



**King County**  
**Department of Permitting**  
**and Environmental Review**  
 35030 SE Douglas Street, Suite 210  
 Snoqualmie, WA 98065-9266  
**206-296-6600** TTY Relay: 711  
 www.kingcounty.gov

**Road Standards**  
**Variance Request to the**  
**County Road Engineer**

For alternate formats, call 206-296-6600.

<p>Project Name: Gunshy Manor</p> <hr/> <p>Project Address and Parcel Number: 20005 NE Union Hill Road, Redmond, WA 98053</p> <hr/> <p>Applicant/Design Engineer Name: The Estate of Barbara J Nelson c/o William C. Nelson, Jr.</p> <hr/> <p>Address: 16508 NE 79th St</p> <hr/> <p>City, State, ZIP: Redmond, WA 98072</p> <hr/> <p><input type="checkbox"/> Check here if project engineering plans are approved and construction has begun.</p>	<p>Permitting File No.: VARR18-00099</p> <hr/> <p>Signature: <i>Laura Egan</i> Date: <u>6/17/19</u></p> <hr/> <p>Engineering Firm Name: ESM Consulting Engineers, LLC</p> <hr/> <p>Telephone: 253-838-6113</p> <hr/> <p>Permitting Engineer Initials: _____</p> <p><input type="checkbox"/> Route Application</p>
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**INSTRUCTIONS TO APPLICANT/DESIGN ENGINEER:**

Please be sure to include all plans, sketches, photos and maps which may assist in complete review and consideration of your variance request. For a complete list of road variance submittal requirements, refer to separate list from Permitting. Failure to provide all pertinent information may result in delayed processing or denial of request. Please submit this request and applicable fee to the Department of Permitting and Environmental Review (Permitting) Permitting Service Center at 35030 SE Douglas Street, Suite 210 in Snoqualmie, WA 98065-9266. To make an appointment for permit submittal, please call 206-296-6797. For more information, refer to the Permitting Web site, [www.kingcounty.gov/permits](http://www.kingcounty.gov/permits).

**REFER TO SECTION 1.08 OF THE KING COUNTY ROAD STANDARDS FOR VARIANCES**

DESCRIPTION OF VARIANCE REQUEST: See Attached

- APPLICABLE SECTION(S) OF STANDARDS:
- 1) 2.02 Rural Local Roadways;
  - 2) 2.06 Private Roads;
  - 3) 2.08 Cul-de-sacs, Islands and Hammerhead;
  - 4) 2.10 Intersection and Low-Speed Curves;
  - 5) 3.02 Concrete Sidewalks;
  - 6) 3.09 School Access

JUSTIFICATION (see attachments, pages All to \_\_\_\_\_):

**AUTHORIZATION SIGNATURES:**

<p>PERMITTING STAFF RECOMMENDATION</p>	<p>DEPARTMENT OF TRANSPORTATION AUTHORIZATION</p> <p><input type="checkbox"/> Approval    <input type="checkbox"/> Conditioned Approval    <input type="checkbox"/> Denied</p> <p>County Design Engineer: _____ Date _____</p>
<p>Development Engineer/Designee: _____ Date _____</p>	<p>County Road Engineer: _____ Date _____</p>

CONDITIONS OF APPROVAL:

**Check out the Permitting Web site at [www.kingcounty.gov/permits](http://www.kingcounty.gov/permits)**



June 20, 2019

Job No. 1359-001-007

Mr. Robert Eichelsdoerfer, PE, Senior Engineer  
King County Dept. Of Transportation  
201 S Jackson St  
Seattle, WA 98104

And

Ms. Huey-Yi Sung, PE, Senior Engineer  
King County Dept. of Local Services,  
Permitting Division  
35030 SE Douglas Street, Ste #210  
Snoqualmie, WA 98065

**RE: Gunshy Manor Preliminary Plat – VARR18-0009  
Revised Road Variance Requests to the 2016 King County Road Design and  
Construction Standards**

Dear Robert and Huey:

On behalf of The Estate of Barbara J Nelson and the WCN GST Non-Exempt Marital Trust #2 (the "applicant") and pursuant to subsection D.5 of Section 1.13 (Variances) of the 2016 King County Road Design and Construction Standards (KCRDCS), ESM Consulting Engineers is submitting this revised letter and relevant exhibits to serve as the applicant's request for determinations and approvals of certain variances in relation to provisions of the KCRDCS for the proposed Gunshy Manor Preliminary Plat.

In early April 2019, the applicant and ESM Consulting Engineers attended a meeting with King County staff to discuss comments provided by the County on March 21, 2019. During this meeting, County staff provided support of the road variance application and expressed no concerns with the proposed variances. In addition, further correspondence with Robert, KCDOT Engineer, concluded agreement on the revised private-road boulevard near the entrance of the project site and within the critical area buffer. ESM also discussed with Huey, KCDOLS Engineer, the proposal to provide a sidewalk on one side of the boulevard section and the need for a crosswalk that meets sight distance for safety purposes.

This revised road variance request is provided to the County to clarify specific requests and to address additional road variances required, which are *italicized* in the next section of this letter. Please review the Gunshy Manor Preliminary Site Plan as a visual aid to represent these specific requests.

### Road Variance Requests

The applicant requests the following determinations and variances in relation to one or more subsections of each of the following 2016 KCRDCS sections:

- (1) *A determination by the Development Engineer for approval of a "curb" type roadway on a rural road within the boulevard section of the proposed Tract G, as supported in Section 2.01 – Land Developments in Rural Areas and specified in subsection E of section 2.02 – Rural Local Roadways;*
- (2) *Approval by the Development Engineer to allow a private rural subaccess roadway with thickened asphalt edge rather than with curb, pursuant to subsection A of Section 2.06 (Private Roads);*
- (3) A determination by the County Road Engineer pursuant to subsection B of Section 2.06 (Private Roads) to allow 23 single-family residential lots to be served by the private road;
- (4) Approval by the County Road Engineer of a variance pursuant to subsection A.4 of Section 2.08 (Cul-de-Sacs, Islands, and Hammerheads) for the length of the proposed ±2900-foot-long permanent cul-de-sac;
- (5) A determination by the County Road Engineer that the intersection spacing provisions of Section 2.10 Intersection and Low-Speed Curves are inapplicable under Section 2.06.G.8 regarding the proposed private road intersection with NE Union Hill Road;
- (6) *Approval by the County Road Engineer to allow a concrete sidewalk on one side of the rural road within the boulevard section of the proposed Tract G, as specified in Section 3.02(1);*
- (7) *A consideration of following Figure 2-005, Extruded Curb Roadway, along a 60' long portion of NE Union Hill Road, as an alternative provision for safe School Access for students within the proposed development, as outlined in Section 3.09.*

### Background

The proposed Gunshy Manor preliminary plat is for 23 single-family lots arranged in a clustered layout to avoid impacts to the extensive critical areas of the site. The private road (Tract G) enters from NE Union Hill Road and extends into the project site, crossing Martin Creek and its buffer. The proposed cross-sections are provided to comply with KCC 21A.24.125, avoiding and minimizing impacts to critical areas, as well as to provide for adequate fire access as required in the 2016 KCRDCS.

This project proposes a boulevard section through the Martin Creek buffer that includes a gated entryway, two residential and fire apparatus paths for egress and ingress, center median, curb and gutter and a sidewalk on one side.

Beyond the boulevard section, the proposed Tract G contains a 48' rural subaccess private roadway with 28' of pavement to support two travel lanes and parking on one side, along with thickened edge and a 4' shoulder on both sides, with additional 6' of grade on both sides to meet the minimum standard for this type of road section. The entirety of Tract G extends approximately 1,500 feet to a midsection eyebrow cul-de-sac for large-vehicle turnaround relief and extends another approximately 1,400 feet to the end of the cul-de-sac where it terminates in a bulb.

#### 1. "Curb" Type Roadway Request - 2.02(E) Rural Local Roadways

Subsection E of the 2016 KCRDCS Section 2.02 provides provision for the County Road Engineer or Development Engineer to approve a variance from a "shoulder" type roadway within Rural Local Roadways. In order to comply with KCC 21A.24.125 while also providing for the necessary features of a private and rural roadway, the boulevard section of Tract G proposes the use of a "curb" type roadway with a sidewalk on one side to minimize the footprint of the roadway within the Martin Creek crossing and buffer.

The use of the "curb" typing minimizes the permanent road improvements by minimum width of 3' along the length of the boulevard section, which totals over 1,300 SF of minimization while also providing a safe walking path for pedestrians. Section 2.01, Land Development in Rural Areas supports the use of "curb" typing within cluster subdivision such as this to support minimizing impacts to critical areas.

#### 2. Rural Subaccess Private Roadway with Thickened Edge Variance - 2.06(A) Private Roads

Subsection A of Section 2.06 (Private Roads) expresses that the Development Engineer may allow a thickened edge asphalt with the provision that stormwater treatment will be adequate and safety uncompromised. The cross-section C-C proposed for the primary portion of Tract G includes 2' thickened edge on both sides of the road as opposed to curbing or immediate shoulder and ditch as depicted on Fig. 2-001 of King County Road Standard Figures.

Curbing is not within this section of the road as it is not consistent with the edges for a rural roadway. An immediate shoulder with a ditch is also not proposed because a storm drainage system, designed to meet the 2016 King County Stormwater Manual standards, is proposed through a series of piping within the roadway and detention facilities on the site to collect, treat and disperse stormwater.

Safety is not compromised with this design – pedestrian access is available along the 4' shoulders immediately adjacent to the thickened edge along the entire road, along with a crosswalk that connects to the sidewalk for the boulevard section. The width of the roadway as proposed, 28' of paving in total, provides room for 2 travel lanes and parking on the eastern side of the road.

Additionally, in view of the significant length of the proposed private road, having the road privately owned and maintained supports the intent of a private road because all the existing surrounding parcels already have means of existing access to a public road. The County will not be responsible for maintaining another public road through this proposal.

### 3. Determination to Allow 23 Single-Family Lots - 2.06(B) Private Roads

The proposal plans for the private road to serve all 23 of the proposed single-family lots within the clustered subdivision. KCRDCS Subsection B of Section 2.06 (Private Roads) allows up to 50 lots to be served by private roads when the entire length of a proposed private road system to the nearest public maintained road is considered, and when the County Road Engineer determines that the following criteria are met:

1. There is no opportunity for connecting to neighboring parcels or developments, or
2. When there are physical barriers, zoning regulations, legal constraints or any other applicable restrictions that prohibits the connection to road stub-outs, easements, neighboring parcel(s), public roads, or rights of way.

In addition, there is no opportunity for connection of the subject development to existing roads on adjacent properties or developments because none of those properties have existing roads stubbed to the subject site. Further, steep slopes exist to the south and east, and wetlands and aquatic areas exist to the south and west. Also, the existing lots to the west of the north end of the proposed subdivisions site have been fully developed. In sum, these constraints provide no opportunity for connecting to neighboring parcels or developments.

### 4. Road Length Variance - 2.08(A.4) Cul-De-Sacs, Islands and Hammerheads

Subsection A.4 of KCRDCS Section 2.08 (Cul-De-Sacs, Islands, and Hammerheads) provides a general limit of 600 feet on a permanent cul-de-sac but provides for variance opportunity by the County Road Engineer. As proposed, the Gunshy Manor subdivision contains a tract for a private roadway (Tract G) with a cul-de-sac extending approximately 1,400 feet from centerline of the midsection eyebrow cul-de-sac to the center of the terminal bulb and roughly another 1,500 lineal feet for a total length of  $\pm 2,900$  lineal feet.

However, because of (1) the site's elongated geometry from north to south and the barriers presented by the site's critical areas and (2) the lack of existing roads to the subject site from surrounding properties, there is no other reasonable layout alternative for a road to serve the proposed lots. In addition to the internal eyebrow cul-de-sac for emergency and service vehicle turnaround, individual driveways would allow turn-around opportunities along the length of the cul-de-sac as each proposed driveway will be longer than 30 feet long (while some over 100 feet long) and 16 feet in width to match KCRDCS standards.

Note that precedent exists for approval of a cul-de-sac in unincorporated King County longer than the length of the subject proposed cul-de-sac. For example, the "Ames Lake Hills" residential subdivision was approved by King County, recorded (King County Recording Number 9505151542), and developed with an overall cul-de-sac length of  $\pm 4,000$  feet. (See the accompanying Ames Lake Hills cul-de-sac exhibit.)

5. Determination That the Intersection Spacing Provisions Are Inapplicable to the Proposed Private Roadway - 2.10(B) Intersections and Low-Speed Curve

The intersection spacing provisions of Section 2.10(B) are inapplicable to the subject proposed private road. On page number 6 of the accompanying "Gunshy Manor Site Access Analysis" memorandum prepared by Transpo Group, Transpo explains why, as can be seen in the following excerpt:

**Intersection Spacing**

The proposed access along NE Union Hill Road was analyzed relative to intersection spacing per *King County Road Design and Construction Standards – 2016*. Per King County Road Standards, intersection spacing is set for the highest classification of street involved, which for these intersections is NE Union Hill Road (a minor arterial), resulting in a recommended spacing of 500 feet between intersections. This is intended for public street connections with higher volumes. The proposed private access is located approximately 180 feet west of 199th Avenue NE. Both 199th Avenue NE and the proposed access are private roads intersecting NE Union Hill Road.

As both accesses are private roads, the minimum roadway spacing requirements noted in the standards are not applicable. The intersection spacing is a result of providing improved sight distance east of the proposed driveway along NE Union Hill Road. The private road of 199th Avenue NE serves 7 single-family homes and up to 25 homes via the proposed access. Low volumes are forecast at both of the proposed accesses with up to 21 trips during the weekday PM peak hour at the proposed access as shown above and approximately 7 trips during the weekday PM peak hour at the 199th Avenue NE access. The two private roads provide access to single family homes with low volumes of traffic and the 180 feet between the driveways will be sufficient.

As an additional justification for the requested determination, note that prior to the applicant's purchase of the parcel of land that has become the westernmost part of the site that abuts the south side of NE Union Hill Road, the planned NE Union Hill Road access point to the project site was substantially farther to the east, where there was less sight distance visibility available to and from the east around and behind the NE Union Hill Road curve. That said, the current proposal provides greater sight distance with the new access point location and minimal need for right-of-way clearing. (For additional information concerning sight distance, please refer to page numbers 5 and 6 of Transpo's November 29, 2018 Sight Access Analysis Memorandum).

6. Approval for Concrete Sidewalk on One Side of Rural Roadway - 3.02(1) Concrete Sidewalks

In addition to the aforementioned design alternatives and justifications proposed within Tract G, the proposed boulevard section contains a 5' wide sidewalk on one side. Section 3.02(1) calls for sidewalks on both sides when provided, unless otherwise allowed by the County Road Engineer.

In an effort to support safe pedestrian use, a crosswalk that meets sight-distance requirements is proposed at the southern end of the boulevard section for those walking along the eastern shoulder, as a walking path is not provided on the eastern side of the boulevard section. The provision for a sidewalk on one side of the boulevard section is to support the effort to minimize impacts to the Martin Creek crossing and buffer.

## 7. Consideration to use Extruded Curb as shown in Figure 2-005 - 3.09 School Access

Section 3.09 provides specifications for surfacing standards when school access is required as part of the development approval. Since a bus stop is already located within 50' of the proposed entryway for the project on NE Union Hill Road, school access improvements were not specifically required by the County or Lake Washington School District. However, in order to support new students that may reside in the proposed subdivision, this project proposes to provide a safe waiting area for students along Union Hill.

From the western edge of the proposed entryway improvements for the project site, an extruded curb will be installed at the edge of the existing pavement with a 5' wide crushed-surface walkway that extends 60' westward. At approximately 50' west of the entryway, an 8' wide crosswalk will be provided at the bus stop location. The applicant asks the County Road Engineer to consider and approve the use of design standards shown in Figure 2-005 along NE Union Hill for 60' in support of safe School Access. Please refer to the included Safe School Walkways Analysis exhibit to view correspondence with Lake Washington School District.

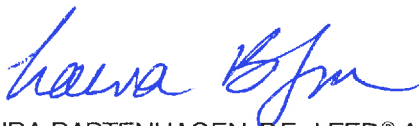
### Summary

The requested determinations and the requested variance to the 2016 KCRDCS should be approved for the reasons set forth above and because they are in the public interest. The public interest will be served by issuance of the requested determinations and variance because (1) those decisions will allow the developable portion of the subject property to be developed for single-family residential lots off the proposed private road, (2) the design alternatives provide for safe vehicle and pedestrian accesses, and (3) impacts to existing critical areas will be reduced while allowing the project to achieve safety, functionality, fire protection, appearance and maintainability of the road network.

We look forward to working with you on this project. Please do not hesitate to contact me if you have any questions, comments or concerns.

Sincerely,

ESM CONSULTING ENGINEERS, LLC.



LAURA BARTENHAGEN, P.E., LEED® AP  
Principal

Enc: As Noted

cc: Buff Nelson, The Estate of Barbara J. Nelson  
David Halinen, Halinen Law Offices





## MEMORANDUM

<b>Date:</b>	November 29, 2018	<b>TG:</b>	1.13203.04
<b>To:</b>	The Estate of Barbara Nelson C/O Buff Nelson		
<b>From:</b>	Dan McKinney, Jr. & Kassi Leingang, PE – Transpo Group		
<b>cc:</b>	Buff Nelson – Gunshy Manor		
<b>Subject:</b>	Gunshy Manor Site Access Analysis		

The following memorandum summarizes the operations of the site accesses to the proposed Gunshy Manor residential development and includes an overview of the project, project traffic volumes, and traffic operations.

### Project Description

The project is located in unincorporated King County just east of the Redmond City limits and is bounded by NE Union Hill Road to the north (see Figure 1) and includes the development of up to 23 single family homes, with 3 existing homes in use being removed. Access to the 23 proposed homes is being provided via NE Union Hill Road approximately 1,000 feet east of the 196th Avenue NE/NE Union Hill Road roundabout in the northwest corner of the property. The driveway location was shifted to the west to enhance sight distances, which improves safety and reduces the amount of vegetation needing to be removed.

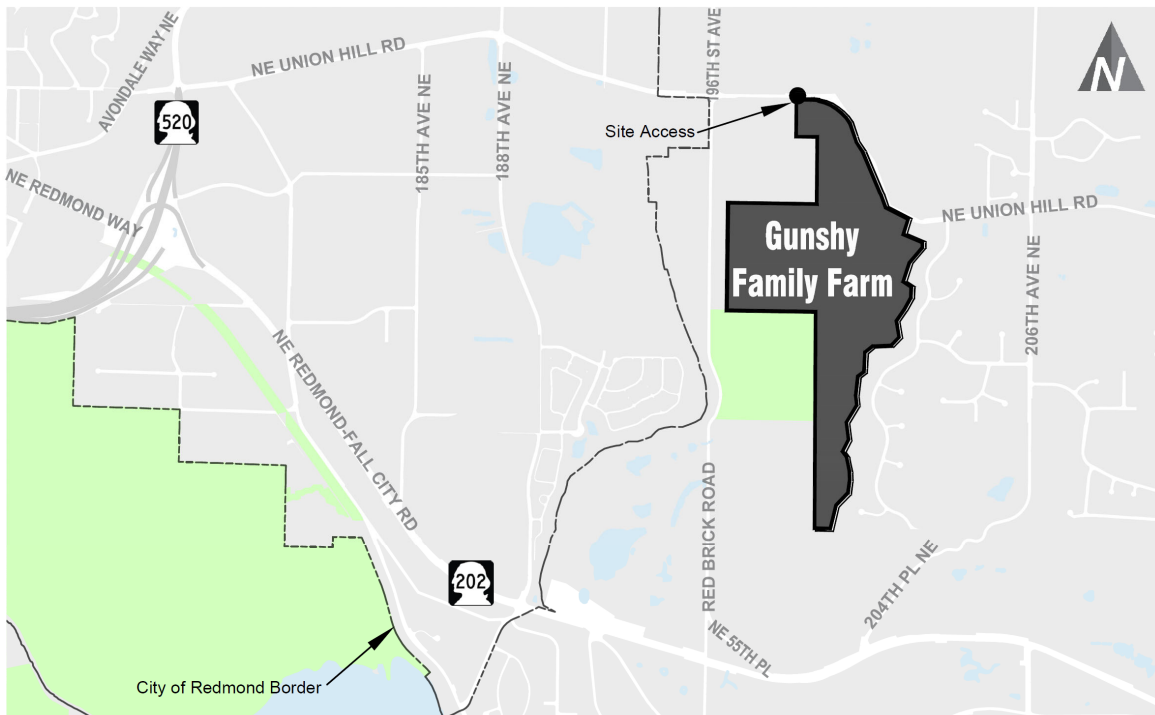


Figure 1 – Property Vicinity & Location

## Traffic Volumes

The following section describes the existing and future without-project traffic volumes as well as estimates the traffic volumes associated with the proposed development.

### Existing and Future Without-Project

A 7-day, 24-hour traffic volumes were collected along NE Union Hill Road in the vicinity of the primary proposed site access in order to capture the existing traffic volume profile in July/August 2018 (see Attachment A). The weekday mid-week (Tuesday-Thursday) average traffic volumes by time of day are shown in Figure 2 below.



Figure 2 – Existing NE Union Hill Road Traffic Volume Profile

As the figure shows, the weekday peak traffic volumes occur during the AM and PM peak periods at approximately 8:00 a.m. and 5:00 p.m. The weekday AM and PM peak hour traffic volumes at the site access intersections are discussed below.

Existing weekday AM and PM peak hour traffic counts were collected at the 196th Avenue NE/NE Union Hill Road intersection, northwest of the site in July 2018. Detailed existing traffic counts are provided in Attachment B. Future (2021) without-project traffic volumes were forecasted by applying an annual growth rate of 3 percent to existing traffic volumes.

### Future With-Project

The traffic volumes associated with the proposed development were estimated based on trip rates in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition (2017). The development is estimated to generate approximately 189 net new vehicular weekday daily trips with 15 trips occurring during the weekday AM peak hour and 20 occurring during the weekday PM peak hour.

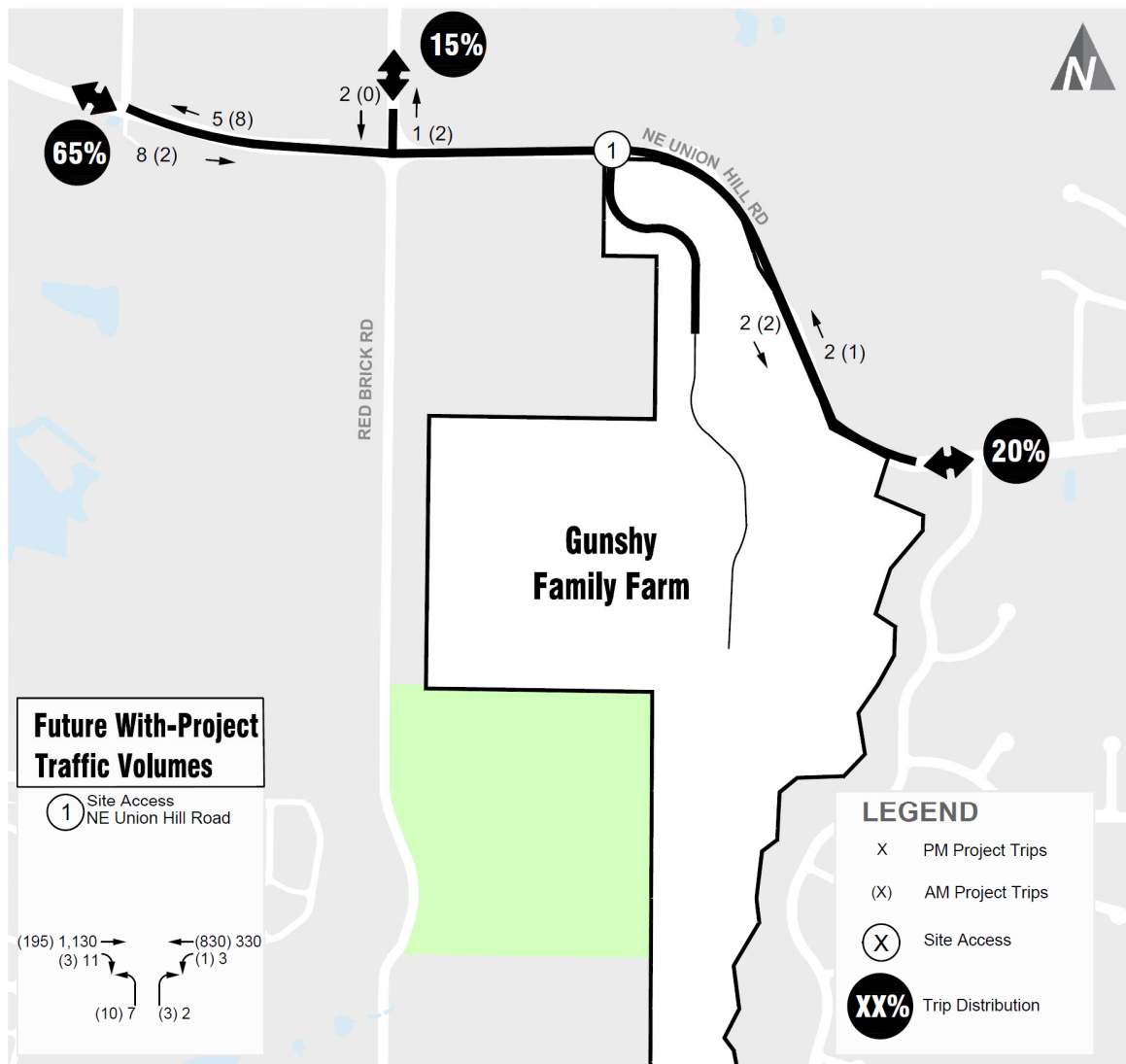
**Table 1. Estimated Weekday Vehicle Trip Generation**

Single Family Detached Housing (LU #210)	Size	Daily Trips	AM Peak Hour Trips <sup>1</sup>			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Proposed	23 DU	227	4	13	17	14	9	23
Existing	3 DU	38	1	1	2	2	1	3
Net New	20 DU	189	3	12	15	12	8	20

Notes: DU= dwelling unit

1. Trip generation based on ITE *Trip Generation Manual* (10th Edition, 2017).

These additional trips were distributed to and from the project site based on existing vehicle travel patterns and the proposed accesses. The trips were generally distributed with approximately 65 percent to/from the west, 20 percent to/from the east or southeast, and 15 percent to/from the north. The project trip distribution for vehicle trips is shown in Figure 3. The project trip assignment to each access is illustrated in Figure 3.



**Figure 3 – Project Trip Distribution and Assignment and Future With-Project Traffic Volumes**

The assigned project generated traffic was added to the future without-project weekday peak hour traffic volumes at the site access intersections. The resulting future (2021) with-project peak hour traffic volumes are shown in Figure 3.

## Traffic Operations

The following section evaluates the operations of the site access intersections. The level of service of both accesses was evaluated. Additionally, the effective vehicle capacity was completed at the NE Union Hill Road site access.

### Level of Service Analysis

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). At unsignalized side-street, stop-controlled intersections, LOS is measured by the average delay on the worst-movement of the intersection. Traffic operations and average vehicle delay for an intersection can be described qualitatively with a range of levels of service (LOS A through LOS F), with LOS A indicating free-flowing traffic and LOS F indicating extreme congestion and long vehicle delays. Appendix B contains a detailed explanation of LOS criteria and definitions.

Weekday AM and PM peak hour traffic operations with the development of the project were evaluated at the site access intersections based on the procedures identified in the *Highway Capacity Manual* (2010) and were evaluated using *Synchro 9.1*. *Synchro 9.1* is a software program that uses *HCM* methodology to evaluate intersection LOS and average vehicle delays. Detailed LOS worksheets for both site access intersections are included in Attachment C. The weekday AM and PM peak hour operations at the site accesses are summarized in Table 1.

**Table 2. Future (2021) With-Project Weekday AM and PM Peak Hour Intersection LOS Summary**

Intersection	AM Peak Hour			PM Peak Hour		
	LOS <sup>1</sup>	Delay <sup>2</sup>	WM <sup>3</sup>	LOS	Delay	WM
1. Site Access/NE Union Hill Road	C	21	NB	D	33	NB

1. Level of Service (A – F) as defined by the 2010 *Highway Capacity Manual* (HCM), Transportation Research Board.
2. Average delay per vehicle in seconds.
3. Worst movement reported for unsignalized two-way stop controlled intersections.

The primary site access along NE Union Hill Road is forecast to operate at LOS C and LOS D during the weekday AM and PM peak hours respectively with queues estimated to be up to 1 vehicle.

### Effective Vehicle Capacity

In order to verify the LOS D or better operations determined in the LOS analysis above at the site access along NE Union Hill Road, the effective vehicle capacity was also evaluated.

A combination of three factors go into calculating the effective vehicle capacity: the number of gaps<sup>1</sup> between vehicles, the headway<sup>2</sup> between vehicles as reflected by the length of time for the observed gaps, and observed courteous driver behavior. The consideration of these three factors is referred to as the effective vehicle capacity.

Data was collected for one week in July/August 2018 along NE Union Hill Road to determine the available vehicle capacity to accommodate vehicles exiting the project site (northbound right and northbound left movements from the site onto NE Union Hill Road). The amount of time required for a vehicle to turn out of the site driveway onto NE Union Hill Road was estimated based on the critical headway calculation per *Highway Capacity Manual* (HCM) 2010, Transportation Research

<sup>1</sup> For this study, a gap is defined as the space between two vehicles.

<sup>2</sup> Headway is defined as the time between two successive vehicles as they pass a point on the roadway measured from the same common feature of both vehicles (for example from the front bumper).

Board.<sup>3</sup> The time was estimated to be approximately 6 seconds for both the northbound left-turn and northbound right-turn movements.

The data was collected in various second intervals (e.g. 0 to 0.5 seconds, 0.5 to 1 second, 1 to 2 seconds, 2 to 4 seconds, 4 to 8 seconds, etc.). The number of gaps of 8 seconds or more were utilized for the analysis for both the northbound left-turn and northbound right-turn movements discussed below. The gaps and total time calculations are shown in Attachment D.<sup>4</sup>

- **Northbound Right-Turn:** The average minimum number of gaps during the AM peak period was 21 gaps during a 15-minute period. During the PM peak period (4 p.m. to 6 p.m.) the minimum number of gaps was 15 gaps during a 15-minute period.
- **Northbound Left-Turn:** The average minimum number of gaps during the AM peak period was 25 gaps during a 15-minute period. During the PM peak period (4 p.m. to 6 p.m.) the minimum number of gaps was 12 gaps during a 15-minute period.

As shown in Figure 3 above, the exiting volumes (i.e. the northbound left and right-turn movements) are 13 and 9 vehicles during the weekday AM and PM peak hours. The gap analysis showed there are greater than 20 gaps every 15 minutes for both movements during the AM peak period and 12 or more gaps every 15 minutes for both movements during the PM peak period, both of which exceed the number of project trips in the respective time periods. Therefore, there is sufficient vehicle capacity along NE Union Hill Road to accommodate the anticipated peak hour vehicles exiting the site during the AM and PM peak hours.

## Sight Distance Evaluation

Sight distance was evaluated at the proposed Gunshy Manor driveways consistent with King County sight distance standards<sup>5</sup>.

The 2012 Arterial Functional Class Unincorporated King County map classifies NE Union Hill Road as a minor arterial roadway. Per Section 2.02 of the *King County Road Design and Construction Standards (2016)*, the design speed of a minor arterial roadway is the posted speed plus 10 mph. In view of NE Union Hill Road's posted speed limit of 35 mph east of 196th Avenue NE, NE Union Hill Road's design speed is 45 mph.

Stopping sight distance is the distance needed for a vehicle to safely stop. Based on the design speed of 45 mph along NE Union Hill Road and the road's 9 percent downward grade, the required stopping sight distance for westbound traffic on NE Union Hill Road is 430 feet per *King County Road Design and Construction Standards (2016)*. For eastbound traffic, the required minimum stopping sight distance is 360 feet based on the design speed and the relatively flat roadway grade, which is less than 3 percent. The required stopping sight distance triangles east and west of the proposed driveway are shown in Attachments E and F, respectively. As shown in the attachments, the required stopping sight distance is met.

Entering sight distance is the distance needed for vehicles to not disrupt<sup>6</sup> the traffic flow of the main roadway, rather than a distance for safety purposes (i.e. stopping sight distance). The recommended entering sight distance per *King County Road Design and Construction Standards (2016)*, is 500 feet for both eastbound and westbound traffic based on a design speed of 45 mph. The recommended entering sight distance triangles east and west of the proposed driveway are shown in Attachments E and F, respectively.

<sup>3</sup> HCM 2010 Section 19, equation 19-30.

<sup>4</sup> The calculations were based on the mid-week data (Tuesday-Thursday) for the minimum gaps and max time of gaps that were too small for vehicles to exit the site onto NE Union Hill Road.

<sup>5</sup> Per *King County Road Design and Construction Standards – 2016*.

<sup>6</sup> Disrupt as defined per AASHTO means that "most major-road drivers should not need to reduce speed to less than 70 percent of their initial speed." (*A Policy on Geometric Design of Highways and Streets*, 6th Edition)

The recommended entering sight distance west of the proposed driveway is met (see Attachment F). East of the driveway, the entering sight distance is currently obstructed by some vegetation and existing trees that are located within the right-of-way (see Attachment E). Attachment E highlights the location of trees near the curve. The developer will work with the County to remove necessary trees and clear underbrush or vegetation in the right-of-way to achieve adequate sight distance. Prior approval was granted by King County under GRDE16-0105, which allowed significantly more clearing than is now proposed.

## Intersection Spacing

The proposed access along NE Union Hill Road was analyzed relative to intersection spacing per *King County Road Design and Construction Standards – 2016*. Per King County Road Standards, intersection spacing is set for the highest classification of street involved, which for these intersections is NE Union Hill Road (a minor arterial), resulting in a recommended spacing of 500 feet between intersections. This is intended for public street connections with higher volumes. The proposed private access is located approximately 180 feet west of 199th Avenue NE. Both 199th Avenue NE and the proposed access are private roads intersecting NE Union Hill Road.

As both accesses are private roads, the minimum roadway spacing requirements noted in the standards are not applicable.<sup>8</sup> The intersection spacing is a result of providing improved sight distance east of the proposed driveway along NE Union Hill Road. The private road of 199th Avenue NE serves 7 single family homes and up to 25 homes via the proposed access. Low volumes are forecast at both of the proposed accesses with up to 21 trips during the weekday PM peak hour at the proposed access as shown above and approximately 7 trips<sup>9</sup> during the weekday PM peak hour at the 199th Avenue NE access. The two private roads provide access to single family homes with low volumes of traffic and the 180 feet between the driveways will be sufficient.

## Summary

The Gunshy Manor residential development is located in unincorporated King County just east of the Redmond City limits and is bounded by NE Union Hill Road to the north and includes the development of up to 23 single family homes and removal of up to 3 existing single family homes. Access to the site is proposed along NE Union Hill Road. The development is estimated to generate approximately 189 net new vehicular weekday daily trips with 15 trips occurring during the weekday AM peak hour and 20 occurring during the weekday PM peak hour. The primary site access along NE Union Hill Road is forecast to operate at LOS C and LOS D during the weekday AM and PM peak hours respectively with queues estimated to be up to 1 vehicle. A gap analysis was performed and verified NE Union Hill Road has the capacity to accommodate the additional project trips.

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<sup>8</sup> Per *King County Road Design and Construction Standards – 2016*: Section 2.06 G8– Private Roads “Not needed as public roads to meet the minimum road spacing requirements of these Standards”.

<sup>9</sup> The trip generation was estimated based on ITE’s *Trip Generation Manual* (10th Edition, 2017) for Single Family Detached Housing (LU # 210), consistent with the proposed development.

## Attachment A: 24-Hour Traffic Counts



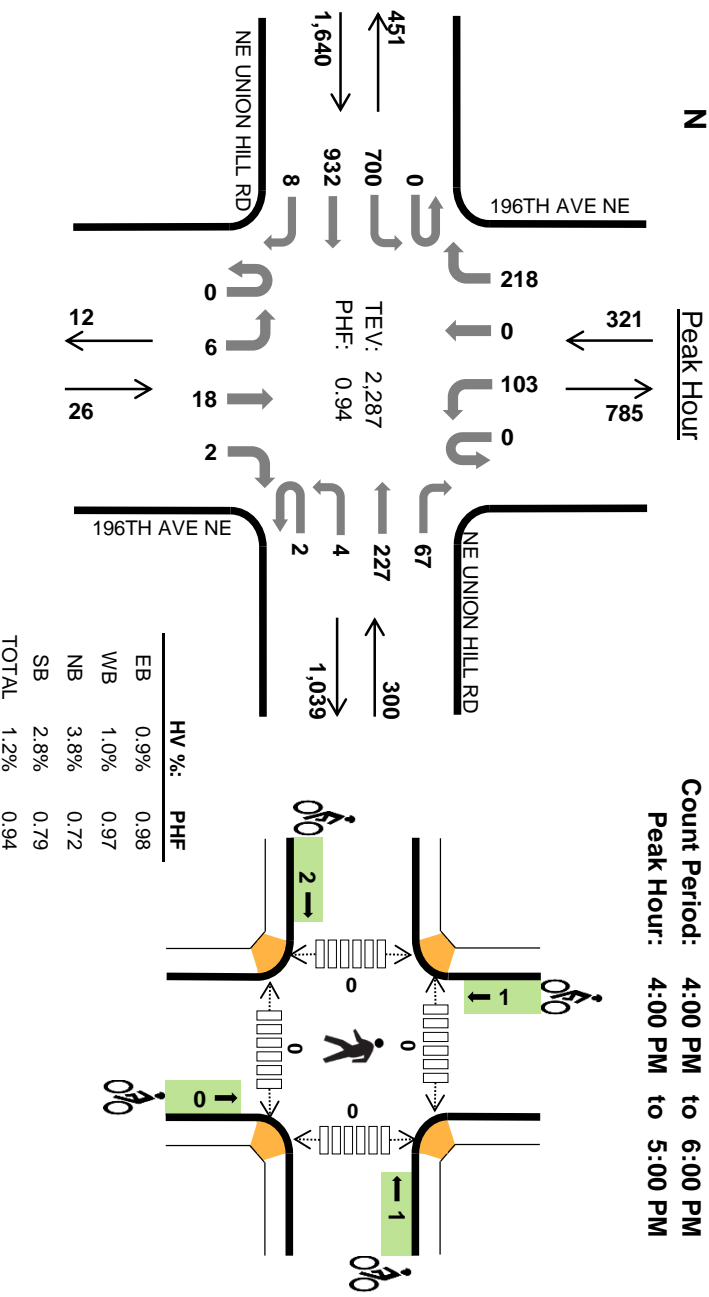
Time	7/27/2018		7/28/2018		7/29/2018		7/30/2018		7/31/2018		8/1/2018		8/2/2018		Mid-Week Average	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	41	12	53	44	23	37	23	60	23	9	32	24	4	28	33	10
1:00 AM	12	8	20	28	15	43	34	46	16	11	27	5	5	10	7	3
2:00 AM	5	9	14	14	11	25	9	10	19	7	8	15	7	8	8	6
3:00 AM	3	12	15	15	7	9	16	8	9	17	4	11	11	10	6	3
4:00 AM	6	34	40	4	18	22	2	17	19	3	50	53	4	42	46	5
5:00 AM	16	108	124	14	37	51	11	22	33	15	125	140	9	130	139	19
6:00 AM	84	340	424	34	75	109	20	50	70	67	357	424	69	377	446	71
7:00 AM	141	579	720	68	163	231	47	100	147	129	617	746	140	667	807	130
8:00 AM	216	677	893	121	233	354	105	181	286	158	773	931	197	775	972	205
9:00 AM	211	503	714	211	334	545	150	270	420	211	495	706	213	589	802	207
10:00 AM	248	388	636	316	357	673	196	290	486	227	403	630	223	392	615	231
11:00 AM	324	343	667	321	330	651	333	302	635	290	327	617	268	347	615	299
12:00 PM	398	268	666	369	308	677	321	364	685	356	279	635	369	301	670	344
1:00 PM	405	297	702	397	299	696	353	266	619	355	267	622	363	274	637	383
2:00 PM	502	269	771	428	276	704	331	249	580	481	280	761	439	261	700	435
3:00 PM	758	267	1,025	448	295	743	301	223	524	637	285	922	655	282	937	676
4:00 PM	874	289	1,163	371	271	642	348	226	574	901	242	1,143	993	292	1,285	989
5:00 PM	850	256	1,106	353	229	582	321	195	516	1,065	254	1,319	1,084	266	1,350	1,066
6:00 PM	575	287	862	285	181	466	286	161	447	742	200	942	825	242	1,067	743
7:00 PM	384	187	571	245	200	445	233	115	348	398	151	549	466	180	646	552
8:00 PM	343	137	480	215	161	376	206	103	309	293	123	416	303	127	430	349
9:00 PM	200	93	293	195	120	315	173	92	265	204	83	287	221	64	285	218
10:00 PM	167	49	216	171	119	290	99	43	142	122	44	166	126	44	170	127
11:00 PM	88	31	119	86	45	131	48	24	72	63	16	79	67	20	87	63
Total	6,851	5,443	12,294	4,745	4,109	8,854	3,972	3,347	7,319	6,767	5,406	12,173	7,068	5,697	12,765	7,165
Percent	56%	44%	44%	54%	46%	54%	46%	46%	56%	44%	56%	45%	55%	44%	56%	44%

1. Mid-week average includes data between Tuesday and Thursday.



## Attachment B: Existing Peak Hour Traffic Counts

# 196TH AVE NE NE UNION HILL RD



Date: Tue, Jul 31, 2018

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 4:00 PM to 5:00 PM

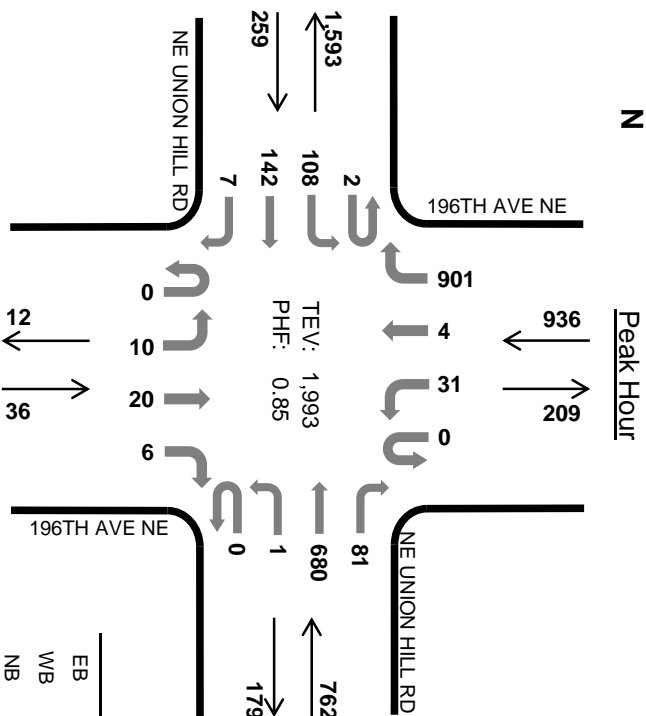
## Two-Hour Count Summaries

Interval Start	NE UNION HILL RD				NE UNION HILL RD				196TH AVE NE				196TH AVE NE				15-min Total	Rolling One Hour
	Eastbound		Westbound		Eastbound		Westbound		Northbound		Southbound		Eastbound		Westbound			
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	215	204	1	1	1	63	12	0	1	7	0	0	31	0	70	606	0
4:15 PM	0	174	228	5	0	2	55	14	0	2	3	1	0	29	0	53	566	0
4:30 PM	0	151	258	1	0	1	54	20	0	1	2	0	0	20	0	52	560	0
4:45 PM	0	160	242	1	1	0	55	21	0	2	6	1	0	23	0	43	555	2,287
5:00 PM	0	159	230	1	0	1	53	17	0	0	6	0	0	26	0	43	536	2,217
5:15 PM	0	157	261	1	0	0	60	25	0	0	7	0	0	31	0	50	592	2,243
5:30 PM	0	152	214	1	0	0	45	14	0	1	4	0	0	40	0	55	526	2,209
5:45 PM	0	132	242	1	1	1	49	9	0	1	5	2	0	39	0	48	530	2,184
Count Total	0	1,300	1,879	12	3	6	434	132	0	8	40	4	0	239	0	414	4,471	0
Peak Hour	0	700	932	8	2	4	227	67	0	6	18	2	0	103	0	218	2,287	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	4	1	0	4	9	0	0	0	1	1	0	0	0	0	0
4:15 PM	5	1	1	1	8	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	1	0	2	4	1	0	0	0	1	0	0	0	0	0
4:45 PM	4	0	0	2	6	1	1	0	0	2	0	0	0	0	0
5:00 PM	3	0	0	5	8	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
5:30 PM	1	0	0	2	3	2	0	0	0	2	0	0	0	0	0
5:45 PM	1	0	0	4	5	0	0	0	0	0	0	0	0	0	0
Count Total	21	3	3	1	20	4	1	0	1	6	0	0	0	0	0
Peak Hour	14	3	3	1	9	2	1	0	1	4	0	0	0	0	0

# 196TH AVE NE NE UNION HILL RD

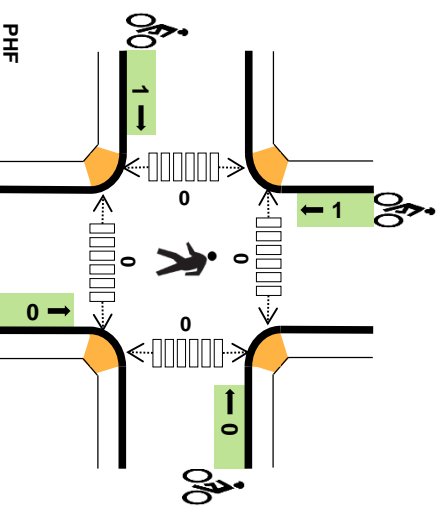


Peak Hour

Date: Tue, Jul 31, 2018

Count Period: 7:00 AM to 9:00 AM

Peak Hour: 8:00 AM to 9:00 AM



	HV %:	PHF
EB	8.9%	0.71
WB	0.7%	0.80
NB	0.0%	0.64
SB	2.5%	0.94
<b>TOTAL</b>	<b>2.6%</b>	<b>0.85</b>

## Two-Hour Count Summaries

Interval Start	NE UNION HILL RD Eastbound				NE UNION HILL RD Westbound				196TH AVE NE Northbound				196TH AVE NE Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	14	26	0	0	0	130	14	0	0	4	0	0	6	0	138	332	0
7:15 AM	0	31	31	1	0	0	138	12	0	0	0	0	0	5	0	176	394	0
7:30 AM	1	22	27	0	0	1	148	17	0	1	2	0	0	7	0	199	425	0
7:45 AM	0	21	37	1	0	1	172	17	0	1	3	0	0	6	3	198	460	1,611
8:00 AM	0	21	35	0	0	1	141	14	0	1	2	0	0	5	1	202	423	1,702
8:15 AM	0	22	24	1	0	0	140	14	0	3	3	2	0	7	2	227	445	1,753
8:30 AM	0	22	37	6	0	0	189	25	0	3	5	3	0	15	0	233	538	1,866
8:45 AM	2	43	46	0	0	0	210	28	0	3	10	1	0	4	1	239	587	1,993
Count Total	3	196	263	9	0	3	1,268	141	0	12	29	6	0	55	7	1,612	3,604	0
Peak Hour	2	108	142	7	0	1	680	81	0	10	20	6	0	31	4	901	1,993	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	1	0	3	6	0	0	0	0	0	0	2	0	0	2
7:15 AM	10	1	0	4	15	0	2	0	0	2	0	1	0	0	1
7:30 AM	5	2	1	1	9	0	2	0	0	2	0	1	0	0	1
7:45 AM	5	4	0	1	10	0	1	0	0	1	0	1	0	0	1
8:00 AM	4	1	0	7	12	0	0	0	0	0	0	0	0	0	0
8:15 AM	2	3	0	0	5	0	0	0	1	1	0	0	0	0	0
8:30 AM	4	0	0	7	11	0	0	0	0	0	0	0	0	0	0
8:45 AM	13	1	0	9	23	1	0	0	0	1	0	0	0	0	0
Count Total	45	13	1	32	91	1	5	0	1	7	0	5	0	0	5
Peak Hour	23	5	0	23	51	1	0	0	1	2	0	0	0	0	0

## Attachment C: LOS Worksheets

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	195	3	1	830	10	3
Future Vol, veh/h	195	3	1	830	10	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	9	9	1	1	0	0
Mvmt Flow	229	4	1	976	12	4

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	233	0	1210
Stage 1	-	-	-	-	231
Stage 2	-	-	-	-	979
Critical Hdwy	-	-	4.11	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	-	-	2.209	-	3.5
Pot Cap-1 Maneuver	-	-	1340	-	204
Stage 1	-	-	-	-	812
Stage 2	-	-	-	-	367
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1340	-	204
Mov Cap-2 Maneuver	-	-	-	-	204
Stage 1	-	-	-	-	812
Stage 2	-	-	-	-	366

Approach	EB	WB	NB
HCM Control Delay, s	0	0	20.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	247	-	-	1340	-
HCM Lane V/C Ratio	0.062	-	-	0.001	-
HCM Control Delay (s)	20.5	-	-	7.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1130	11	3	330	7	2
Future Vol, veh/h	1130	11	3	330	7	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	1	1	1	1	0	0
Mvmt Flow	1202	12	3	351	7	2

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	0	0	1214	0
Stage 1	-	-	-	1208
Stage 2	-	-	-	357
Critical Hdwy	-	-	4.11	-
Critical Hdwy Stg 1	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	5.4
Follow-up Hdwy	-	-	2.209	-
Pot Cap-1 Maneuver	-	-	578	-
Stage 1	-	-	-	286
Stage 2	-	-	-	713
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	-	-	578	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	286
Stage 2	-	-	-	709

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	33.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	137	-	-	578	-
HCM Lane V/C Ratio	0.07	-	-	0.006	-
HCM Control Delay (s)	33.2	-	-	11.3	0
HCM Lane LOS	D	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

## Attachment D: Gap Analysis

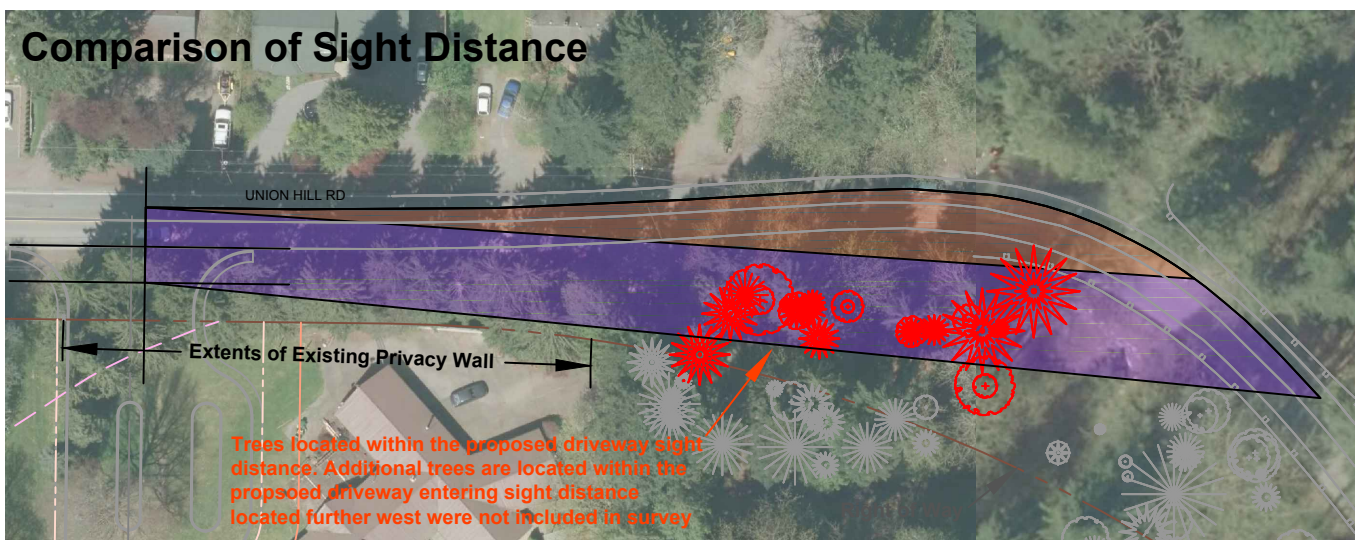
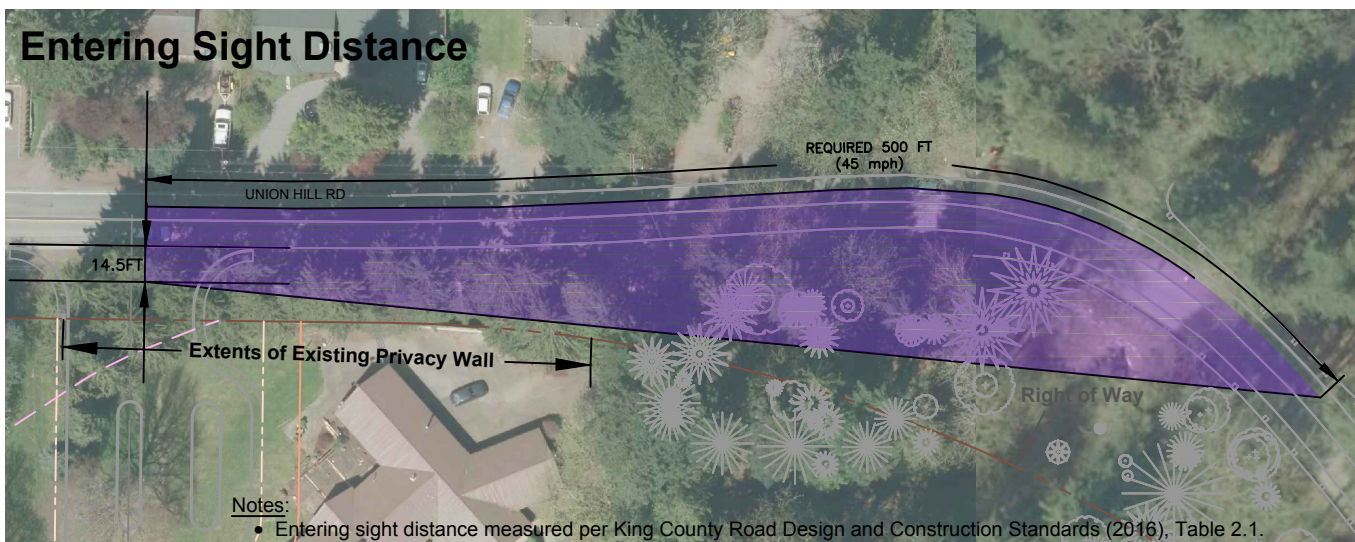
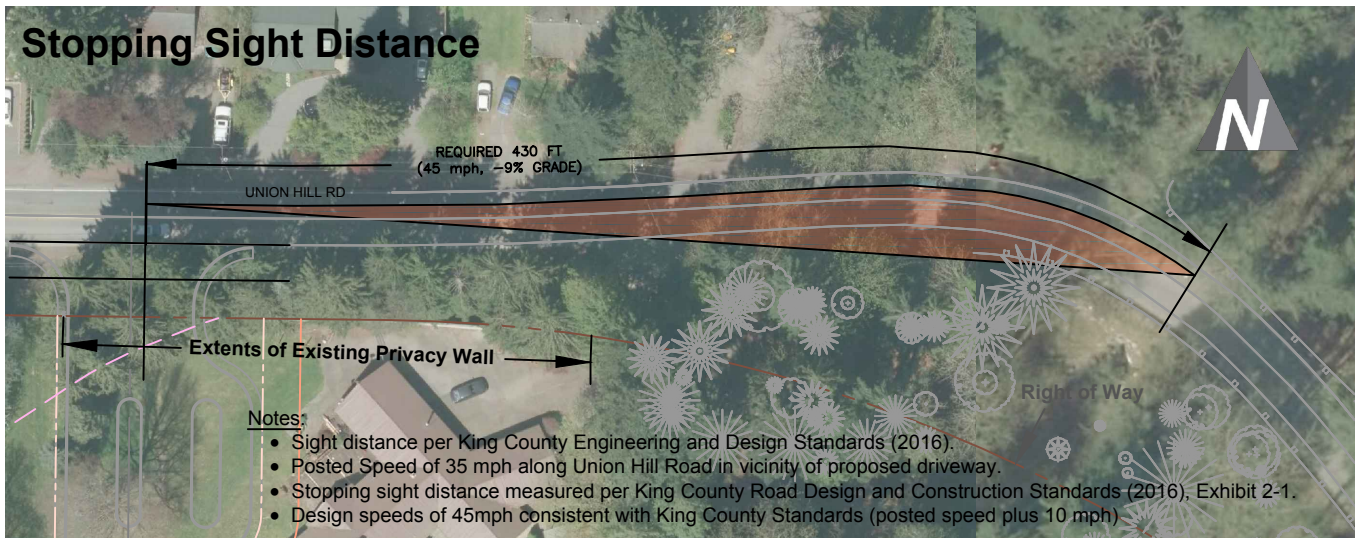
**NORTHBOUND LEFT** - uses the combined gap data as it crosses both the eastbound and westbound approaches  
8 seconds or more

	Tuesday, July 31, 2018	Wednesday, August 1, 2018	Thursday, August 2, 2018	Minimum	
0700	31	31	30	30	
0715	31	30	29	29	
0730	26	30	33	26	
0745	28	36	31	28	
0800	29	28	29	28	
0815	29	24	25	24	
0830	18	21	18	18	
0845	21	24	18	18	
Minimum	18	21	18	25	Average
1600	18	24	16	16	
1615	21	17	16	16	
1630	9	10	20	9	
1645	18	18	14	14	
1700	7	10	4	4	
1715	16	13	13	13	
1730	13	9	14	9	
1745	11	13	16	11	
Minimum	7	9	4	12	Average

**NORTHBOUND RIGHT** - uses the eastbound gap data as it enters only the eastbound approach  
8 seconds or more

Time	Tuesday, July 31, 2018	Wednesday, August 1, 2018	Thursday, August 2, 2018	Minimum	
0700	22	14	20	14	
0715	26	23	16	16	
0730	22	27	22	22	
0745	19	22	24	19	
0800	20	27	24	20	
0815	26	24	26	24	
0830	23	30	23	23	
0845	26	27	27	26	
Minimum	19	14	16	21	Average
1600	22	25	21	21	
1615	26	22	16	16	
1630	14	14	24	14	
1645	21	22	19	19	
1700	15	18	7	7	
1715	20	16	21	16	
1730	12	11	21	11	
1745	13	18	19	13	
Minimum	12	11	7	15	Average



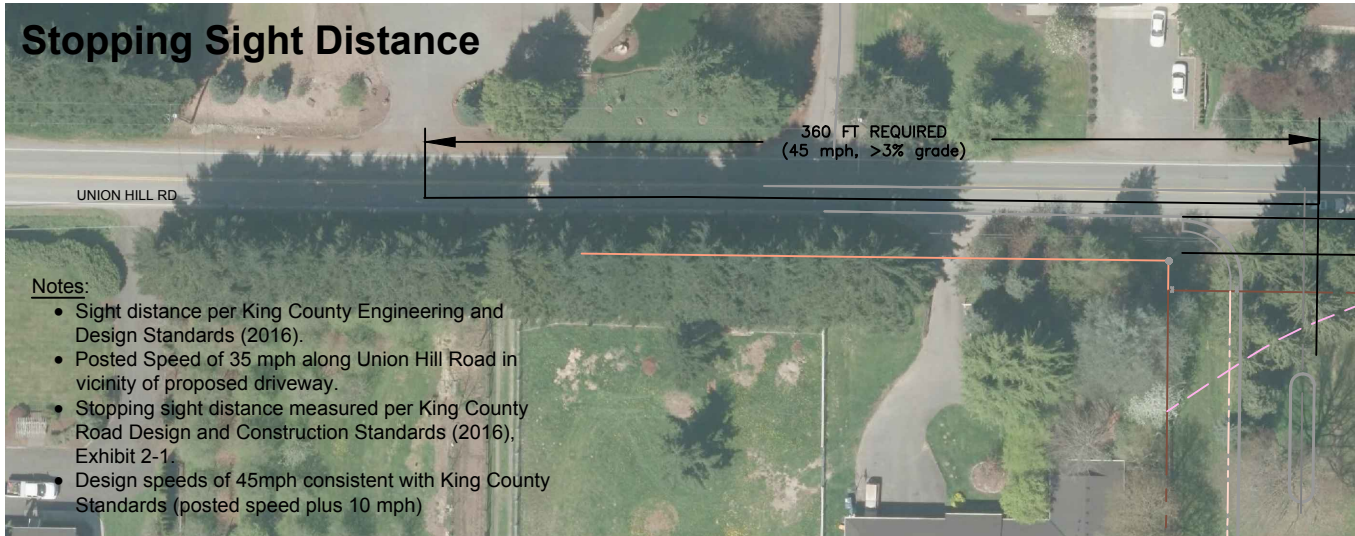


## Sight Distance East of Proposed NE Union Hill Rd Driveway ATTACHMENT

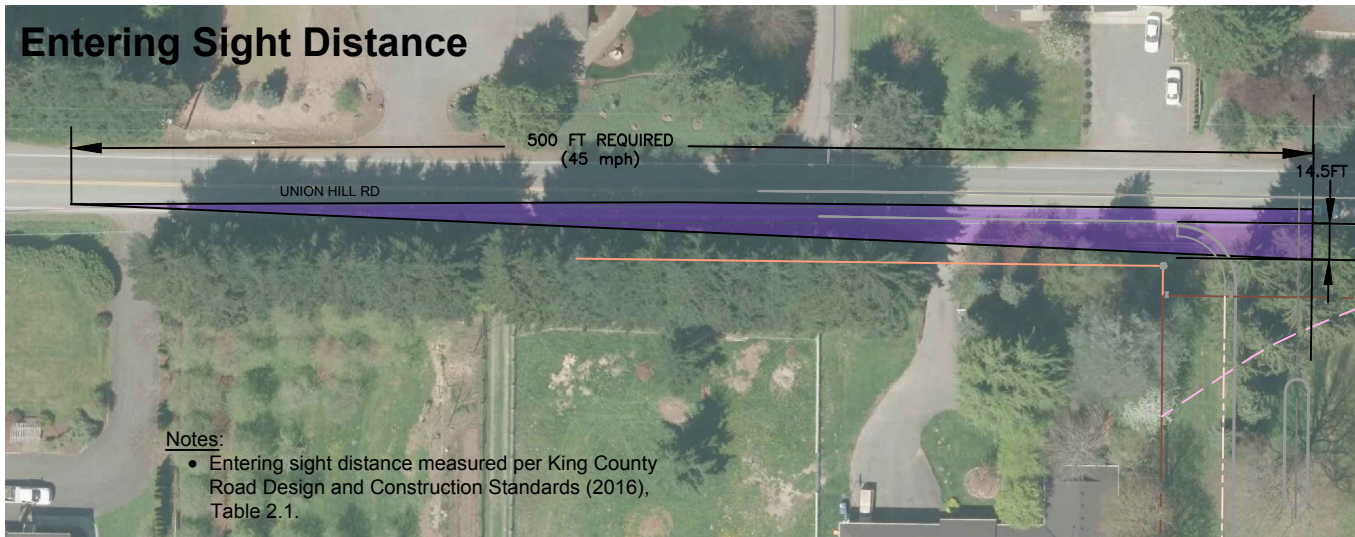
Gunshy Manor



## Stopping Sight Distance



## Entering Sight Distance

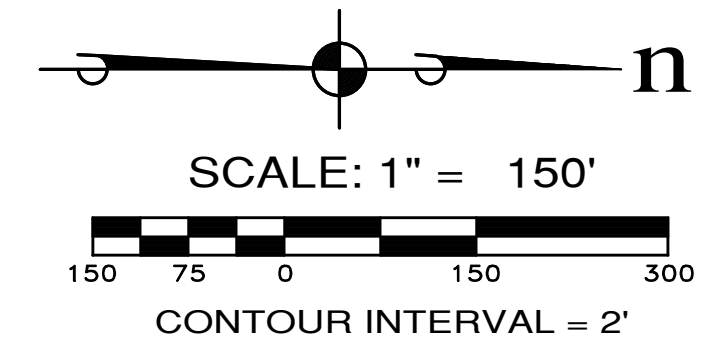




A PORTION OF THE NW & SW 1/4 OF SEC 8, TWP 25 N, RGE 6 E, W.M.

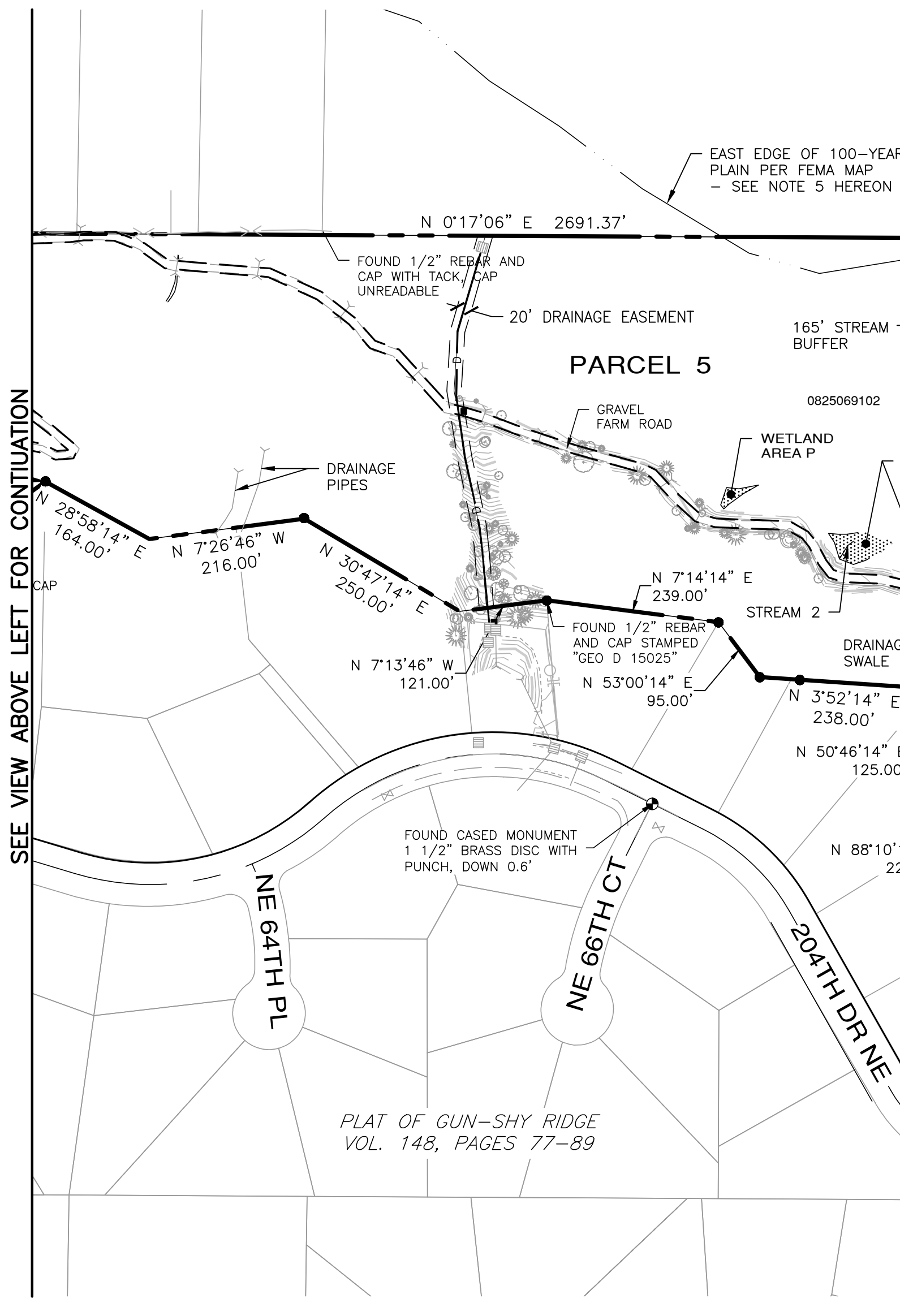
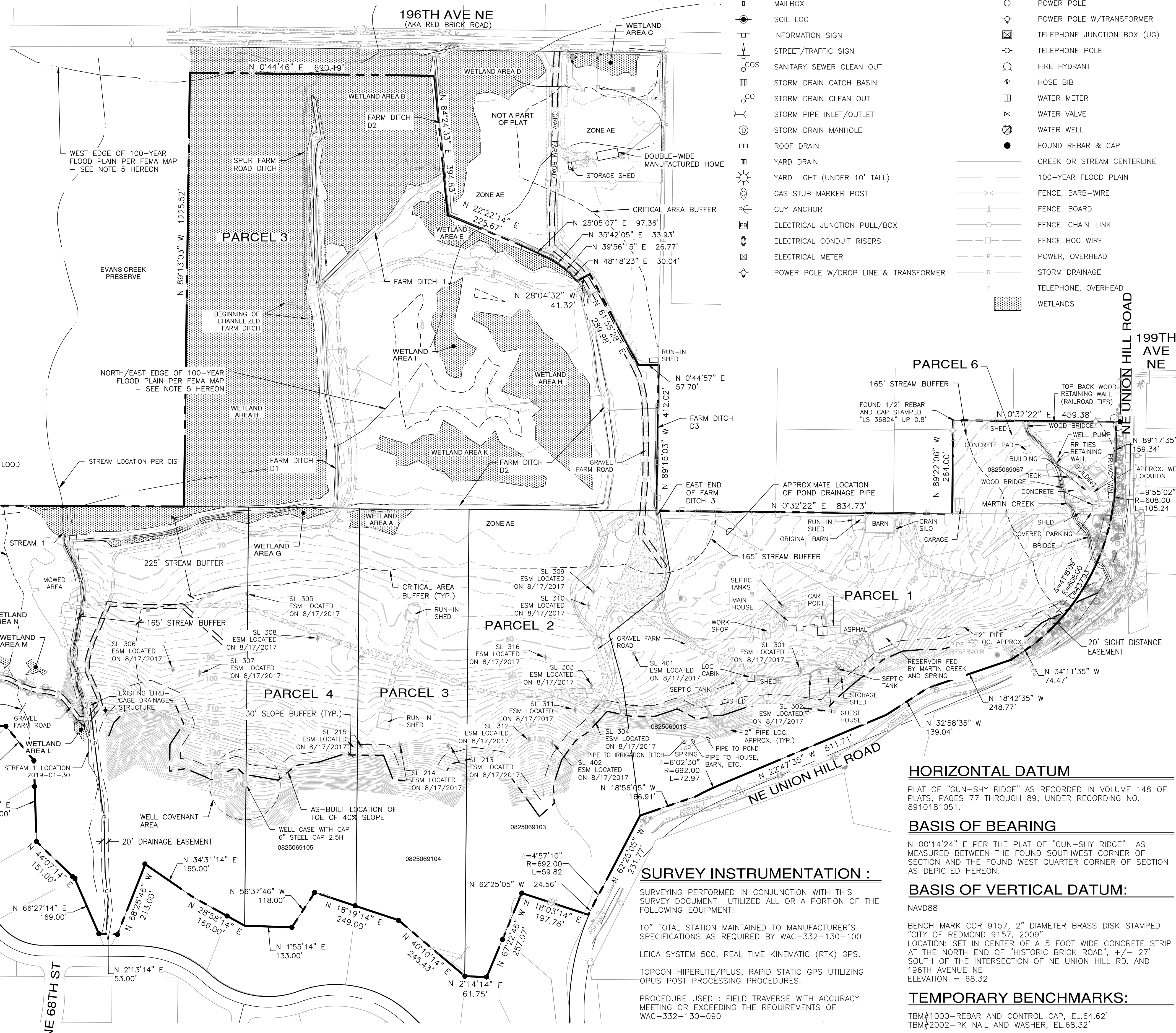
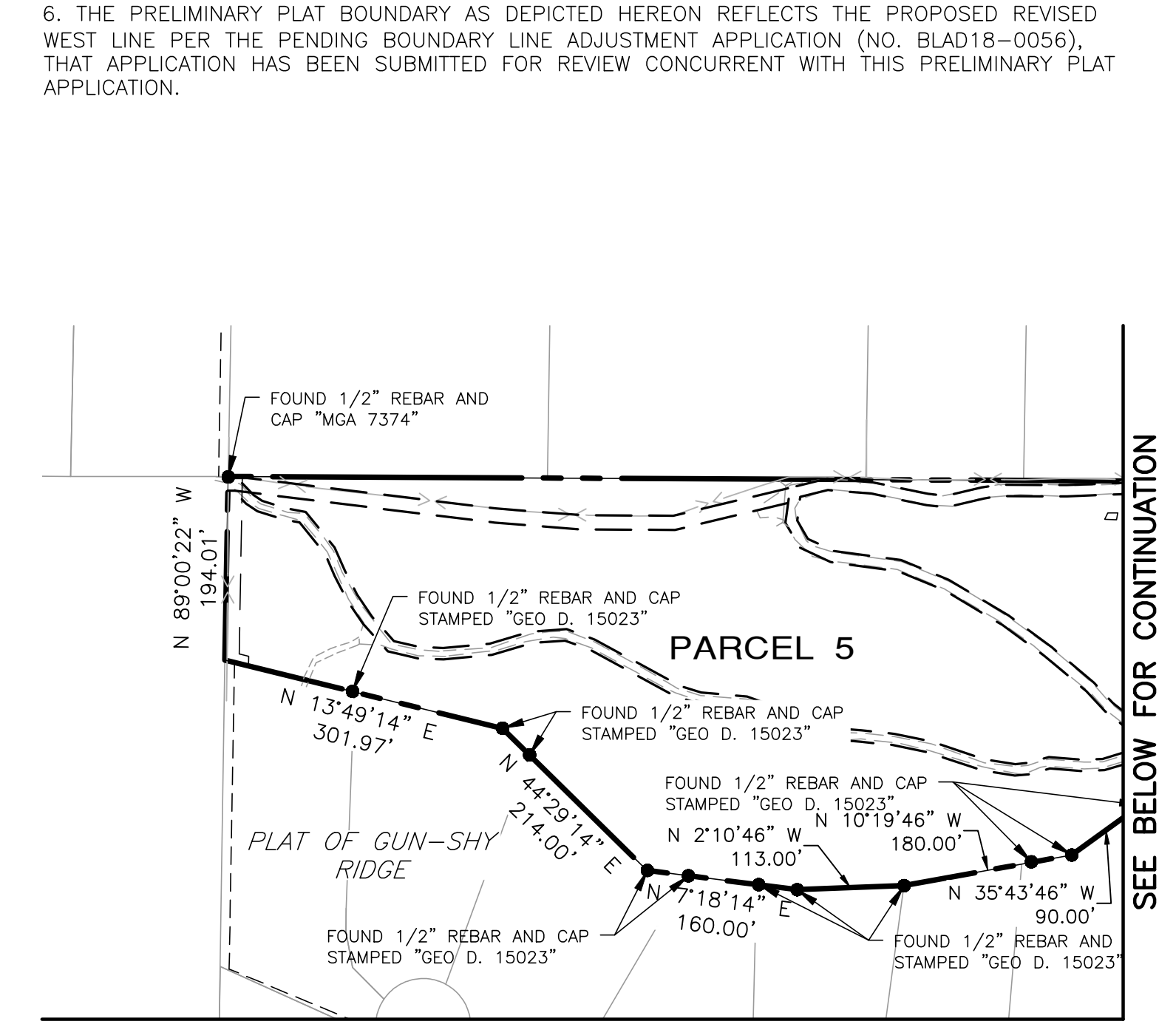
NOTES

1. SURVEY MAPPING SHOWN HEREON WAS PERFORMED SEPTEMBER, 2014 - JANUARY, 2018.
2. WETLANDS DELINEATED BY TALASAEA CONSULTANTS INC. AND FIELD LOCATED BY ESM.
3. SOIL LOG (SL) LOCATIONS FROM ADC WASTEWATER ENGINEERING.
4. LOCATIONS OF SOIL TEST PITS TPE1-4 AND TPB1-6 ARE BASED ON A SKETCH PROVIDED BY TALASAEA CONSULTANTS INC. AND LOCATED BY ESM.
5. THE LIMITS OF ZONE "AE" 100-YEAR FLOODPLAIN, SHOWN HEREON ARE AS DEPICTED ON THE FEMA FLOOD INSURANCE RATE MAP (FIRM) 53033C390 H DATED PRELIMINARY FEBRUARY 1, 2013, AND KING COUNTY GIS 100-YEAR FLOOD PLAIN LAYER, MAP PROVIDED BY KING COUNTY.
6. THE PRELIMINARY PLAT BOUNDARY AS DEPICTED HEREON REFLECTS THE PROPOSED REVISED WEST LINE PER THE PENDING BOUNDARY LINE ADJUSTMENT APPLICATION (NO. BLAD18-0056), THAT APPLICATION HAS BEEN SUBMITTED FOR REVIEW CONCURRENT WITH THIS PRELIMINARY PLAT APPLICATION.



LEGEND

- ☒ WETLAND FLAG
- BOLLARD
- MAILBOX
- SOIL LOG
- ⊥ INFORMATION SIGN
- ⊥ STREET/TRAFFIC SIGN
- SANITARY SEWER CLEAN OUT
- STORM DRAIN CATCH BASIN
- STORM DRAIN CLEAN OUT
- STORM PIPE INLET/OUTLET
- STORM DRAIN MANHOLE
- ROOF DRAIN
- YARD DRAIN
- ☀ YARD LIGHT (UNDER 10' TALL)
- GAS STUB MARKER POST
- ⊥ GUY ANCHOR
- ⊥ ELECTRICAL JUNCTION PULL/BOX
- ⊥ ELECTRICAL CONDUIT RISERS
- ⊥ ELECTRICAL METER
- ⊥ POWER POLE W/DROP LINE & TRANSFORMER
- POWER POLE W/DROP LINE
- POWER POLE W/LIGHT
- POWER POLE
- POWER POLE W/TRANSFORMER
- ☒ TELEPHONE JUNCTION BOX (UG)
- TELEPHONE POLE
- FIRE HYDRANT
- ⊥ HOSE BIB
- ⊥ WATER METER
- ⊥ WATER VALVE
- ⊥ WATER WELL
- FOUND REBAR & CAP
- CREEK OR STREAM CENTERLINE
- 100-YEAR FLOOD PLAIN
- FENCE, BARB-WIRE
- FENCE, BOARD
- FENCE, CHAIN-LINK
- FENCE HOG WIRE
- POWER, OVERHEAD
- STORM DRAINAGE
- TELEPHONE, OVERHEAD
- ▨ WETLANDS



**HORIZONTAL DATUM**  
 PLAT OF "GUN-SHY RIDGE" AS RECORDED IN VOLUME 148 OF PLATS, PAGES 77 THROUGH 89, UNDER RECORDING NO. 8910181051.

**BASIS OF BEARING**  
 N 00°14'24" E PER THE PLAT OF "GUN-SHY RIDGE" AS MEASURED BETWEEN THE FOUND SOUTHWEST CORNER OF SECTION AND THE FOUND WEST QUARTER CORNER OF SECTION AS DEPICTED HEREON.

**BASIS OF VERTICAL DATUM:**  
 NAVD88

**BENCH MARK COR 9157, 2" DIAMETER BRASS DISK STAMPED "CITY OF REDMOND 9157, 2009"**  
 LOCATION: SET IN CENTER OF A 5 FOOT WIDE CONCRETE STRIP AT THE NORTH END OF "HISTORIC BRICK ROAD", +/- 27' SOUTH OF THE INTERSECTION OF NE UNION HILL RD. AND 196TH AVENUE NE  
 ELEVATION = 68.32

**TEMPORARY BENCHMARKS:**  
 TBM#1000-REBAR AND CONTROL CAP, EL.64.62'  
 TBM#2002-PK NAIL AND WASHER, EL.68.32'

**SURVEY INSTRUMENTATION :**  
 SURVEYING PERFORMED IN CONJUNCTION WITH THIS SURVEY DOCUMENT UTILIZED ALL OR A PORTION OF THE FOLLOWING EQUIPMENT:  
 10" TOTAL STATION MAINTAINED TO MANUFACTURER'S SPECIFICATIONS AS REQUIRED BY WAC-332-130-100  
 LEICA SYSTEM 500, REAL TIME KINEMATIC (RTK) GPS.  
 TOPCON HIPERLITE/PLUS, RAPID STATIC GPS UTILIZING OPUS POST PROCESSING PROCEDURES.  
 PROCEDURE USED : FIELD TRAVERSE WITH ACCURACY MEETING OR EXCEEDING THE REQUIREMENTS OF WAC-332-130-090

SEE VIEW ABOVE LEFT FOR CONTINUATION

SEE BELOW FOR CONTINUATION

REVISIONS		
NO.	DESCRIPTION/DATE	BY
0	FIRST SUBMITTAL 05/29/2018	ESM
1	SECOND SUBMITTAL 11/30/2018	ESM
2	THIRD SUBMITTAL 06/20/2019	ESM

**ESM CONSULTING ENGINEERS LLC**  
 33400 8th Ave S, Suite 205  
 Federal Way, WA 98003  
 (206) 835-6113  
 (206) 837-9900  
 www.esmenvi.com  
 Civil Engineering Surveying Land Planning  
 Public Works Project Management Landscape Architecture

**THE ESTATE OF BARBARA J. NELSON, ET AL.**  
**GUNSHY MANOR**  
 EXISTING CONDITIONS  
 KING COUNTY WASHINGTON

JOB NO.: 1359-001-007  
 DWG. NAME: PP-02  
 DESIGNED BY: LGB  
 DRAWN BY: DCL  
 CHECKED BY:  
 DATE: 06/20/2019  
 DATE OF PRINT:  
 OF SHEETS

A PORTION OF THE NW & SW 1/4 OF SEC 8, TWP 25 N, RGE 6 E, W.M.

196TH AVE NE  
(AKA "RED BRICK ROAD")

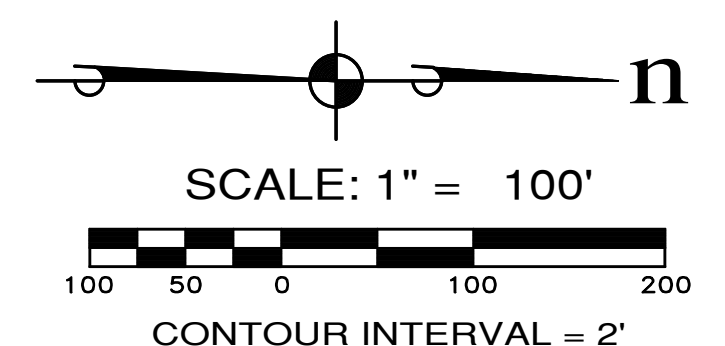


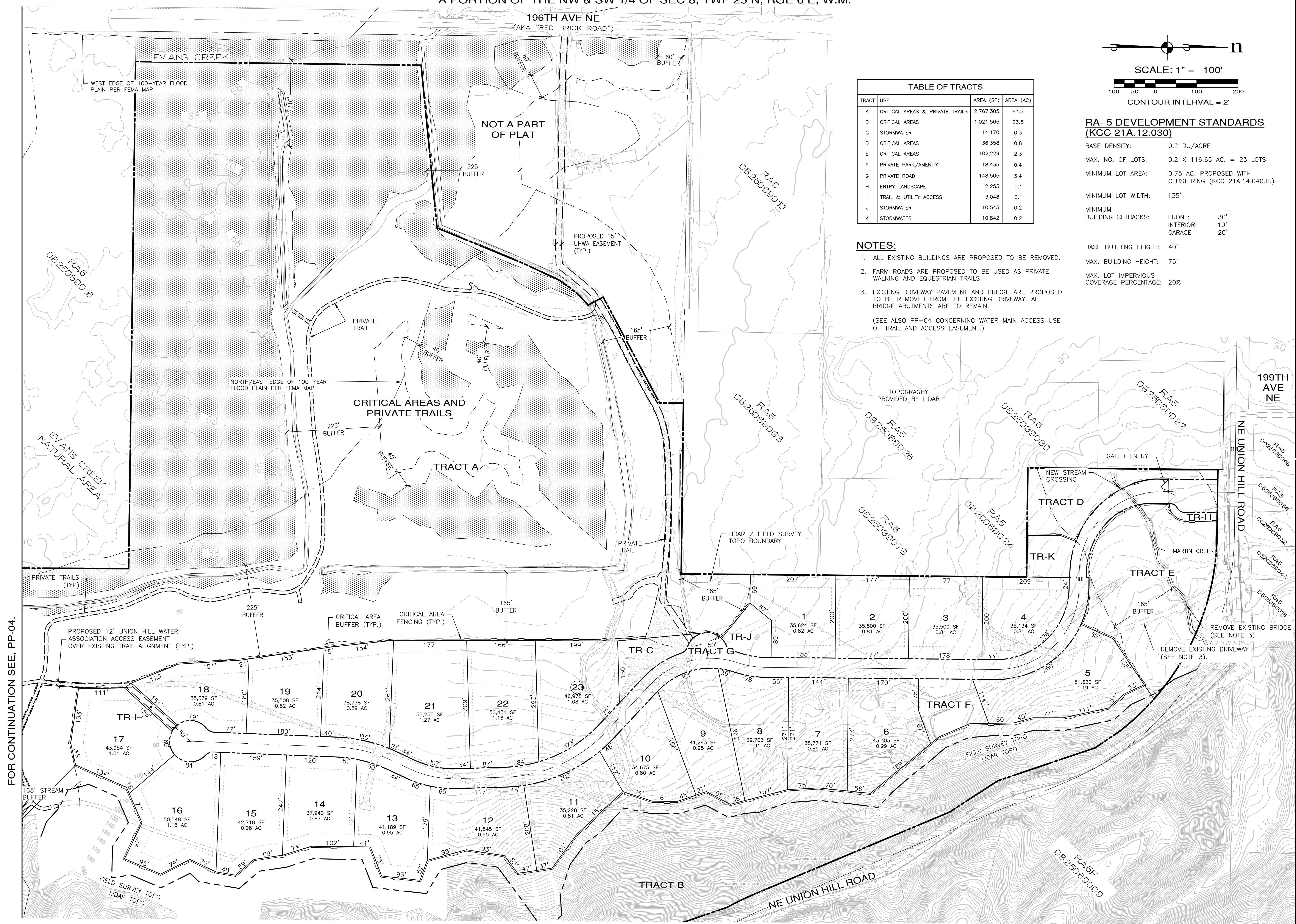
TABLE OF TRACTS			
TRACT	USE	AREA (SF)	AREA (AC)
A	CRITICAL AREAS & PRIVATE TRAILS	2,767,305	63.5
B	CRITICAL AREAS	1,021,505	23.5
C	STORMWATER	14,170	0.3
D	CRITICAL AREAS	36,358	0.8
E	CRITICAL AREAS	102,229	2.3
F	PRIVATE PARK/AMENITY	18,435	0.4
G	PRIVATE ROAD	148,505	3.4
H	ENTRY LANDSCAPE	2,253	0.1
I	TRAIL & UTILITY ACCESS	3,048	0.1
J	STORMWATER	10,543	0.2
K	STORMWATER	10,842	0.2

RA-5 DEVELOPMENT STANDARDS  
(KCC 21A.12.030)

- BASE DENSITY: 0.2 DU/ACRE
- MAX. NO. OF LOTS: 0.2 X 116.65 AC. = 23 LOTS
- MINIMUM LOT AREA: 0.75 AC. PROPOSED WITH CLUSTERING (KCC 21A.14.040.B.)
- MINIMUM LOT WIDTH: 135'
- MINIMUM BUILDING SETBACKS: FRONT: 30', INTERIOR: 10', GARAGE: 20'
- BASE BUILDING HEIGHT: 40'
- MAX. BUILDING HEIGHT: 75'
- MAX. LOT IMPERVIOUS COVERAGE PERCENTAGE: 20%

NOTES:

- ALL EXISTING BUILDINGS ARE PROPOSED TO BE REMOVED.
- FARM ROADS ARE PROPOSED TO BE USED AS PRIVATE WALKING AND EQUESTRIAN TRAILS.
- EXISTING DRIVEWAY PAVEMENT AND BRIDGE ARE PROPOSED TO BE REMOVED FROM THE EXISTING DRIVEWAY. ALL BRIDGE ABUTMENTS ARE TO REMAIN.  
(SEE ALSO PP-04 CONCERNING WATER MAIN ACCESS USE OF TRAIL AND ACCESS EASEMENT.)



FOR CONTINUATION SEE, PP-04.

File: \\csm\eng\ESM\0851\1559\001\007\PP-04\196th\196th-03.dwg  
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Plotted by: EJM

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NO.	DESCRIPTION/DATE	BY
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1	SECOND SUBMITTAL 11/30/2018	ESM
2	THIRD SUBMITTAL 06/20/2019	ESM

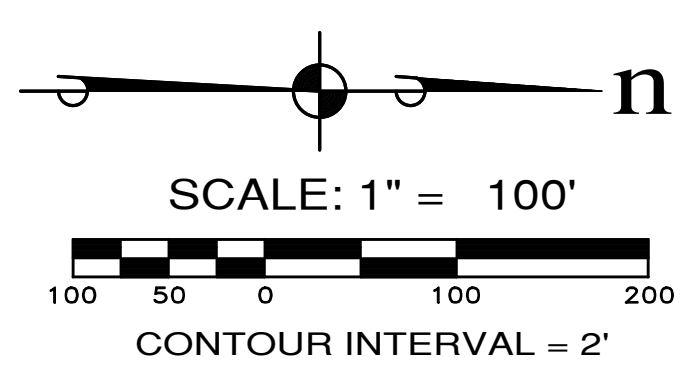


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THE ESTATE OF BARBARA J. NELSON, ET AL.  
**GUNSHY MANOR**  
PRELIMINARY SITE PLAN  
KING COUNTY WASHINGTON

JOB NO.: 1359-001-007  
DWG. NAME: PP-03  
DESIGNED BY: LGB  
DRAWN BY: DCL  
CHECKED BY:  
DATE: 06/20/2019  
DATE OF PRINT:  
OF SHEETS

A PORTION OF THE NW & SW 1/4 OF SEC 8, TWP 25 N, RGE 6 E, W.M.



REVISIONS			
NO.	DESCRIPTION/DATE	BY	
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1	SECOND SUBMITTAL 11/30/2018	ESM	
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THE ESTATE OF BARBARA J. NELSON, ET AL.  
**GUNSHY MANOR**  
 PRELIMINARY SITE PLAN  
 KING COUNTY WASHINGTON

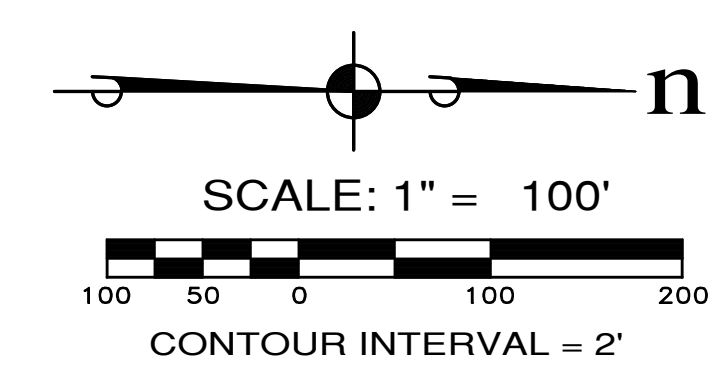
FOR CONTINUATION, SEE PP-03.

JOBS NO.: 1359-001-007  
 DWG. NAME: PP-04  
 DESIGNED BY: LGB  
 DRAWN BY: DCL  
 CHECKED BY:  
 DATE: 06/20/2019  
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 OF SHEETS

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 Plotted By: ESM

A PORTION OF THE NW & SW 1/4 OF SEC 8, TWP 25 N, RGE 6 E, W.M.

196TH AVE NE  
(AKA RED-BRICK ROAD)



NOTES:

1. THE CONCEPTUAL BUILDING PADS SHOWN ARE 50'X50' (2,500 SF) IN SIZE AND ARE GRADED FLAT. FINAL BUILDING PAD SITES MAY BE LARGER OR SMALLER, AND PLACED IN DIFFERENT LOCATIONS THAN SHOWN ON THIS CONCEPTUAL SITE PLAN.
2. FUTURE BUILDINGS MAY USE STEPPED FOUNDATIONS TO TAKE UP GRADE ACROSS PADS, OR MAY INCORPORATE DAYLIGHT BASEMENTS OR GARAGE-UNDER STYLE HOMES TO WORK WITH THE EXISTING TOPOGRAPHY.
3. DRIVEWAYS SHOWN ARE NO STEEPER THAN 15%. BUILDING PAD LOCATIONS AND DRIVEWAY CONFIGURATIONS CAN BE MODIFIED TO REDUCE SLOPES AND GRADINGS.
4. ALL EXISTING BUILDINGS ARE PROPOSED TO BE REMOVED.

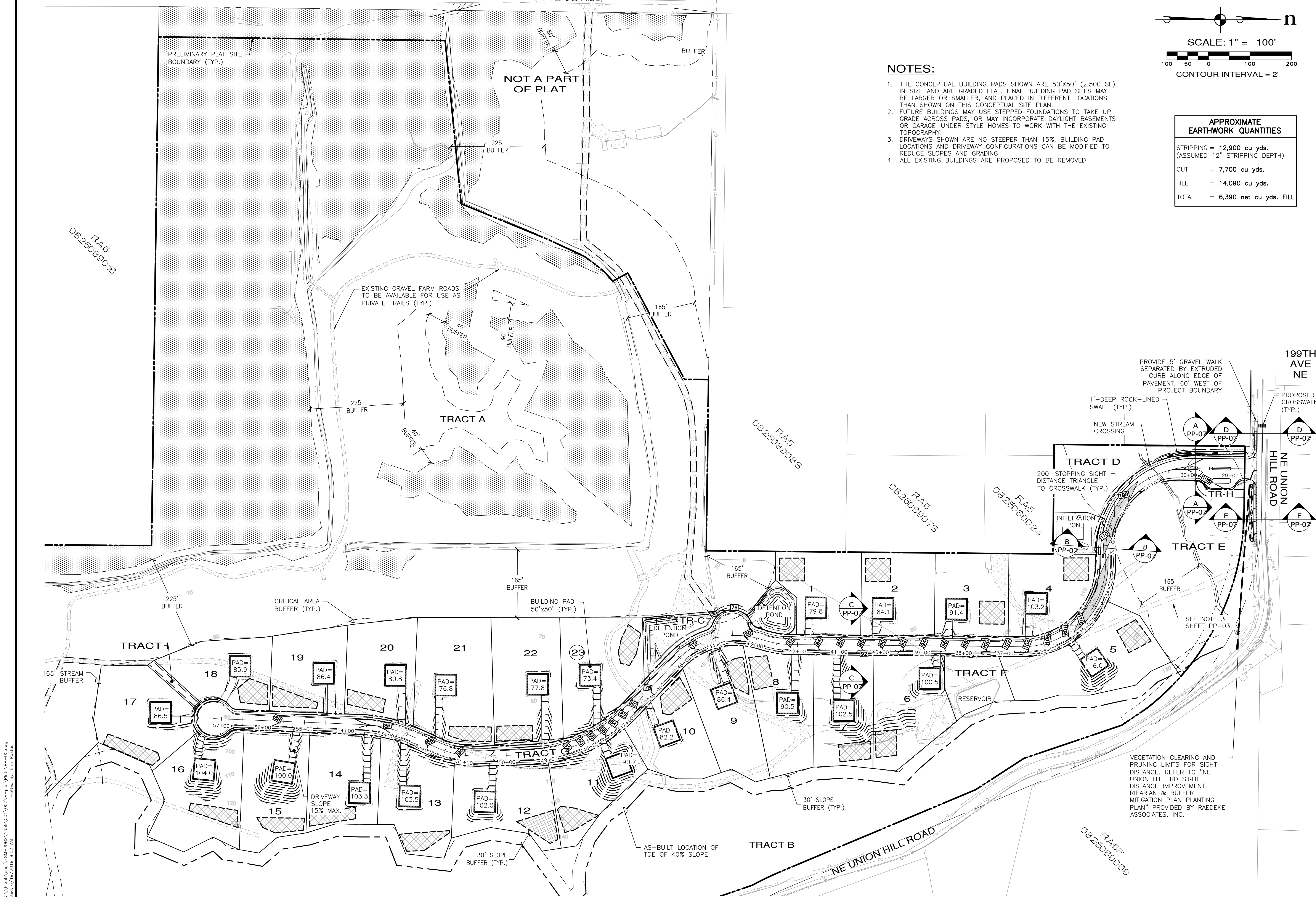
APPROXIMATE EARTHWORK QUANTITIES	
STRIPPING	= 12,900 cu yds. (ASSUMED 12" STRIPPING DEPTH)
CUT	= 7,700 cu yds.
FILL	= 14,090 cu yds.
TOTAL	= 6,390 net cu yds. FILL

REVISIONS		
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THE ESTATE OF BARBARA J. NELSON, ET AL.  
**GUNSHY MANOR**  
 PRELIMINARY GRADING PLAN  
 KING COUNTY WASHINGTON

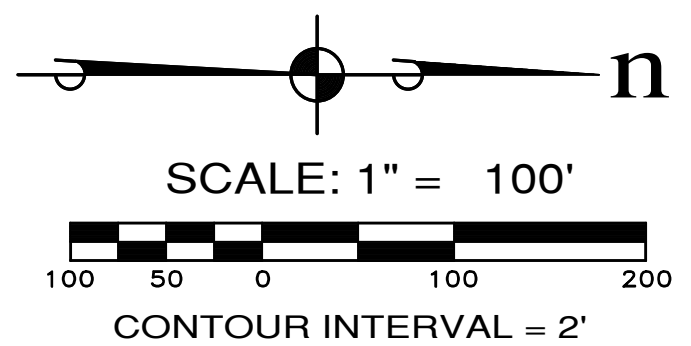
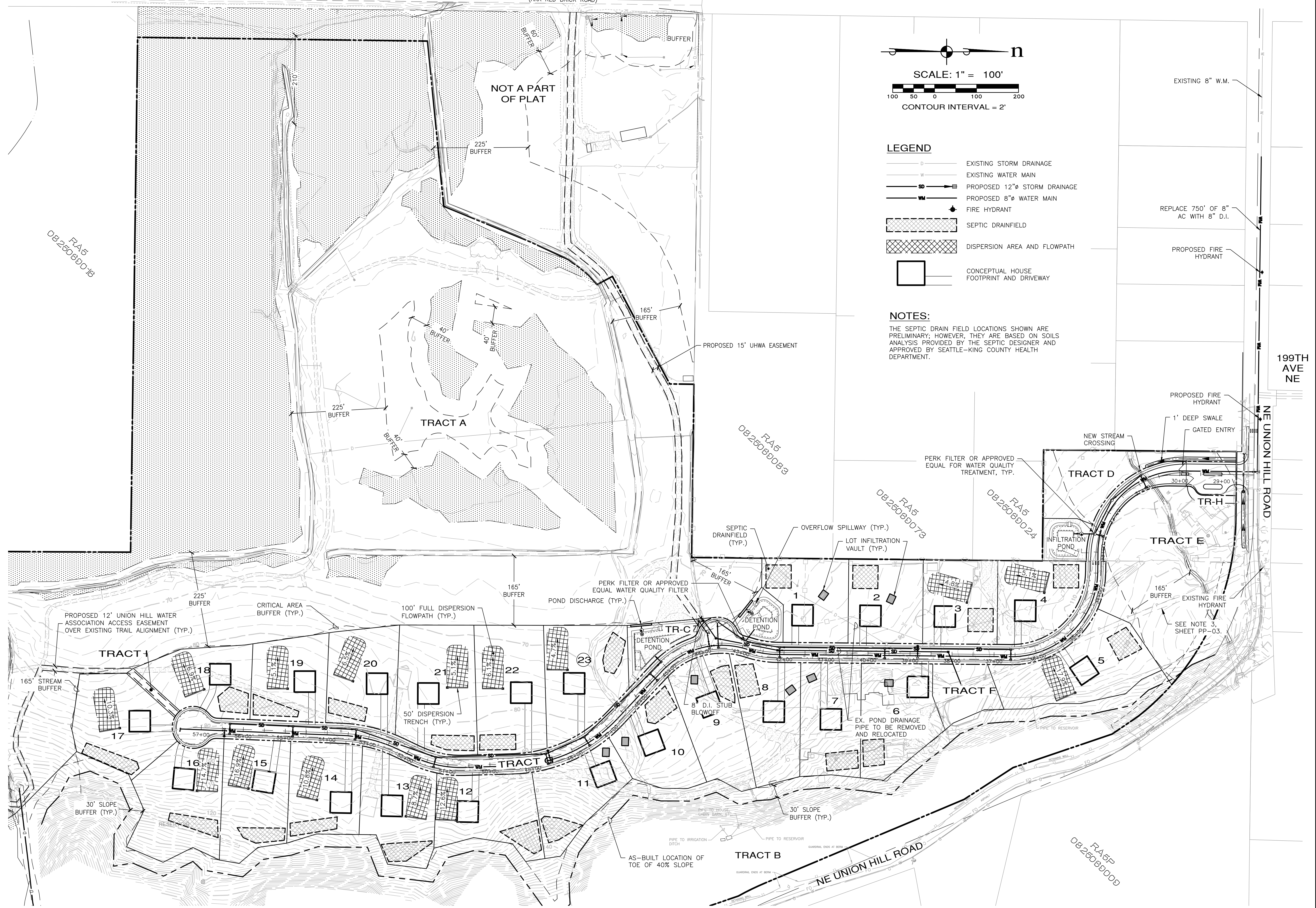
JOB NO.: 1359-001-007  
 DWG. NAME: PP-05  
 DESIGNED BY: LGB  
 DRAWN BY: DCL  
 CHECKED BY:  
 DATE: 06/20/2019  
 DATE OF PRINT:  
 OF SHEETS



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A PORTION OF THE NW & SW 1/4 OF SEC 8, TWP 25 N, RGE 6 E, W.M.

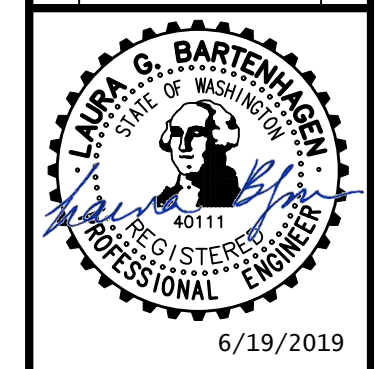
196TH AVE NE  
(AKA RED BRICK ROAD)



- LEGEND**
- EXISTING STORM DRAINAGE
  - EXISTING WATER MAIN
  - PROPOSED 12" STORM DRAINAGE
  - PROPOSED 8" WATER MAIN
  - FIRE HYDRANT
  - SEPTIC DRAINFIELD
  - DISPERSION AREA AND FLOWPATH
  - CONCEPTUAL HOUSE FOOTPRINT AND DRIVEWAY

**NOTES:**  
THE SEPTIC DRAIN FIELD LOCATIONS SHOWN ARE PRELIMINARY; HOWEVER, THEY ARE BASED ON SOILS ANALYSIS PROVIDED BY THE SEPTIC DESIGNER AND APPROVED BY SEATTLE-KING COUNTY HEALTH DEPARTMENT.

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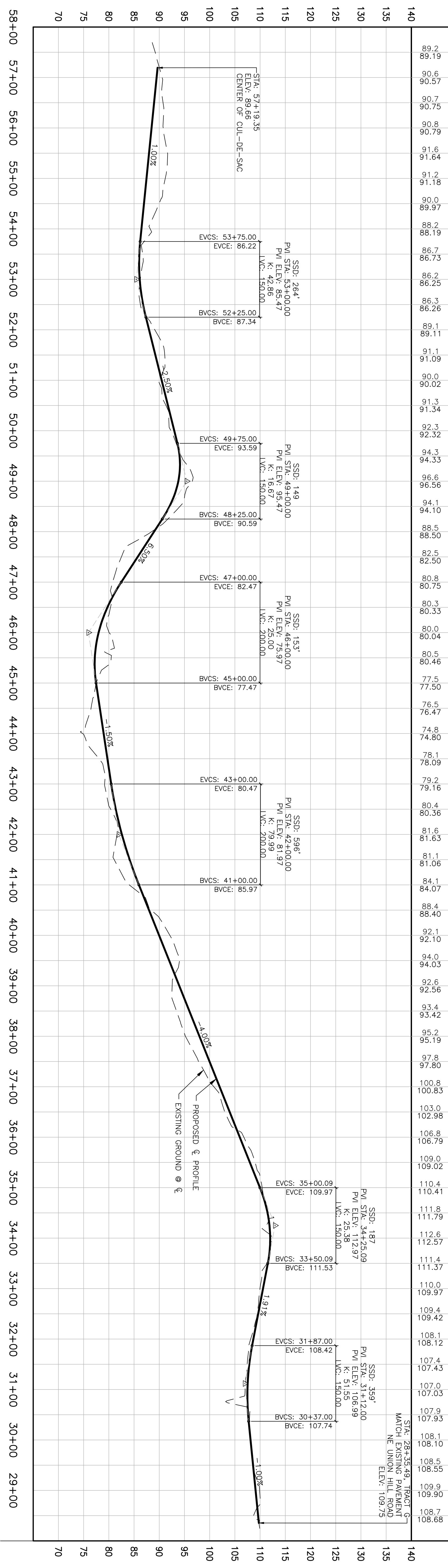
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**GUNSHY MANOR**  
PRELIMINARY UTILITY PLAN  
KING COUNTY WASHINGTON

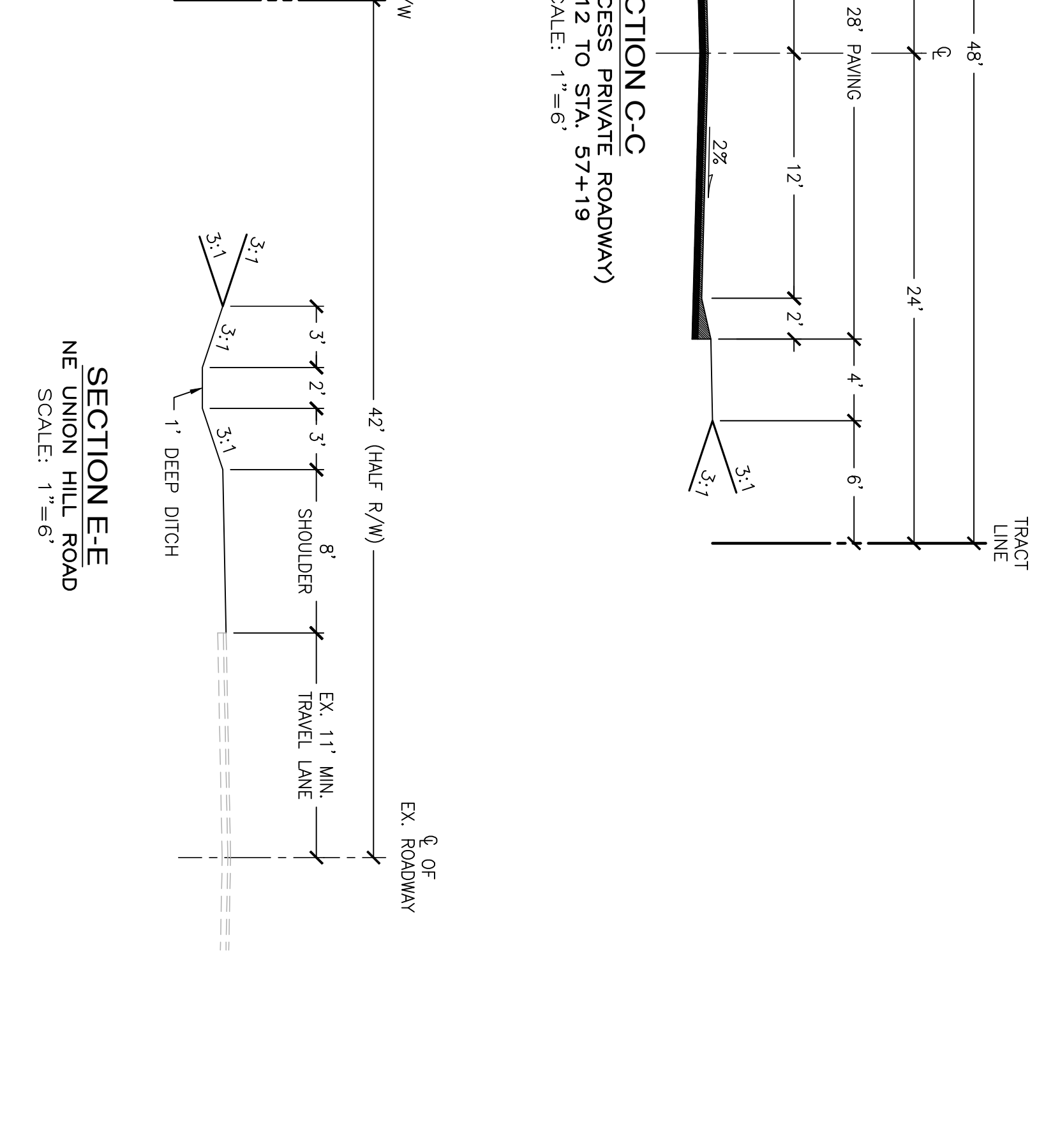
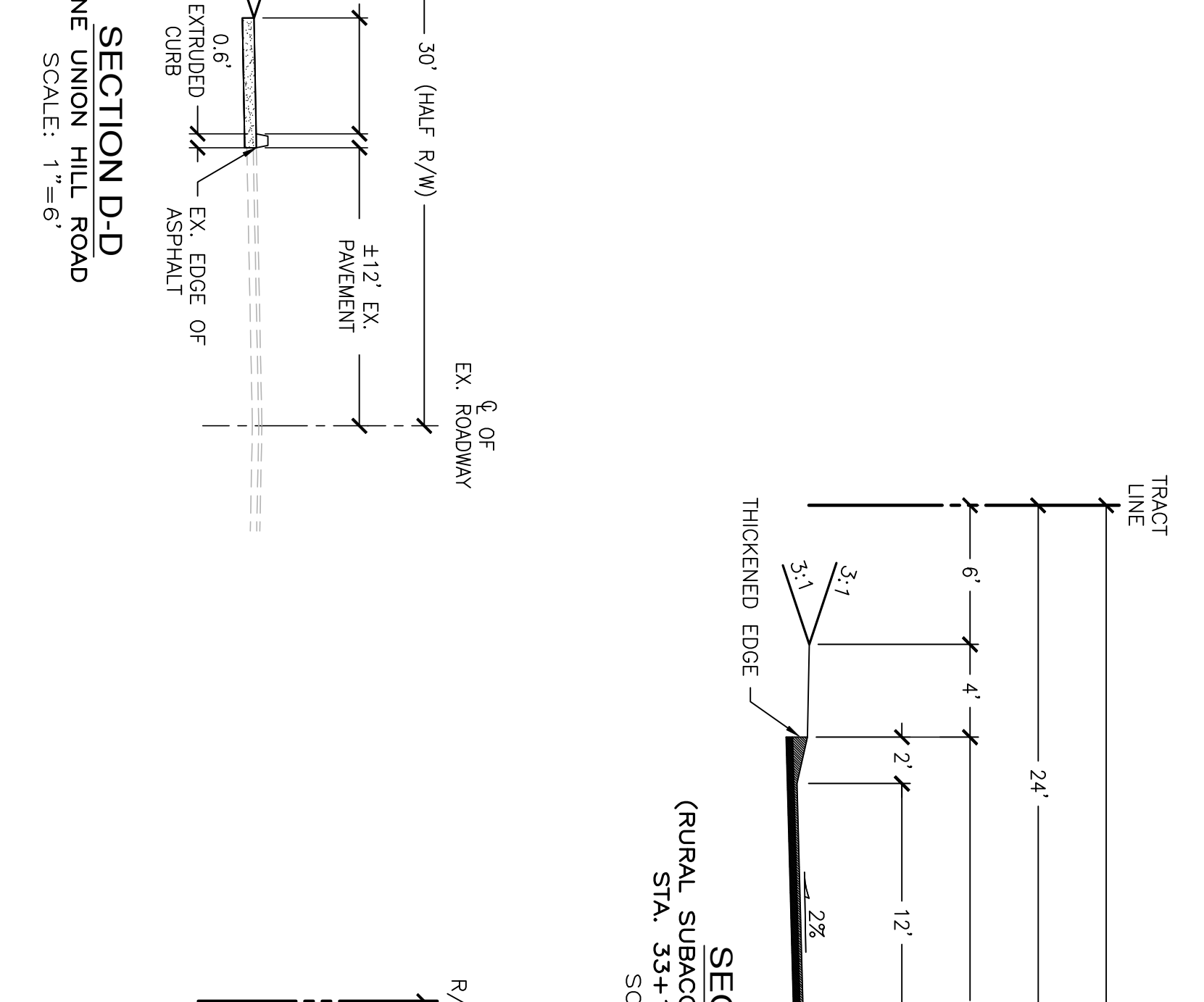
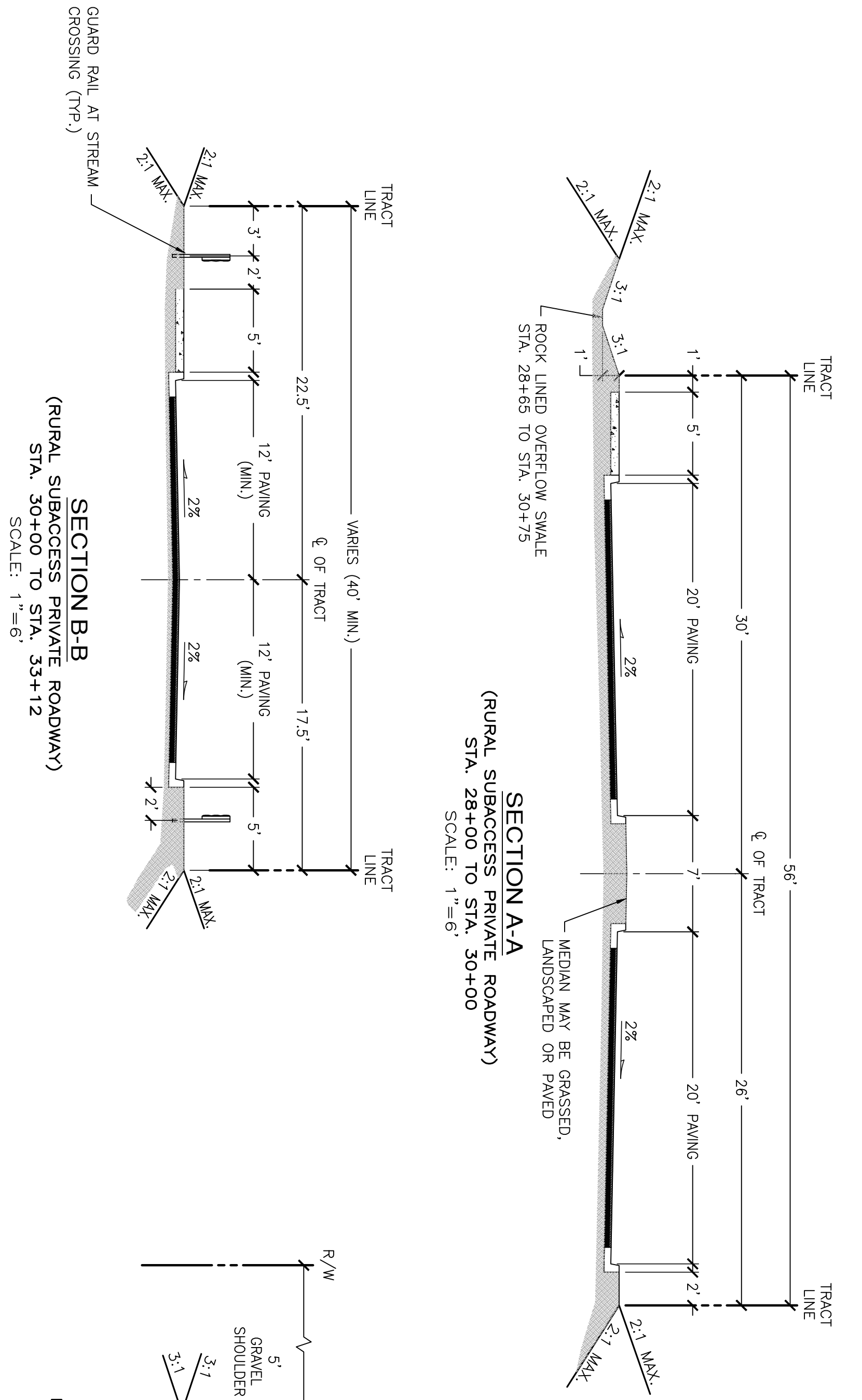
JOB NO.: 1359-001-007  
DWG. NAME: PP-06  
DESIGNED BY: LOB  
DRAWN BY: DCL  
CHECKED BY:  
DATE: 06/20/2019  
DATE OF PRINT:  
OF SHEETS

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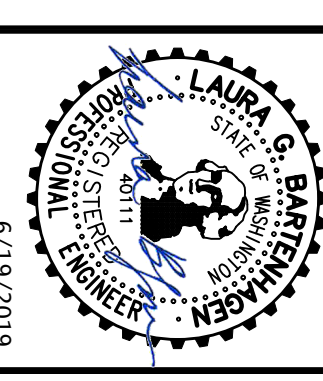




**PRELIMINARY ROAD PROFILE**  
 1"=100' HORIZ  
 1"=10' VERT



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**GUNSHY MANOR**

KING COUNTY PRELIMINARY ROADWAY PROFILE & CROSS SECTIONS WASHINGTON

JOB NO.: 1359-001-007	DESIGNED BY: IGB
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DATE: 06/20/2019	DATE OF PRINT:
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