACCESSIBLE PARKING = 5 SPACES
	TOTAL REQUIRED = 63 SPACES	

MEMORY CARE

(31) EXIST. UNITS

ASSISTED LIVING

(8) 1BR - AL
(4) ALCOVE - AL
(8) STUDIO - AL
TOTAL NEW - 20 UNITS
TOTAL EXISTING - 36 UNITS
TOTAL AL - 56 UNITS

1ST/2ND FLOOR AREA TOTAL = 6,385 SF
BUILDING AREA TOTAL = 12,770 SF

INDEPENDENT LIVING

ROOM COUNT 1ST FLR	ROOM COUNT TOTALS	
(5) 2BR	(25) 2BR	- 36% OF TOTAL
(5) 1BR	(33) 1BR	- 48% OF TOTAL
(2) 1BR/D	(6) 1BR/DEN	- 8% OF TOTAL
(2) STUDIO	(6) STUDIO	- 8% OF TOTAL
TOTAL - 14 UNITS	70 TOTAL UNITS	

1ST FLOOR AREA TOTAL	=	33,157 SF
2ND FLOOR AREA TOTAL	=	30,286 SF
3RD FLOOR AREA TOTAL	=	31,255 SF
IL BUILDING AREA TOTAL	=	94,698 SF
GARAGE	=	4,638 SF
MAINTENANCE BASEMENT	=	1,988 SF
IL BUILDING AREA TOTAL	=	101,324 SF
TI AREA (DINING EXPANSION)	=	1030 SF

PROJECT NUMBER: 212203

The Springs at Sherwood
Sherwood, Oregon

SHEET TITLE:
PRELIMINARY SITE PLAN

DRAWN BY: ----
DATE ISSUED: 03.24.2014

SHEET: **A101**

TRIP GENERATION CALCULATIONS

Land Use: Single-Family Detached Housing
Land Use Code: 210
Variable: Dwelling Units
Variable Value: 4

AM PEAK HOUR

Trip Rate: 0.75

	Enter	Exit	Total
Directional Distribution	25%	75%	
Trip Ends	**1**	**2**	**3**

PM PEAK HOUR

Trip Rate: 1.00

	Enter	Exit	Total
Directional Distribution	63%	37%	
Trip Ends	**3**	**1**	**4**

WEEKDAY

Trip Rate: 9.52

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**19**	**19**	**38**

SATURDAY

Trip Rate: 9.91

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**20**	**20**	**40**

Source: TRIP GENERATION, Ninth Edition

TRIP GENERATION CALCULATIONS

Land Use: Senior Adult Housing - Attached
Land Use Code: 252
Variable: Dwelling Units
Variable Value: 70

AM PEAK HOUR

Trip Equation: T = 0.20(X) - 0.13

	Enter	Exit	Total
Directional Distribution	36%	64%	
Trip Ends	**5**	**9**	**14**

PM PEAK HOUR

Trip Equation: T = 0.24(X) + 1.64

	Enter	Exit	Total
Directional Distribution	60%	40%	
Trip Ends	**11**	**7**	**18**

WEEKDAY

Trip Equation: T = 2.98(X) + 21.05

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**115**	**115**	**230**

Source: TRIP GENERATION, Ninth Edition

TRIP GENERATION CALCULATIONS

Land Use: Assisted Living
Land Use Code: 254
Variable: Beds
Variable Value: 67

AM PEAK HOUR (of Generator)

Trip Rate: 0.18

	Enter	Exit	Total
Directional Distribution	65%	35%	
Trip Ends	**8**	**4**	**12**

PM PEAK HOUR (of Generator)

Trip Equation: Ln(T)=0.79Ln(X)-0.06

	Enter	Exit	Total
Directional Distribution	44%	56%	
Trip Ends	**11**	**15**	**26**

WEEKDAY

Trip Equation: Ln(T)=0.56Ln(X)+3.07

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**113**	**113**	**226**

SATURDAY

Trip Rate: 2.20

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**74**	**74**	**148**

Source: TRIP GENERATION, Ninth Edition

TRIP GENERATION CALCULATIONS

Land Use: Assisted Living
Land Use Code: 254
Variable: Beds
Variable Value: 87

AM PEAK HOUR (of Generator)

Trip Rate: 0.18

	Enter	Exit	Total
Directional Distribution	65%	35%	
Trip Ends	**10**	**6**	**16**

PM PEAK HOUR (of Generator)

Trip Equation: Ln(T)=0.79Ln(X)-0.06

	Enter	Exit	Total
Directional Distribution	44%	56%	
Trip Ends	**14**	**18**	**32**

WEEKDAY

Trip Equation: Ln(T)=0.56Ln(X)+3.07

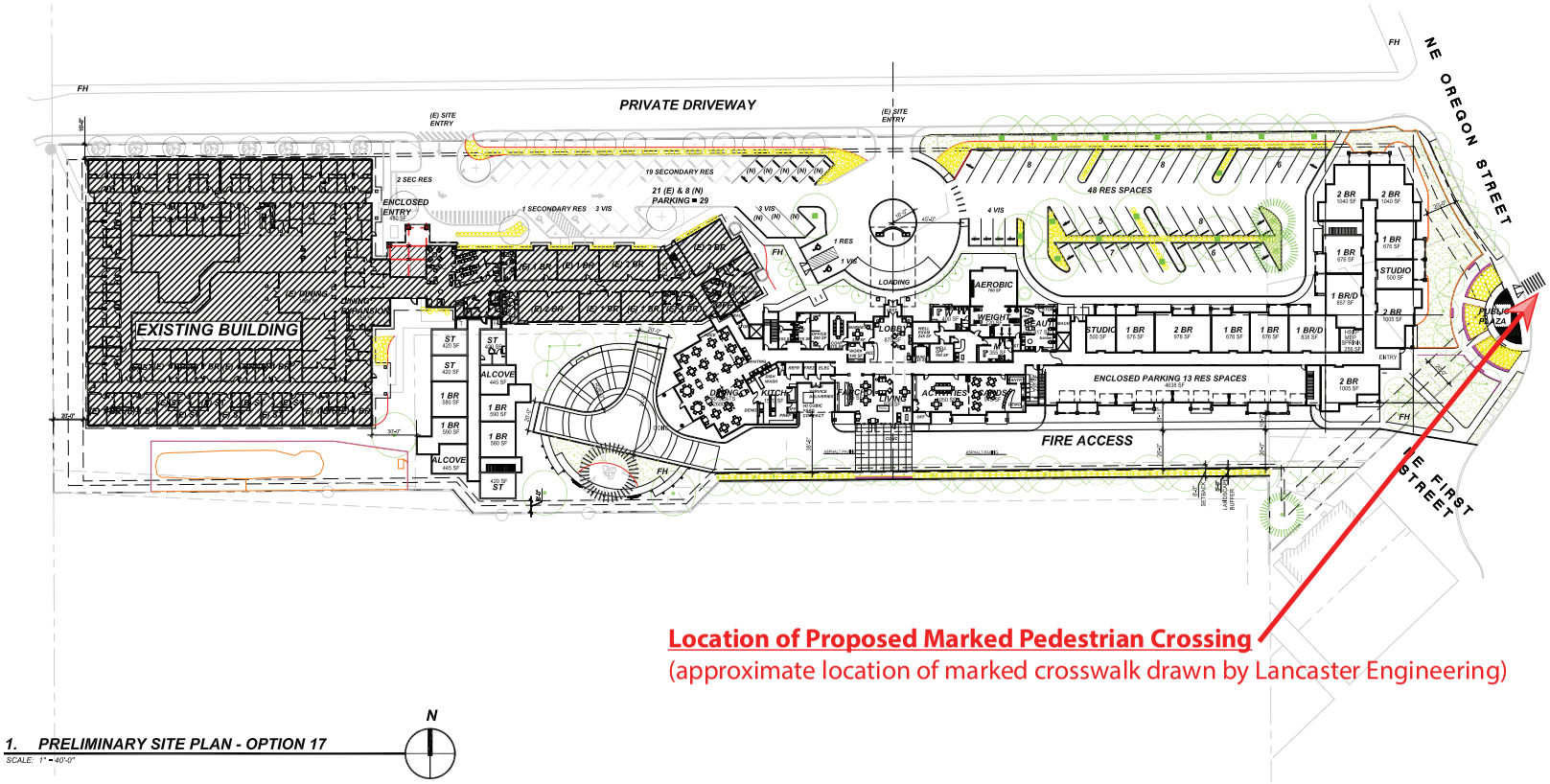
	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**131**	**131**	**262**

SATURDAY

Trip Rate: 2.20

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	**96**	**96**	**192**

Source: TRIP GENERATION, Ninth Edition



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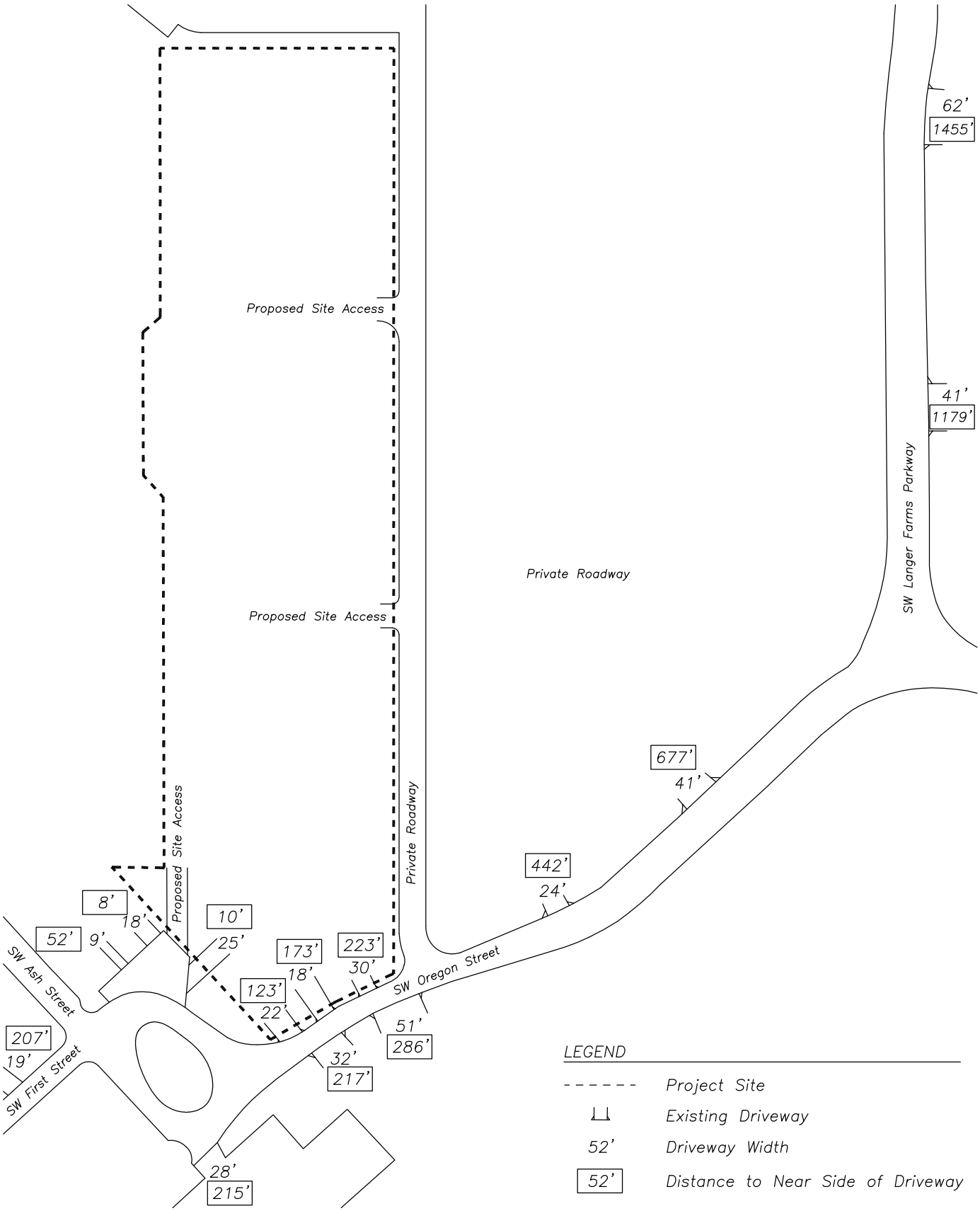

Location, Width, and Distance to Neighboring Driveways Based on Closest Site Access Point

no scale

FIGURE –

PAGE APP 7