

ANACORTES PLANNING COMMISSION



September 27, 2017

Municipal Building Council Chambers

6th Street and "Q" Avenue

AGENDA

6 P.M.

1. **Roll Call**
2. **Minutes of August 23, 2017 and September 13, 2017**
3. **Correspondence**
4. **Old Business**
5. **New Business**
 - A. **Public Hearing**: CUP-2017-0002, Conditional Use Permit to permit a dog kennel /boarding and grooming associated with an existing doggy daycare, 9121 Molly Lane
 - B. **Public Hearing**: SDP-2017-0001; WSDOT Shoreline Permit(s) SSDP, SCUP & Shoreline Variance; SR-20 /Sharpe's Corner Vicinity Improvements

If reasonable accommodation of a disability is needed please contact Cherri Kahns at 299-1950 at least 48 hours prior to this meeting.



Planning Commission Meeting Minutes for – August 23, 2017

Chair Laumbattus called the meeting of August 23, 2017 to order at approximately 6 p.m.

Roll Call

Members Present: Commissioners Moffitt, Oppel, Laumbattus, Cleland-McGrath, Mount, and Doll

Members Absent: Commissioner McNett

Minutes

Minutes of August 9, approved as read.

Correspondence

None

Old Business

Critical Areas Update

Review of Geologically Hazardous Area, Frequently Flooded Areas, & Critical Aquifer

Libby Grage, Planning Manager, recapped scheduling and walked through the proposed changes.

Commissioner Oppel questioned maps referenced. Ms. Grage stated maps are from agencies like Skagit County, DNR, and FEMA.

Commissioner Doll requested an example of "mitigated to a level equal to or less than predevelopment conditions." Ms. Grage stated that would be designed by an engineer, and Mr. Measamer, Planning Director, stated that question will be directed to a geotechnical engineer.

Commissioner Doll requested clarification on the incorporation of the Anacortes Community Forest Lands in the ordinance. Mr. Measamer stated the ACFL is currently designated as a habitat of local importance, regulated by the current critical areas ordinance.

Chair Laumbattus questioned the ability to drill a well. Mr. Measamer provided Skagit County Health Department is the regulator of wells. The city's preference is that all wells be abandoned for drinking purposes and only used for irrigation. Wells are fed by the city's water supply. No new wells have been drilled recently, to Mr. Measamer's recollection.

Martha Hall. Ms. Hall requested an extension of the public comment period. Ms. Hall expressed concern with language from the draft and would like further discussion on some topics, including using discretion on determinations.

Mr. Measamer clarified the public comment period does not end on the provided date. The date is meant for comments that will be incorporated in the second draft.

Patrick O'Hearn, 11039 Post Drive. Mr. O'Hearn suggested 3rd party review not be required when providing a report from a professional determined by the city.

Gene Derig, 1302 K Avenue. Mr. Derig agreed with Mr. O'Hearn.

Commissioner Oppel requested clarification on whether the Critical Areas Ordinance or Shoreline Master Program are the regulations in a situation of a steep slope on the Guemes Trail. Ms. Grage clarified that within Shoreline Jurisdiction, the SMP is the sole regulation. Ms. Grage stated regulations for the critical areas update can be transferred to the SMP update. Commissioner Oppel questioned if a landscape and mitigation plan would be required on slopes. Ms. Grage confirmed. Commissioner Oppel agreed with Ms. Hall's comments on discretion on determinations.

Ms. Grage stated that staff will provide a matrix of responses to public comments.

Chair Laumbattus called the meeting to a close at approximately 7:50 p.m.

DRAFT



Planning Commission Meeting Minutes for – September 13, 2017

Chair Laumbattus called the meeting of September 13, 2017 to order at approximately 6 p.m.

Roll Call

Members Present: Commissioners Oppel, Laumbattus, McNett, Cleland-McGrath, and Doll

Members Absent: Commissioner Moffitt and Mount

Minutes

None

Correspondence

None

Old Business

Critical Areas Update

Libby Grage, Planning Manager, summarized public input and concerns.

Wim Houppermans, 3412 K Avenue. Mr. Houppermans expressed disappointment that the critical areas ordinance is not strict enough.

Tom Glade, 210 Mansfield Court, Evergreen Islands. Mr. Glade commented that streams hold social value, and requested that stream names be retained.

Patrick O'Hearn, 11039 Post Drive. Mr. O'Hearn supported a setback from the wetland buffer.

Don Measamer, Planning Director, requested Planning Commissioners consider a building setback from the wetland buffer for either 5 feet or 10 feet. Ms. Grage stated the proposal allows for a shorter setback in specific situations.

New Business

Final Plat, Phase IV, Rock Ridge South

Kevin Cricchio, Associate Planner, summarized the project.

Commissioner Doll questioned the status of several conditions. Mr. Cricchio explained that all concerns were either addressed or not a part of phase IV.

Tom Glade, 210 Mansfield Court, Evergreen Island. Mr. Glade stated concern with water quality of the Cranberry Lake Watershed, and will provide written comments later.

Commissioner McNett made a motion to recommend approval of the Final Plat, Phase IV, of Rock Ridge South. Commissioner Oppel seconded. The motion passed unanimously.

Chair Laumbattus called the meeting to a close at approximately 7:30 p.m.



Planning Commission Agenda Bill

Meeting Date: 9/27/2017 **Agenda Item:** 5A

Subject: Dog Kennel /Boarding & Grooming, CUP-2017-0002

Staff Contact: Kevin Cricchio, AICP, WPIT, Associate Planner

Approved for Submittal to Commission by	
X	Don Measamer, Director

Action Type	
X	Public Hearing
X	Discussion
X	Possible Action

Summary & Background: The City of Anacortes' Planning, Community, & Economic Development Department received a Conditional Use Permit to permit a dog kennel /boarding and grooming associated with an existing doggy daycare. The subject property is located in the LM1 Zoning District. The proposed use (dog boarding and grooming) would be adjacent to a permitted doggy daycare. The applicant & landowner for the proposed use recently purchased the existing doggy daycare business. The doggy daycare is located in three (3) units of an existing warehouse & storage building. If permitted, the proposed boarding and grooming use would be in four (4) more units of the existing building. An open-record public hearing before the Planning Commission is scheduled for 6:00 PM on September 27, 2017. Please bring your packets with you to the hearing.

Recommendation: The Department of Planning, Community, and Economic Development recommends that the Planning Commission make a motion to recommend approval to City Council regarding the subject Conditional Use Permit subject to staff's suggested conditions of approval.

Attachments:

Staff Report with Draft Planning Commission's Findings of Fact, Conclusions of Law, & Recommendation

Exhibit #01, Master Permit Application, Narrative, & CUP Criteria of Approval,

Exhibit #02, GIS Map & Assessor's Info

Exhibit #03, Notice of Application & Hearing

Exhibit #04, Public Comments Received

Exhibit #05, Agency & Department Comments Received

Exhibit #06, Site Plan & Parking Plan

Exhibit #07, Signed City Council Findings of Fact, Conclusions of Law, and Decision,
CUP-2015-0002

Exhibit #08, Signed City Council Findings of Fact, Conclusions of Law, and Decision,
CUP-2012-0002



**PLANNING COMMISSION'S DRAFT FINDINGS OF FACT,
CONCLUSIONS OF LAW, & RECOMMENDATION:**

OPEN-RECORD PUBLIC

HEARING DATE: Wednesday, September 27, 2017, @ 6:00 PM

CLOSED-RECORD PUBLIC

HEARING DATE: Monday, October 9, 2017, @ 6:00 PM

FILE NUMBER: CUP-2017-0002

PROJECT LOCATION: The existing doggy daycare is located in suites 101 & 102 at 9119 Molly Lane along with suite 103 at 9121 Molly Lane. The proposed dog boarding and grooming addition would occur within suites 101, 102, 104, and 105 at 9121 Molly Lane, Anacortes, WA.

SUBJECT PARCEL: Parcel #: P127035

**APPLICANT &
LANDOWNER:**

Kirk and Kelly Moore
12863 South Wildwood Lane
Anacortes, WA 98221

**STAFF REPORT
PREPARED BY:**

Kevin Cricchio, AICP, WPIT
Associate Planner
City of Anacortes
904 6th Street
Anacortes, WA 98221

SUBJECT PROPOSAL: The applicant has applied for a Conditional Use Permit to permit a dog kennel /boarding and grooming associated with an existing doggy daycare. The subject property is located in the LM1 Zoning District.

EXISTING LAND USE: The proposed use (dog boarding and grooming) would be adjacent to a permitted doggy daycare known as "Smarter Than

Your Dog.” The applicant & landowner for the proposed use recently purchased the existing doggy daycare business. The doggy daycare is located in three (3) units of an existing warehouse & storage building. If permitted, the proposed boarding and grooming of dogs would be in four (4) more units of the existing building.

The applicant would like to board up to 40 dogs. To accommodate grooming, the applicant would like to install a wash sink using existing plumbing and add a grooming table to their business.

CURRENT ZONING & COMP.

PLAN DESIGNATION: Light Manufacturing 1 (LM1) Zoning District

SURROUNDING ZONING & LAND USES:

Direction:	Zoning:	Present Land-Use:
North:	Light Manufacturing 1	Jerry Smith Chevrolet Auto Dealership
South:	Light Manufacturing 1	Existing Wetland & Stormwater Pond
East:	Light Manufacturing 1	Existing Wetland & Sunland Bark & Topsoil
West:	Light Manufacturing 1	Existing Warehouse & Storage Building

DRAFT FINDINGS OF FACT:

I. GENERAL BACKGROUND:

1. The project site consists of two (2) storage /warehouse structures and associated improvements including landscaping and parking. The multi-tenant building has manufacturing and industrial uses therein.
2. On September 9, 2011, former Planning Director Ryan Larsen issued an administrative interpretation (#11-001) which concludes that the proposed dog training and day care services land use appears appropriate in the HM and LM1 Zone.
3. Based on this administrative interpretation, on March 29, 2012, a Conditional Use Permit (CUP-2012-0002) was submitted to permit a doggy daycare at 9119 Molly Lane, Units B101 and B102. An open-record public hearing was conducted by the Planning Commission on May 9, 2012. The Planning Commission recommended approval to City Council. On June 4, 2012, a closed-record public hearing was conducted on June 4, 2012 regarding the subject CUP. City Council’s Findings of Fact, Conclusions of Law, and Decision were signed by Mayor Dean Maxwell on June 18, 2012 (**See Exhibit #08**).
4. The doggy daycare called, “Smarter than your Dog” was located within two (2) suites in an existing warehouse building totaling 3,000 ± square feet. This use

was not listed in AMC Chapter 17.19 as either a permitted or conditional use. Additionally, dog training and day care are not identified in the definitions of “kennels” or “veterinary clinics” as listed in AMC 17.06 –Definitions.

5. Then on April 17, 2015, the City of Anacortes’ Department of Planning, Community, & Economic Development received another Conditional-Use Permit to permit an expansion of the existing business into one unit located at 9121 Molly Lane consisting of approximately an additional 1,000 square feet. Per AMC § 17.10.100(F), “Expansion of an approved conditional use by expanding the land area by more than ten percent or by increasing the land covered by buildings by more than ten percent will require a new conditional use permit.” The proposed expansion exceeds this 10% threshold thus requiring a new Conditional Use Permit.
6. The Planning Commission conducted an open-record public hearing on May 27, 2015, regarding the expansion of a conditional use. After deliberating on the matter, the Planning Commission voted to recommend approval to City Council.
7. Then on June 15, 2015, the City Council conducted a closed-record public hearing and following deliberation on the matter, approved the proposed expansion of the conditional use.
8. Dog Waste: A small outdoor fenced area, which exists from the previously approved Conditional Use Permit (**See Exhibits #07 & 08**) is used by the existing doggy daycare as an area for dogs to relieve themselves. The proposed use [dog kennel /boarding and grooming] would also use this outdoor area for the relief by the dogs. Urine will be treated with a medical grade enzymatic cleaner. Solid waste will be collected immediately and triple bagged for disposal.
9. Per AMC Table 19.20.030-1, a pre-application conference was conducted prior to CUP application submittal. The pre-application conference was held at 2:00 PM on Tuesday, June 20, 2017, concerning the proposed development (PRE-2017-0018).
10. Per AMC Table 19.20.030-1, a neighborhood meeting was conducted prior to CUP application submittal. The neighborhood meeting was held at the senior center at 6:00 PM on Thursday, July 27, 2017.
11. On August 8, 2017, the applicant submitted the subject Conditional Use Permit to the City of Anacortes’ Department of Planning, Community, & Economic for review.
12. Following a review of the application material submitted, the Planning, Community, & Economic Department deemed the subject application complete effective August 16, 2017.
13. Per AMC Table 19.20.030-1, Conditional Use Permits require a twenty-one (21) day comment period. The twenty-one (21) day comment period ended at 5:00

PM on September 7, 2017, but comments were accepted up until the close of the of the open-record public hearing.

II. NOTICE OF APPLICATION (NOA) & NOTICE OF HEARING (NOH):

1. A "Notice of Application & Hearing" was published in the Anacortes American Newspaper on August 16, 2017.
2. The Notice of Application & Hearing was posted onsite in two different locations on August 9, 2017. Additionally, the notice was posted at the library, city hall, and the local USPS on August 9, 2017. The Notice of Application and Hearing was posted on the city's website on August 10, 2017.
3. The notice was mailed to neighboring landowners located within 300-feet of the subject property on August 10, 2017.
4. Agencies and departments of jurisdiction were solicited for comment on August 10, 2017.

III. CRITICAL AREA / ENVIRONMENTALLY SENSITIVE AREA REVIEW:

The proposed use is within an existing warehouse /storage building. Any construction associated with this project will only involve a tenant improvement (TI) to the existing building and units therein. Therefore, since no new construction is involved, critical areas review was not required.

IV. STATE ENVIRONMENTAL POLICY ACT:

No new construction is involved since the proposed use will be within an existing building. Accordingly, the subject proposal is exempt from SEPA environmental review per WAC § 197.11.800 and AMC § 18.04.120.

V. PUBLIC COMMENT:

To date, no public comment have been received (**See Exhibit # 04**).

VI. AGENCY & DEPARTMENT COMMENT:

Comments received from both agencies and departments of jurisdiction can be found in **Exhibit # 05**.

VII. ZONING ORDINANCE/CODE:

1. Per AMC 17.19.010, the purposed of the Light Manufacturing 1 (LM1) Zone is to "accommodate industrial type uses that do not need water access or proximity to the central business district or to the Commercial Avenue corridor."
2. A Conditional Use Permit (CUP-2012-0002) was approved by City Council on June 15, 2015 to permit a doggy daycare use within the existing building (**See Exhibit #08**).

3. A Conditional Use Permit (CUP-2015-0002) to expand the conditional use (approved by CUP-2012-0002) was approved by the City Council on May 27, 2015.
4. The applicant now wishes to permit dog boarding /kennel and grooming associated with the doggy daycare.
5. According to 17.19.040(F), “Kennels” in the LM1 Zoning District require a Conditional Use Permit. Accordingly, the applicant has submitted a Conditional Use Permit to permit a dog boarding /kennel and associated grooming within an existing building. If approved, this use would complement and be accessory to the existing doggy daycare.
6. The applicant for the proposed use [dog boarding /grooming] recently purchased the existing doggy daycare business.
7. “Dog boarding /kennels” or “grooming” are not listed as a “use” in 17.46.020 of the Anacortes Municipal Code regulating the minimum number of off-street parking spaces required for development.

AMC 17.46.020 does list “Retail /mixed retail /shopping center” uses however. This type of use requires five (5) off-street parking spaces for every 1,000 net square feet (NSF) for buildings that are less than 15,000 NSF. For building that are greater than 15,000 NSF, four (4) off-street parking spaces are required for every 1,000 NSF. The existing and proposed uses onsite (a doggy daycare, dog boarding, & dog grooming) however are not retail, mixed retail, or a shopping center per se.

The applicant contends that a better match for a proposed use in AMC 17.46.020 would fit under “Senior Housing / Nursing Home.” Senior Housing / Nursing Homes require 0.33 off-street parking spaces per guest. At a maximum capacity of 40 guests, this would require 14 parking spaces. The proposed use however is not a senior house /nursing home either.

According to AMC 17.46.010(D), “For uses not specifically mentioned herein, the decision maker must determine the off-street parking requirement based generally on the requirements for similar uses.”

According to the applicant’s site plan (**See Exhibit #06**), there are fourteen (14) designated & striped off-street parking spaces in the near vicinity to serve the existing [doggy daycare] and proposed [dog boarding /kennel & grooming] businesses.

Additionally, the existing warehouse / storage building has a broad paved driveway that separates one warehouse /storage building from another. According to the applicant’s site plan (**See Exhibit #06**), there is adequate room

for an additional fourteen (14) short-term off-street parking spaces in front of the bays /units involved in the doggy daycare, dog boarding/kennel, and grooming business if needed. There also is room for four (4) additional off-street parking spaces if needed parallel to the roll-up doors. Both the existing and proposed parking areas discussed above have adequately served the existing business [doggy daycare]. Both the existing and proposed uses result in little traffic within a given day when compared to other uses. Additionally, what traffic the businesses do generate, vehicles are typically parked for a short period of time associated with hours of drop off and pickup. Therefore, PCED believes that off-street parking for both the existing and proposed businesses will adequately be addressed by said parking areas located onsite.

8. Per AMC § 19.36.040, in order to grant a Conditional Use Permit, the decision maker must find that the use would be consistent with the following criteria as follows:

- A) The use would comply with any specific requirements for the conditional use specified elsewhere in this code.

STAFF ANALYSIS:

Per AMC § 17.19.040(F), “kennels” require a Conditional Use Permit in the Light Manufacturing 1 Zoning District.

- B) Access to this site is appropriate considering the anticipated volume of traffic resulting from the use.

STAFF ANALYSIS:

Ingress and egress to the subject parcel is from Molly Lane. Off of Molly Lane, there is a broad driveway that separates one warehouse /storage building from another.

- C) Off-street parking and loading facilities are adequate in terms of location, amount, and design to service the use.

STAFF ANALYSIS:

There are fourteen (14) designated striped off-street parking spaces in the near vicinity of the businesses. Additionally, there is room for fourteen (14) short-term off-street parking spaces in front of the respective bays /units involved with the doggy daycare, dog boarding/kennel, and grooming business if needed. There also is room for four (4) additional off-street parking spaces if needed parallel to the roll-up doors.

- D) The amount and location of open-space and the provision of screening is such that buffering of incompatible uses is achieved.

STAFF ANALYSIS:

The proposed use(s) will be indoors within several units of an existing warehouse and storage building. It will also be adjacent to an existing doggy daycare business. Therefore, since no use is proposed outdoors there is no need for a provision of open-space or screening of incompatible uses.

- E) The location and intensity of outdoor lighting is such that it does not cast light on adjacent, adjoining, or neighboring properties.

STAFF ANALYSIS:

No additional outdoor lighting is proposed beyond what exists at Warehouse and Storage building development today.

- F) Hours and manner of operation of the proposed use, including anticipated noise generation, are not inconsistent with the adjacent or nearby uses.

STAFF ANALYSIS:

The hours of operation and noise associated with the proposed use(s) will not have a negative impact on adjacent businesses. The owners of the proposed business also owns the adjacent doggy daycare –smarter than your dog. The owners diligently manage dog barking. Additionally, the business owners also own several bays/units within the warehouse and storage building used for doggy daycare, boarding, and grooming.

- G) Public facilities and utilities are capable of adequately serving the proposed use.

STAFF ANALYSIS:

The proposed use will have no impact on public facilities and utilities that serve the project site.

- H) The physical conditions of the site, including size, shape, topography, and drainage, are suitable for the proposed development.

STAFF ANALYSIS:

The proposed use will be within an existing warehouse and storage building. There will be no change to the development's physical conditions.

- I) Any other factors deemed relevant to the decision maker.

STAFF ANALYSIS:

Kirk and Kelly Moore developed the subject warehouse and storage buildings where the propose use would be located at. Kirk is the HOA President for this development. Kirk and Kelly Moore own 13 properties within a 300-foot radius. They have an invested interest in maintaining and improving the area.

9. The subject proposal **is, is not** consistent with the above development regulations and the proposed land use is permitted in the underlying zoning districts.

VIII. CONCLUSIONS OF LAW:

1. The public notice requirements of the Conditional-Use Permit **have, have not** been complied with.
2. The project **is, is not** consistent with the general purposes of the City's Comprehensive Plan, the city's planning standards and specifications of the zoning ordinance, and other ordinances applicable to the proposal.
3. The Planning Commission bases its Findings of Fact, Conclusions of Law & Recommendation on the entire record, including all testimony and exhibits. Any finding, which would be deemed a Conclusion of Law, and any Conclusion of Law which should be deemed a finding is hereby adopted as such.

IX. STAFF RECOMMENDATION:

The Department of Planning, Community, and Economic Development recommends that the Planning Commission make a recommendation of approval to City Council regarding the subject Conditional Use Permit subject to staff's suggested conditions of approval listed below.

X. RECOMMENDATION:

Based on the foregoing information and analysis, the environmental documents submitted by the applicant, and the City regulatory authority to implement the policies, standards, and the regulations of the Anacortes Municipal Code (AMC), the Planning Commission **recommends approval, approval with conditions, or denial** to City Council concerning the subject Conditional Use Permit subject to staff's suggested conditions of approval listed below.

XI. CONDITIONS OF APPROVAL:

1. The applicant shall be responsible for reimbursement to the City for the cost of posting, mailing and publication of the public hearing for this proposal. Payment shall be made prior to building permit application submittal or issuance.
2. The scope of this project shall not exceed that as set-out in the conditional use permit application (including attachments), and in accordance with the determinations made and conditions imposed.
3. A building permit shall be secured for any proposed tenant improvement prior to the occupancy of the building /units.
4. If any garbage dumpsters are proposed, the applicant is responsible for following the city's dumpster pad specifications. Dumpsters shall be screened by constructing a wood

enclosure(s) around them surrounded by landscaping. Both wood enclosures and landscaping shall be in place prior to certificate of occupancy being issued.

5. Development shall at all times comply with AMC Chapter 6.06 regulating indoor/outdoor commercial kennels and grooming parlors within the City of Anacortes.

These Findings of Fact, Conclusions of Law, and Recommendation were adopted by the City of Anacortes' Planning Commission on **September 27, 2017**.

**CITY OF ANACORTES, WASHINGTON
PLANNING COMMISSION**

By _____
Marty Laumbattus, Planning Commission Chair

EXHIBITS:

EXHIBIT NUMBER:	NAME OF EXHIBIT:
Exhibit #01	Master Permit Application, Narrative, & CUP Criteria of Approval
Exhibit #02	GIS Map & Assessor's Info
Exhibit #03	Notice of Application & Hearing
Exhibit #04	Public Comments Received
Exhibit #05	Agency & Department Comments Received
Exhibit #06	Site Plan & Parking Plan
Exhibit #07	Signed City Council Findings of Fact, Conclusions of Law, & Decision, CUP-2015-0002 –Smarter Than Your Dog
Exhibit #08	Signed City Council Findings of Fact, Conclusions of Law, & Decision, CUP-2012-0002–Smarter Than Your Dog

EXHIBIT #01:

MASTER PERMIT APPLICATION, NARRATIVE, & CUP CRITERIA OF APPROVAL



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT

MASTER PERMIT APPLICATION

Mailing Address: P.O. Box 547, Anacortes, WA 98221

Office Location: 904 6th Street, Anacortes WA 98821

Phone: (360) 299-1984, Fax: (360) 293-1938

PERMITS REQUESTED FROM THE CITY OF ANACORTES:

☐ Accessory Dwelling Unit (ADU)	☐ Annexation Request	☐ Administrative Interpretation
☐ Administrative Conditional Use Permit	☐ Binding Site Plan (Preliminary)	☐ Binding Site Plan (Final)
☐ Boundary Line Adjustment (BLA)	☐ Clearing Permit	☐ Code (AMC) Amendment
☐ Comprehensive Plan Amendment	☒ Conditional Use Permit (CUP)	☐ Cottage Housing
☐ Essential Public Facility	☐ Extension of Time for Approval	☐ Floodplain Development Permit
☐ Grade and Fill Permit	☐ Home Occupation Permit	☐ Lot Certification
☐ Manufactured Home Subdivision	☐ Minor Permit Revision	☐ Plat (Preliminary)
☐ Plat (Final)	☐ Plat Amendment /Modification	☐ Reasonable Use Exception
☐ Rezone Request	☐ SEPA Environmental Review	☐ Shoreline Exemption
☐ Shoreline Substantial Development Permit	☐ Shoreline Conditional Use Permit	☐ Shoreline Variance
☐ Short Plat /Subdivision (Preliminary)	☐ Short Plat /Subdivision (Final)	☐ Special Use Permit
☐ Stormwater Management Manual Adjustments & Exceptions	☐ Variance (Level 1)	☐ Variance (Level 2)

PROJECT & SITE INFORMATION:

SITE ADDRESS: <i>See Attached</i>	PROJECT NAME: <i>See Attached</i>
PARCEL NUMBER(S): <i>See Attached</i>	SECTION, TOWNSHIP, & RANGE: <i>See Attached</i>
LOT SQUARE FOOTAGE & ACREAGE: <i>See Attached</i>	PROJECT VALUATION: <i>See Attached</i>
LEGAL DESCRIPTION: <i>See Attached</i>	PRESENT ZONING: <i>See Attached</i>
PRESENT USE OF PROPERTY: <i>See Attached</i>	CUT & FILL (CY) PROPOSED: <i>See Attached</i>
PRE-APPLICATION CONFERENCE REQUIRED: ☒ Yes ☐ No	WATER SOURCE: ☒ City of Anacortes ☐ Private Well ☐ Community Well
SEWAGE DISPOSAL: ☒ City of Anacortes ☐ Septic Tank	ROAD ACCESS: ☒ City Road ☐ State Highway ☐ Private Road
CRITICAL AREAS WITHIN 300 FEET: ☐ Yes ☒ No	WATER BODIES WITHIN 200 FEET: ☐ Yes ☒ No
FLOODPLAIN: Flood Zone: <i>N/A</i> FIRM Panel # _____ Date of Panel: _____	
LOT COVERAGE AREA CALCULATIONS: Existing Square Footage: <i>5,000</i> Proposed Square Footage: <i>5,000</i>	
IMPERVIOUS SURFACE AREA CALCULATIONS: Existing Impervious Square Footage: <i>5,000</i> New Impervious Surface: <i>5,000</i>	

PROPERTY OWNER INFORMATION: ☐ Multiple owners attached	
NAME: Kelly & Kirk Moore	MAILING ADDRESS: 12863 S. Wildwood Lane
CITY, STATE, ZIP: Kenai, Wa, 98221	PHONE #: (360) 421-1283 (360) 421-2342
FAX #: N/A	EMAIL ADDRESS: Kirk@north@gmail.com, Kkeemoore@gmail.com
APPLICANT INFORMATION: ☒ Same as property owner	
NAME:	MAILING ADDRESS:
CITY, STATE, ZIP:	PHONE #:
FAX #:	EMAIL ADDRESS:
CONTACT PERSON: ☒ Same as property owner ☐ Same as applicant	
NAME:	MAILING ADDRESS:
CITY, STATE, ZIP:	PHONE #:
FAX #:	EMAIL ADDRESS:
DESCRIPTION OF SUBJECT PROPOSAL	
PROPOSED WORK: Currently 9121 Molly Lane has dog training and daycare. We propose adding pet boarding and grooming. We will have onsite kennels - estimated up to 40 pets with staff. The plan is to use existing wash station in 9121 building for grooming and bathing.	

NOTES:

- ☒ I am the property owner and I grant permission to city staff to enter the project site to verify presence or absence of critical areas and to perform inspections of the work proposed by this application; or
- ☐ Attached is a letter of authorization stating that I have the consent of the property owner to submit the subject application on their behalf. Additionally, the property owner has granted permission to city staff to enter the project site in order to verify the presence or absence of critical areas and to perform inspections of work proposed by this application.
- ☐ A notarized affidavit (see below) is required to be completed by all persons having an ownership interest in the subject property and the applicant, if different from the property owner(s). If the signatory is not listed as the owner in the title report, or if the signatory is signing on behalf of an entity, documentation authorizing the signatory to sign the affidavit on behalf of the individual or entity shall provided.

SIGNATURE REQUIRED:

I certify that the information, statements, & answers above regarding the subject application(s) are true and correct to the best of my knowledge and belief.

Signature: Kirk Moore
 Print Name: Kelly Moore Kirk Moore
 Date: 7/10/17

Title: Owner
 Company: Smarter Than Your Dog!
(STYD)

To: Anacortes Planning Department

From: Smarter Than Your Dog

Kirk and Kelly Moore

Re: Project Narrative, Pet boarding and grooming Conditional use permit

Smarter than Your Dog doggie daycare has a clientele that we believe would benefit from pet boarding and grooming.

Looking into the LM1 zoning dog kennel is listed as a conditional use. Kelly and I would like to begin pet boarding and grooming. To accommodate boarding we would start with 5 to 10 kennels and possibly grow the business over time up to 40 dogs. To start the grooming component of our business we would like to install a wash sink using existing plumbing and add a grooming table. We have learned it is common practice to combine daycare, boarding and grooming under one business.

We attended the pre-application conference. In addition, July 27th a neighborhood meeting was held. In this meeting several questions were raised. Attached to this narrative is an STYD neighborhood meeting question and answer summary.

STYD Neighborhood Meeting Question and Answer

Question 1: Describe existing square footage for doggy daycare and proposed for kennel and grooming. What is the total proposed and how much square footage for each use?

Answer 1: Existing square footage is 3000 sq ft open space in building 9119 of Molly Lanen and an additional 1000 sq ft of open space in the 9121 building. Although we plan to start off only utilizing an additional 1000 sq ft of the 9121 building our proposal would be for up to an additional 4000 sq ft in the 9121 building

Question 2: Will there be boarding of dogs overnight? If so, a concern about safety and the welfare of the dogs was raised.

Answer 2: Pets will be boarded overnight. Pet boarding is a common practice. There are many safe successful pet boarding models currently in use. We continue to research different models and will implement the model that best fits the existing daycare as well as the physical building that will house the boarding/grooming business.

Question 3: Describe in detail how animal waste is being taken care of.

Answer 3: Urine is treated with a medical grade enzymatic cleaner. Solid wastes are collected immediately and triple bagged for disposal as recommended by Skagit County. Our facility is very clean.

Question 4: A concern was expressed about the common dumpster being used for animal waste.

Answer 4: Waste is triple bagged. Waste does not escape the triple bag system. Overall waste is very small in both mass and volume and will not have a large impact of the in place waste system.

Question 5: How many dogs will be in doggy daycare, grooming, and boarding/ kennels at one time?

Answer 5: Currently the daycare averages 30 dogs a day. Expected short term Boarding projection is 10 pets with the potential long term of expanding to average 40 pets.

Question 6: Describe area (square footage, etc.) of area designated for the exercise of dogs associated with the kennel.

Answer 6: Current business has 3500 sq ft of indoor play area for dogs. Additional indoor space will be added as boarding needs require. Dogs who cannot participate in the dog daycare pack model will be exercised in the additional square footage open to dog kennel area.

Question 7: Any area outside used for the exercise or training of dogs?

Answer 7: Currently the area in front of the 9121 building is used three hours a week for evening weekday training and 2 hours most Saturdays. Our proposal will have little or no impact on training outside of the facility.

Question 8: Will there be a visual discernable difference in what is permitted there today [doggy daycare] and what is proposed?

Answer 8: With growth there may be additional outdoor signage adhering to association by-laws.

Question 9: How many staff members are employed today and will this increase/decrease? How much?

Answer 9: Currently STYD has 6 employees. Typically 3 employees man the daycare. With the addition of grooming and boarding we anticipate having approximately 10 employees with approximately 4 on site during daycare hours. Hours to be determined-one employee will tend to pet needs ie., feeding, walking and cleaning kennels when the daycare is not in session.

Question 10: Will staff currently employed be retained?

Answer 10: Yes

Question 11: What units (and addresses) will be used for each proposed use: doggy daycare, grooming, and boarding?

Answer 11: Unit 102 will be used immediately for grooming and pet boarding. Bays 101-105 are flexible, so as we grow we will determine best fit for further expansion. Kirk and Kelly Moore, owner of STYD, own all 5 bays in the 9121 building.

Question 12: Are the units metered with a water meter/plumbing?

Answer 12: Bay 103 of the 9121 building is connected and metered. No additional connection is necessary.

Question 13: Is drop in doggy daycare /boarding proposed?

Answer 13: Yes, additional space for drop-in dogs will be added to the business. STYD pack daycare model will remain intact.

Question 14: Discuss in detail both existing parking (# of spaces and use), demand for parking based on the existing parking for the existing use(s), and how that will change with the added use of kennel /boarding and grooming. Essentially you want to contrast existing parking provided on site with proposed using [AMC Chapter 17.46](#) regulating off-street parking. Does this proposed use increase the off-street parking requirement? Is there sufficient off-street parking for all existing and proposed uses as required by AMC Chapter 17.46?

Answer 14: While Pet boarding and grooming parking is not specified in Anacortes LM1 zoning the best match for the proposed project from Anacortes Code of Ordinances Title 17 Chapter 17.46.020 Spaces Required would be the Senior Housing Nursing Home. At first this seemed like an odd fit but when I examined the categories more closely in 17.46.020 Spaces Required, Senior Housing Nursing Home is the most relevant in that the overnight guests/residents do not drive. Parking is needed for support staff and an occasional short term guest. Senior Housing Nursing Home required parking is .33 spaces per guest. At maximum capacity of 40 pet guests this would require 14 parking spaces. When the 9117, 9119 and 9121 buildings went through their civil review it was recognized that the broad asphalt driveway in front of the bays could be used as unlined parking. Our proposed project has up to 125 ft of building frontage that runs up to and adjacent to the asphalt parking lot/driveway.

With an average parking space of 8.9 ft wide the one hundred and twenty five feet of frontage would accommodate 14 parking spaces.

The proposed project is also within Premium Warehouse and Storage. Premium warehouse and storage has 16 parking spots in the immediate vicinity that are designated short term parking. Currently these short term parking spaces are rarely above 30% capacity and would also be used for drop off and pick up short term parking by future pet customers.

We believe the parking demand by the proposed use will be even lower than the Senior Housing Nursing Home, but we do want to be prepared. As the developer of the facility and the president of the Homeowners Association the parking situation at Premium Warehouse and Storage is rarely if ever stressed by short term parking.

CITY OF ANACORTES 7-27-17 NEIGHBORHOOD MEETING
DOG KENNEL ADDITION TO DOGGY DAYCARE

	PRINT NAME:	REGARDING:	ADDRESS:	PHONE & EMAIL ADDRESS:
1.	Carol Dellutri	Dog Kennel	3486 Green Cliffs rd	carl@dellutri.com 360 420 4388
2.	Jack Stenmark	"	11196 C Ave	(360) 858-5035
3.	JERRY HENRIS	DOG KENNEL	11196 D AVE	(360) 770-8745
4.	Terry Lou	"	PO Box 1509 Lacombe	360 982-4068
5.	Jeanine Lou	"	PO Box 1509 Lacombe	" " "
6.	Patrick Swanljung	"	1607 25th St Anacortes	206-228-8340 patrick.swanljung@mac.com
7.	Molly Smith	"	745 Bellevue Ave #201 Seattle	206-552-3553 maosmith@msu.edu
8.	Dan August	"	13672 Harbor Ln	360 224-0274 daugust50@gmail.com
9.				
10.				

Conditional Use Permit Criteria of approval AMC 19.36.040

1 The use would comply with any specific requirements for the conditional use specified elsewhere in this code;

We believe that our intended purpose meets all specific requirements of a conditional use for LM1 zoning in the City of Anacortes

2 Access to the site is appropriate considering the anticipated volume of traffic resulting from the use;

9121 Molly Ln was laid out by Pat Severin at Sound Engineering and has excellent egress regress.

3. Off-street parking and loading facilities are adequate in terms of location, amount, and design to service the use;

While Pet boarding and grooming parking is not specified in Anacortes LM1 zoning the best match for the proposed project from Anacortes Code of Ordinances Title 17 Chapter 17.46.020 Spaces Required would be the Senior House Nursing Home. At first this seemed like an odd fit but when I examined the categories more closely in 17.46.020 Spaces Required, Senior Housing Nursing Home is the most relevant in that the overnight guests/residents do not drive. Parking is needed for support staff and an occasional short term guest. Senior Housing Nursing Home required parking is .33 spaces per guest. At maximum capacity of 40 pet guests this would require 14 parking spaces. When the 9119 and 9121 building went through their civil review it was recognized that the broad asphalt driveway in front of the bays could be used as unlined parking. The proposed project has up to 125 ft of building frontage that runs up to and adjacent to the asphalt parking lot/driveway. With an average parking space of 8.9 ft wide the one hundred and twenty five feet of frontage would accommodate 14 parking spaces.

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We believe the parking demand by the proposed use will be even lower than the Senior Housing Nursing Home but we do want to be prepared. As the developer of the facility and the president of the HOA the parking situation at Premium warehouse and storage is rarely if ever stressed by short term parking.

4. The amount and location of open space and the provision of screening is such that buffering of incompatible uses is achieved;

Proposed project will be within existing building No screening will be necessary

5. The location and intensity of outdoor lighting is such that it does not cast light on adjacent, adjoining, or neighboring properties;

Proposed project will require no change in current outdoor lighting

6. Hours and manner of operation of the proposed use, including anticipated noise generation, are not inconsistent with the adjacent or nearby uses;

Hours of operation and anticipated noise will have no impact on Adjacent or nearby bays. STYD has been operating for 5 years and as the landowners we have not had one complaint. Staff is diligent in managing barking. Warehouse bays adjacent to the daycare and all bays in the 9121 building used for daycare, boarding and grooming are all owned by Kirk and Kelly Moore.

7. Public facilities and utilities are capable of adequately serving the proposed use;

Proposed use will have little to no impact on public facilities and utilities.

8. The physical conditions of the site, including size, shape, topography, and drainage, are suitable for the proposed development;

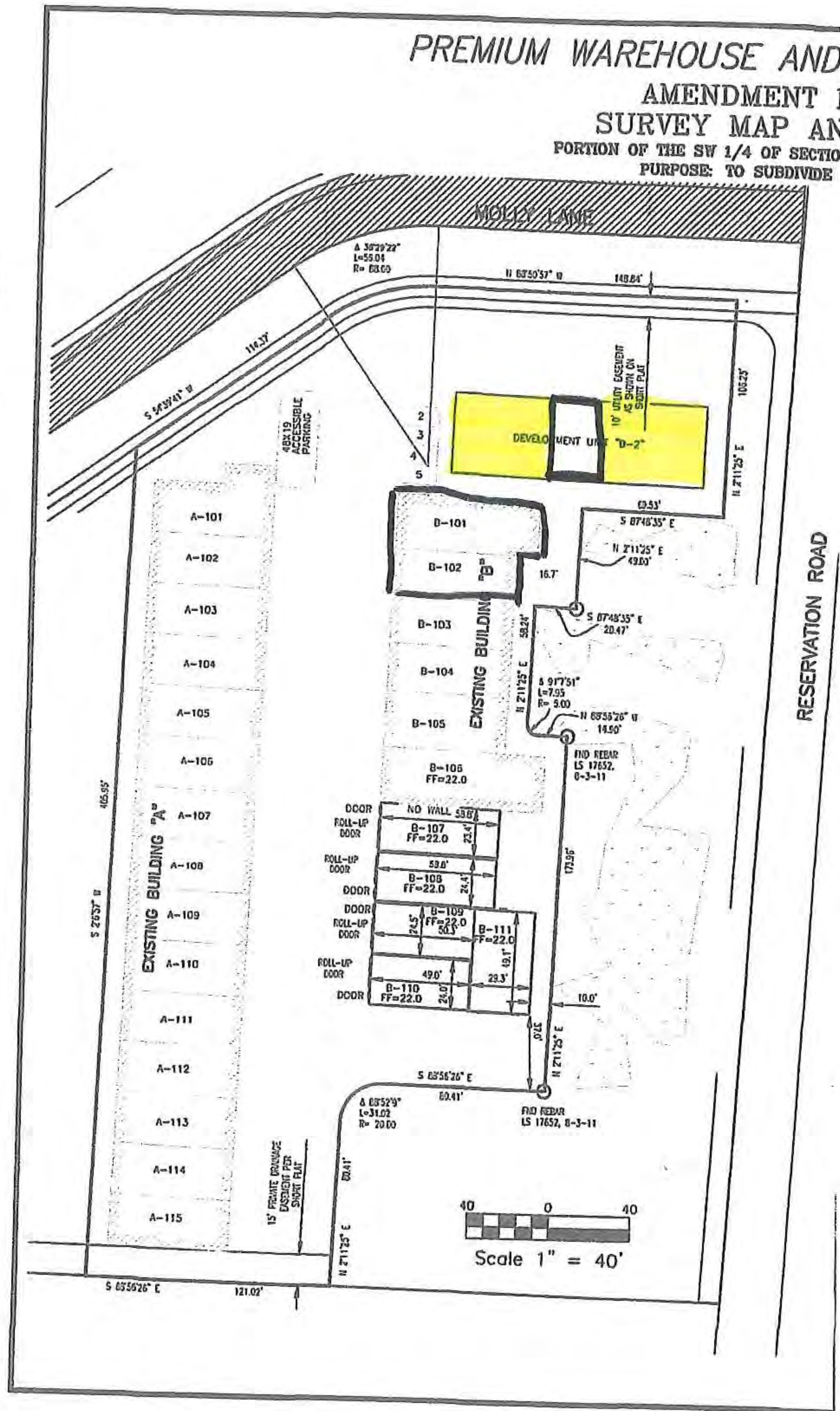
No Impact

9. Any other factors deemed relevant to the decision-maker.

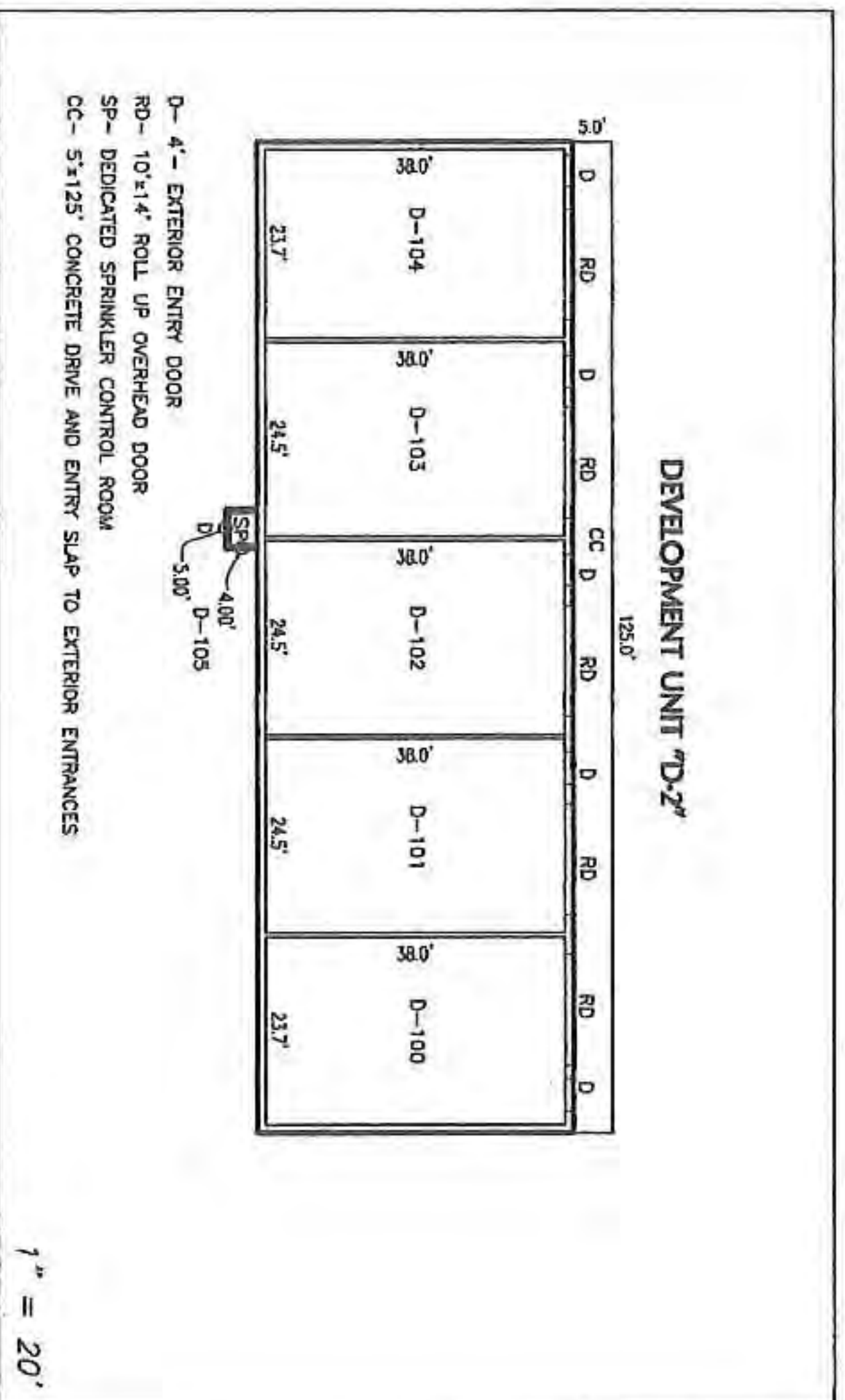
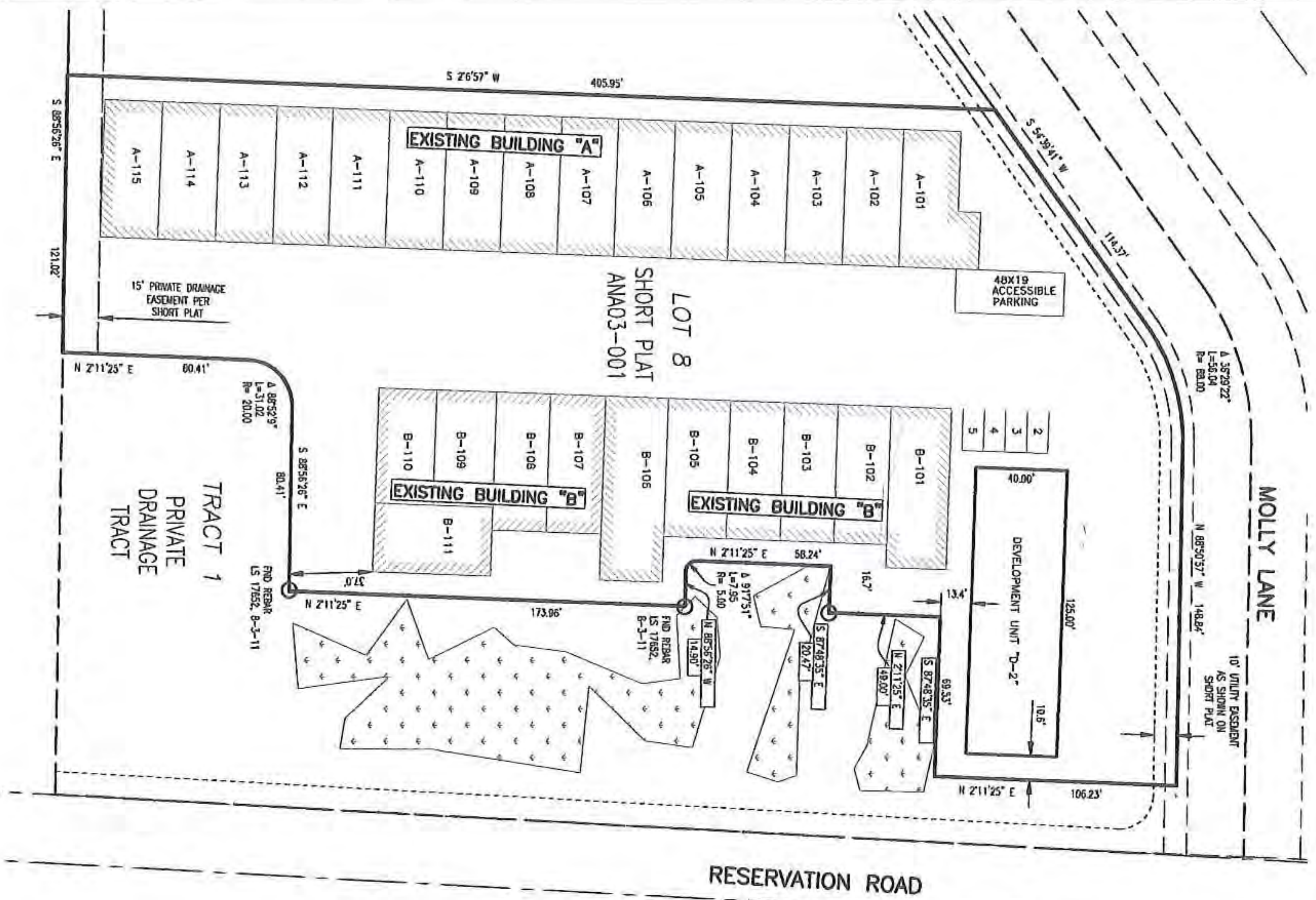
Kirk and Kelly Moore own 13 properties within the 300 foot radius. Kelly and Kirk Moore developed Premium Warehouse and Storage. Kirk is the HOA President of Premium Warehouse and Storage association board. We are very aware of the current uses of the neighboring properties and we have an invested interest in maintaining and improving the area.

PREMIUM WAREHOUSE AND
AMENDMENT 1
SURVEY MAP AN
PORTION OF THE SW 1/4 OF SECTION
PURPOSE: TO SUBDIVIDE

 Current STVD
 Proposed STVD



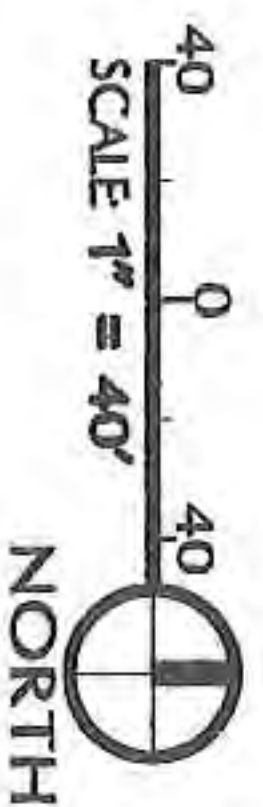
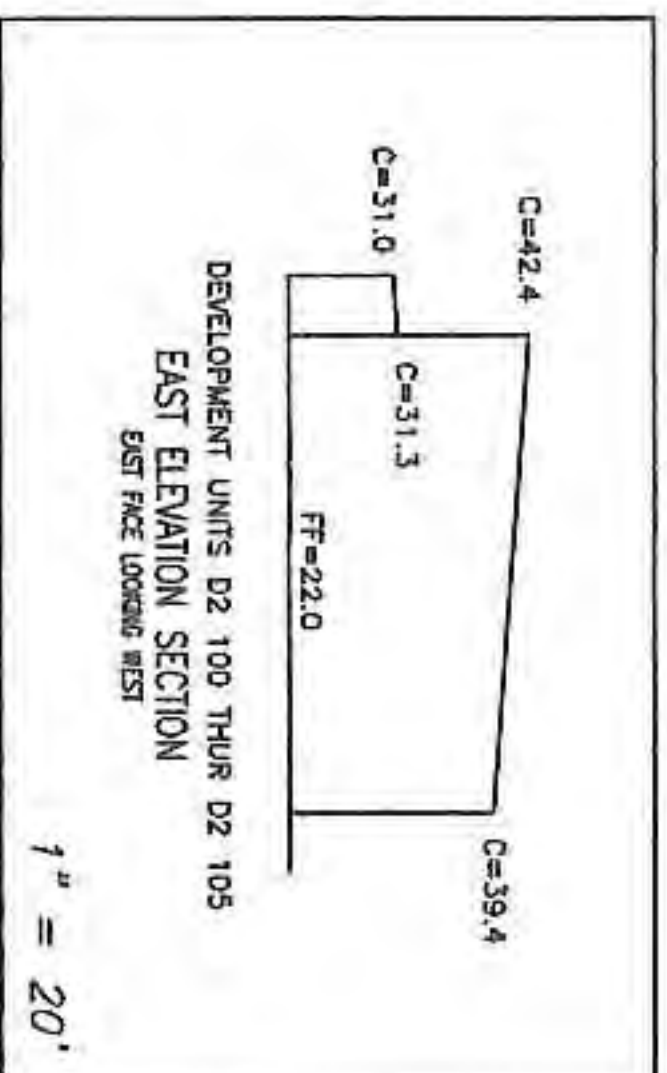
PREMIUM WAREHOUSE AND STORAGE A CONDOMINIUM AMENDMENT NO. 3 SURVEY MAP AND PLANS A PORTION OF THE SW 1/4 OF SECTION 3, T34 N, R2 E, WM PURPOSE: TO SUBDIVIDE UNIT D-2



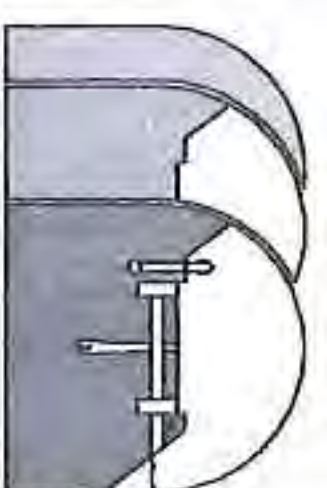
UNIT AREAS

UNIT	AREA
D-100	900 SQ FT
D-101	931 SQ FT
D-102	931 SQ FT
D-103	931 SQ FT
D-104	900 SQ FT
D-105	20 SQ FT

- LEGEND**
- RECOVERED SURVEY MARKER 8-3-11
 - c CEILING ELEVATION
 - ff FINISHED FLOOR
 - ce COMMON ELEMENT



PREMIUM WAREHOUSE AND STORAGE
A CONDOMINIUM PLAT
IN A PORTION OF THE NW 1/4 OF THE SW 1/4 OF SECTION 3,
TOWNSHIP 34 NORTH, RANGE 2 EAST, W.M.,
SKAGIT COUNTY, WASHINGTON
OWNERS
K & K SOLUTIONS, LLC



Sound Development Group
ENGINEERING, SURVEYING & LAND DEVELOPMENT SERVICES
P.O. Box 1705 • 1111 Cleveland Avenue, Suite 202
Mount Vernon, WA 98273
Tel: 360-404-2010 Fax: 360-404-2013

Details for Parcel: P127035



Jurisdiction:

Zoning Designation:

Parcel Number

P127035

XrefID

4943-004-002-0000

Quarter Section Township Range

SW 03 34 02

Owner Information

K AND K STORAGE LLC
ATTN KIRK MOORE AS AGENT
12863 S WILDWOOD LN
ANACORTES, WA 98221

Site Address(es) _

Map Links

[Open in iMap](#)

Assessor's Parcel Map:

[PDF](#) | [DWF](#)

Current Legal Description Abbreviation Definitions

DELETE ACCOUNT FOR NEW PLAT 6026 UNDER AF#201507020088 D-2 DEVELOPMENT UNIT, OF PREMIUM WAREHOUSE AND STORAGE CONDO, RECORDED UNDER AF#200711090161, BEING A PORTION OF LOT 8 OF ANACORTES SHORT PLAT ANA-03-001 AF#200302130095, BEING A PORTION LOCATED IN SW1/4 SW1/4.

2017 Values for 2018 Taxes*

Building Market Value \$4,200.00
Land Market Value +\$65,000.00
Total Market Value \$69,200.00
Assessed Value \$.00
Taxable Value \$.00

Sale Information

Deed Type QUIT CLAIM DEED
Sale Date 2012-02-14
Sale Price \$.00
Sale requires NRL disclosure ([more info](#))

2018 Property Tax Summary

2018 Taxes will be available after 2/15/2018
Use the Taxes link above for 2017 taxes

* Effective date of value is January 1 of the assessment year (2017)

Legal Description at time of Assessment

This parcel number was deleted on 07/21/2015, see legal description for more information.

*Land Use	(500) CONDOMINIUMS OTHER THAN RESIDENTIAL	WAC 458-53-030
Neighborhood	(713ANA) ANACORTES CONDOMINIUM WAREHOUSE	
Levy Code	0901	Fire District
School District	SD103	Exemptions
Utilities		Acres
		NaN
Improvement 1 Attributes Summary		
Building Style	COMMERCIAL REAL PROPERTY	
Year Built	2009	Foundation
Above Grade Living Area		Exterior Walls
Finished Basement		Roof Covering
*Total Living Area		Heat/Air Conditioning
Unfinished Basement		Fireplace
*Total Garage Area		Bedrooms
Bathrooms		
For additional information on individual segments see Improvements tab		

* Land Use codes are for assessment administration purposes and do not represent jurisdictional zoning. Please contact the appropriate planning department in your jurisdiction for land use questions.

* Total living area includes above grade living area and finished basement area.

* Garage square footage includes all garage areas; basement garages, attached garages, detached garages, etc.

Assessment data for improvements is based on exterior inspections. Please contact the Assessor's office if the information does not accurately reflect the interior characteristics.

Existing:

101 1/4, 102 of 9119 Molly Ln

1/2 103 9121 Molly Lane

Proposed

of 101, 102, 104, 1/2 105
9121 Molly Lane

STYD Neighborhood Meeting Question and Answer

Question 1: Describe existing square footage for doggy daycare and proposed for kennel and grooming. What is the total proposed and how much square footage for each use?

Answer 1: Existing square footage is 3000 sq ft open space in building 9119 of Molly Lanen and an additional 1000 sq ft of open space in the 9121 building. Although we plan to start off only utilizing an additional 1000 sq ft of the 9121 building our proposal would be for up to an additional 4000 sq ft in the 9121 building

Question 2: Will there be boarding of dogs overnight? If so, a concern about safety and the welfare of the dogs was raised.

Answer 2: Pets will be boarded overnight. Pet boarding is a common practice. There are many safe successful pet boarding models currently in use. We continue to research different models and will implement the model that best fits the existing daycare as well as the physical building that will house the boarding/grooming business.

Question 3: Describe in detail how animal waste is being taken care of.

Answer 3: Urine is treated with a medical grade enzymatic cleaner. Solid wastes are collected immediately and triple bagged for disposal as recommended by Skagit County. Our facility is very clean.

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Answer 12: Bay 103 of the 9121 building is connected and metered. No additional connection is necessary.

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EXHIBIT #02:

GIS MAP & ASSESSOR'S INFO

9114

HM

SR20

12469

12484

12510

9028

MOLLY LANE

9121

LM1

9117

9119

9029

RESERVATION ROAD

PADILLA HEIGHTS ROAD

12640

Details for Parcel: P132761



Jurisdiction: ANACORTES
Please contact the city of **ANACORTES** for ANACORTES zoning information.

Zoning Designation:

Parcel Number
P132761

XrefID
6026-000-001-0005

Quarter Section Township Range
SW 03 34 02

Owner Information
K AND K STORAGE LLC
ATTN KIRK MOORE AS AGENT
12863 S WILDWOOD LN
ANACORTES, WA 98221

Site Address(es)
MOLLY LANE
Anacortes, WA (Jurisdiction, State)
[Zip Code Lookup](#) | [Site Address Information](#)

Map Links
[Open in iMap](#)
Assessor's Parcel Map:
[PDF](#) | [DWF](#)

Current Legal Description [Abbreviation Definitions](#)

UNIT C-105 OF PREMIUM WAREHOUSE AND STORAGE CONDO, AMENDMENT NO. 3, RECORDED UNDER AF#201507020088, BEING A PORTION OF UNIT D-2 OF PREMIUM WAREHOUSE AND STORAGE CONDO, RECORDED UNDER AF#200711090161, BEING A PORTION OF LOT 8 OF ANACORTES SHORT PLAT ANA-03-001 AF#200302130095, BEING A PORTION LOCATED IN SW1/4 SW1/4.

2016 Values for 2017 Taxes*

Building Market Value \$77,700.00
Land Market Value +\$12,900.00
Total Market Value \$90,600.00
Assessed Value \$90,600.00
Taxable Value \$90,600.00

Sale Information

Deed Type QUIT CLAIM DEED
Sale Date 2012-02-14
Sale Price \$.00

2017 Property Tax Summary

2017 Taxable Value \$90,600.00
General Taxes \$867.88
Special Assessments/Fees
Total Taxes \$867.88

* Effective date of value is January 1 of the assessment year (2016)

Legal Description at time of Assessment

*Land Use	(500) CONDOMINIUMS OTHER THAN RESIDENTIAL		WAC 458-53-030	
Neighborhood	(713ANA) ANACORTES CONDOMINIUM WAREHOUSE			
Levy Code	0901	Fire District		
School District	SD103	Exemptions		
Utilities		Acres	0.05	
Improvement 1 Attributes Summary				
Building Style	COMMERCIAL REAL PROPERTY			
Year Built	2015	Foundation		
Above Grade Living Area	960 Square Feet	Exterior Walls		
Finished Basement		Roof Covering		
*Total Living Area	960 Square Feet	Heat/Air Conditioning		
Unfinished Basement		Fireplace		
*Total Garage Area		Bedrooms		
Bathrooms				
For additional information on individual segments see Improvements tab				

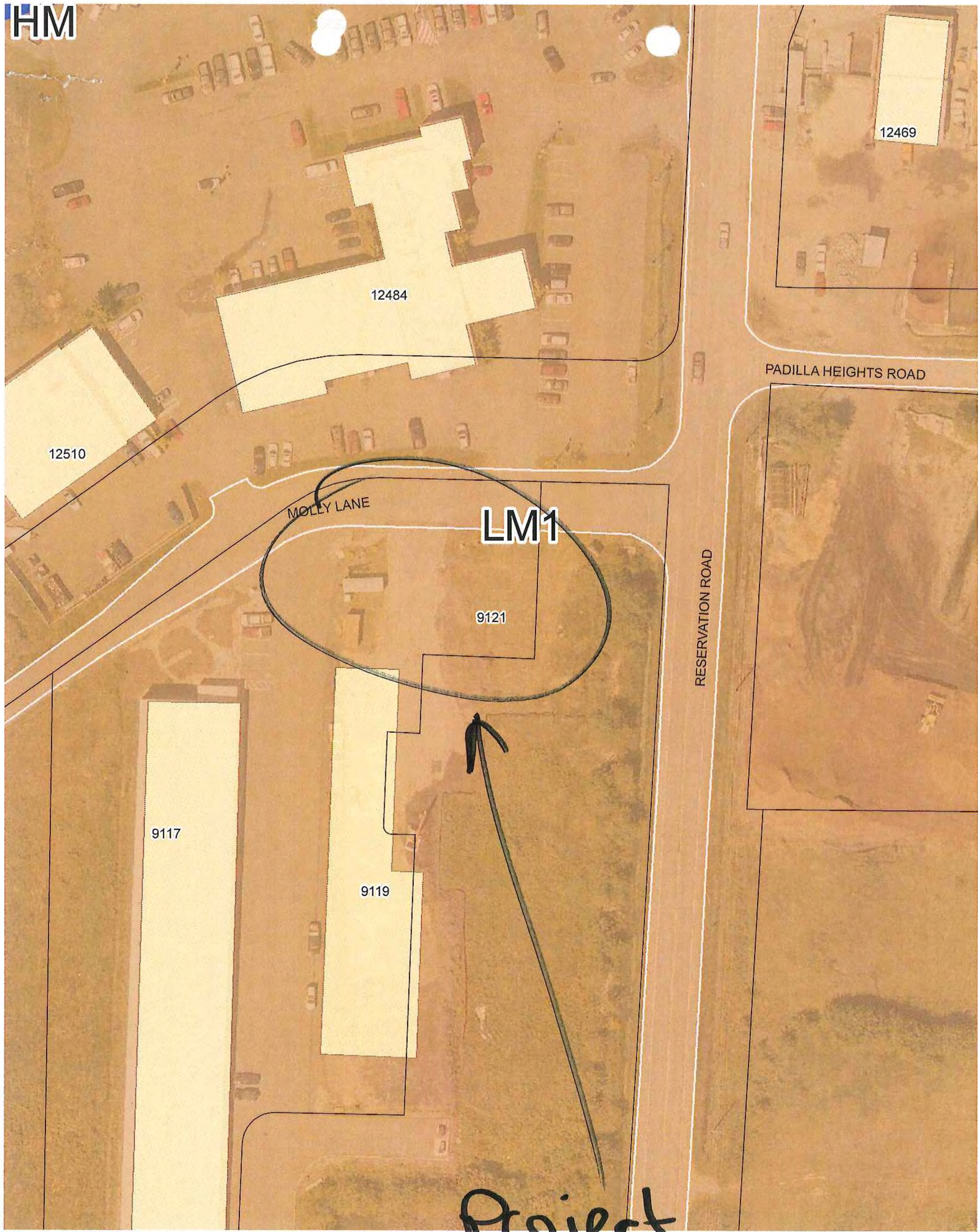
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* Garage square footage includes all garage areas; basement garages, attached garages, detached garages, etc.

Assessment data for improvements is based on exterior inspections. Please contact the Assessor's office if the information does not accurately reflect the interior characteristics.

HM



Project Site



EXHIBIT #03:

NOTICE OF APPLICATION & HEARING



NOTICE OF APPLICATION & HEARING:

Notice Is Hereby Given That An Application Was Made For The Following Proposal:

Request: The applicant has applied for a Conditional Use Permit to permit both a dog kennel /boarding and grooming associated with an existing doggy daycare. The subject property is located in the LM1 Zoning District.

Project Location: The existing doggy daycare is located in suites 101 & 102 at 9119 Molly Lane along with suite 103 at 9121 Molly Lane. The proposed dog boarding and grooming addition would occur within suites 101, 102, 104, and 105 at 9121 Molly Lane, Anacortes, WA.

Applicant: Kirk and Kelly Moore, 12863 South Wildwood Lane, Anacortes, WA

File Number: CUP-2017-0002

Date of Application: August 8, 2017

Date of Completeness: August 16, 2017

Public Comment Period: Any person may comment on this application by writing to the address below and/or by testifying at the public hearing. Staff will issue a recommendation on the project after the comment period ends at **5:00 PM on September 7, 2017**. Written comments on the proposal should be submitted before the end of the comment period but will be accepted until the close of the Open-Record Public Hearing.

Required Project Permits/Approvals: The following may be required in addition to the above: Building Permit Application Approval

Preliminary Determination of Consistency: At this time, no determination of consistency with City of Anacortes plans, regulations, or standards has been made. At a minimum, this project will be subject to the following plans and regulations: the Comprehensive Plan; Anacortes Municipal Code (Zoning, etc.), Engineering Design and Building Standards.

SEPA Review: SEPA review is not required.

Open-Record Public Hearing: An open-record public hearing will be held by the **Planning Commission at 6:00 PM on Wednesday, September 27, 2017** to make a recommendation on the application to City Council. **Closed-Record Public Hearing:** A closed-record public hearing to make a decision on the application will be held by the **City Council at 6:00 PM on Monday, October 9, 2017**. Both hearings will be in City Council chambers located at 904 6th Street, Anacortes, WA.

How to become a party of record: You may become a party of record by submitting written comments, including a (USPS) mailing address, to the City of Anacortes PCED at the address listed below. E-mailed comments must include a return (USPS) mailing address in order for the sender to be considered a party of record. Questions about this proposal, requests to receive future notices of hearings and/or the decision, once made, and/or appeal procedures should be directed to the contact person listed below. The application and complete case file are available for review at the City of Anacortes PCED located at 904 6th Street, Anacortes, WA 98221. A decision on this application will be made within 120 days from the date of completeness.

For Project Information: Kevin Cricchio, AICP, Associate Planner; Phone: (360) 293-1937; Email: kevinc@cityofanacortes.org; City of Anacortes, P.O. Box 547, Anacortes, WA 98221

Date Issued: August 16, 2017

Publish: August 16, 2017

EXHIBIT #04:

PUBLIC COMMENTS RECEIVED

No public comments have been received to date.

EXHIBIT #05:

AGENCY & DEPARTMENT COMMENTS RECEIVED



Development Review Group (DRG)

Name of Applicant: Kirk & Kelly Moore

Brief Description: Dog Kennel/ Boarding & Grooming Conditional Use Permit

Please initial if approved and/or include your comments:

Street Department: B.L.

Comments:

OK

Water Department: TSN

Comments:

OK

Solid Waste: M.K.

Comments:

OK

Sandi Andersen: SA

Comments:



Anacortes Planning, Community & Economic Development Dept.

Permit Center

P.O. Box 547, Anacortes, WA 98221-0547

Don Measamer, *Director of Planning, Community and Economic Development*

PH (360) 299-1984

FAX (360) 293-1938

DEPARTMENT / AGENCY COMMENT FORM:

August 10, 2017

RE: Dog Kennel /Boarding & Grooming Conditional Use Permit, CUP-2017-0002

From: Kevin Cricchio, Associate Planner; City of Anacortes; 904 6th Street, P.O. Box 547, Anacortes, WA 98221; Phone: (360) 293-1937; Email: kevinc@cityofanacortes.org

Description of Subject Proposal:

CUP-2017-0002: The applicant has applied for a Conditional Use Permit to permit a dog kennel /boarding and grooming associated with an existing doggy daycare. The existing doggy daycare is located in suites 101 & 102 at 9119 Molly Lane along with suite 103 at 9121 Molly Lane. The proposed dog boarding and grooming addition would occur within suites 101, 102, 104, and 105 at 9121 Molly Lane, Anacortes, WA. The subject property is Zoned LM1. Please provide me with any comments /requirements to me by **5:00 PM on September 7, 2017.**

Applicant & Landowner:

Kirk & Kelly Moore
12863 South Wildwood Lane
Anacortes, WA 98221

Conditions &/or Requirements:

NO PUBLIC WORKS ISSUES. ALL IMPROVEMENTS ARE IN.

Signature:

A handwritten signature in blue ink, appearing to read "Don Measamer".

Date:

08.14.17

Dept. / Agency Name:

CDP. EUB



Anacortes Planning, Community & Economic Development Dept.

Permit Center

P.O. Box 547, Anacortes, WA 98221-0547

Don Measamer, *Director of Planning, Community and Economic Development*

PH (360) 299-1984

FAX (360) 293-1938

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From: Kevin Cricchio, Associate Planner; City of Anacortes; 904 6th Street, P.O. Box 547, Anacortes, WA 98221; Phone: (360) 293-1937; Email: kevinc@cityofanacortes.org

Description of Subject Proposal:

CUP-2017-0002: The applicant has applied for a Conditional Use Permit to permit a dog kennel /boarding and grooming associated with an existing doggy daycare. The existing doggy daycare is located in suites 101 & 102 at 9119 Molly Lane along with suite 103 at 9121 Molly Lane. The proposed dog boarding and grooming addition would occur within suites 101, 102, 104, and 105 at 9121 Molly Lane, Anacortes, WA. The subject property is Zoned LM1. Please provide me with any comments /requirements to me by **5:00 PM on September 7, 2017.**

Applicant & Landowner:

Kirk & Kelly Moore
12863 South Wildwood Lane
Anacortes, WA 98221

Conditions &/or Requirements:

Signature:



Date:

8-11-17

Dept. / Agency Name:

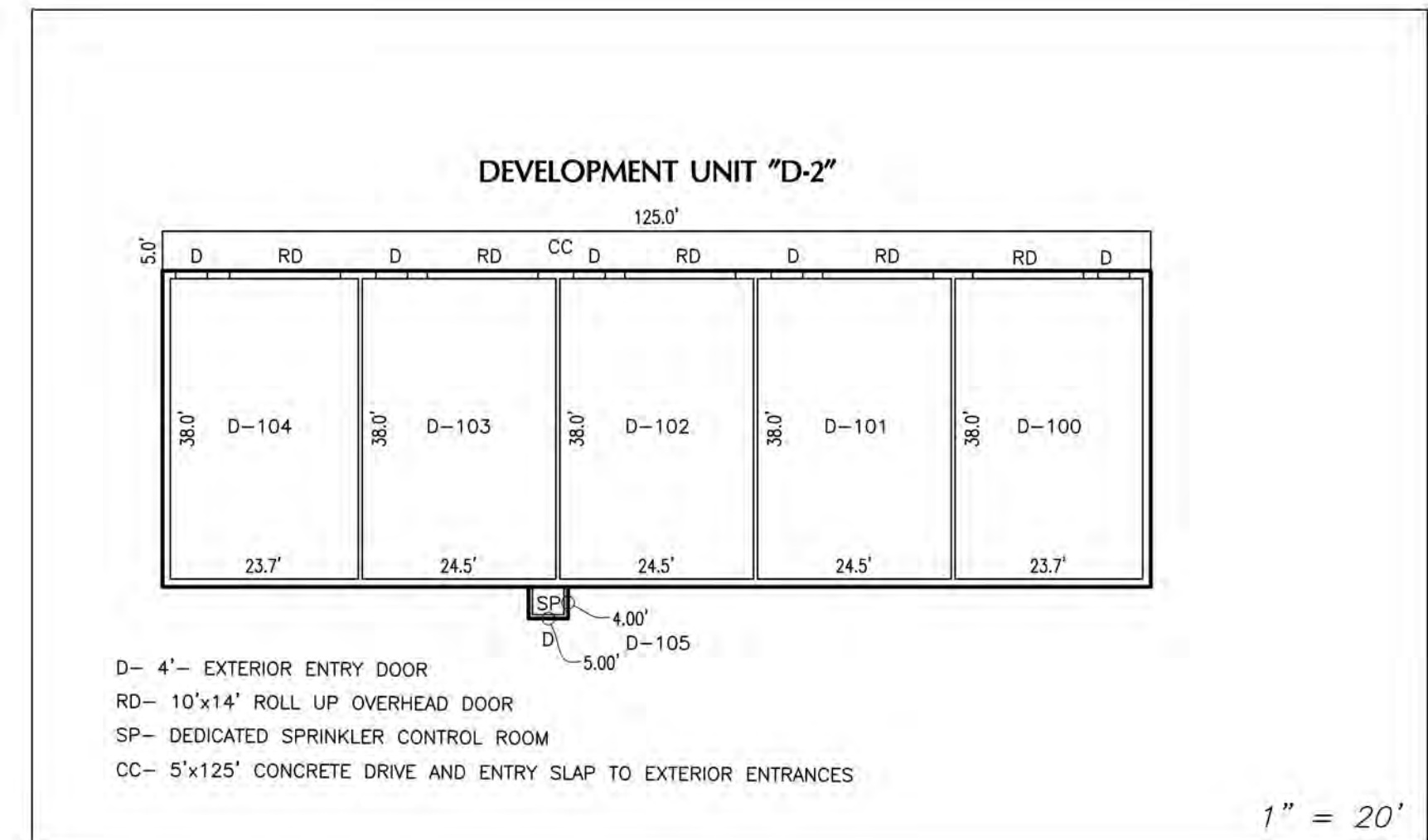
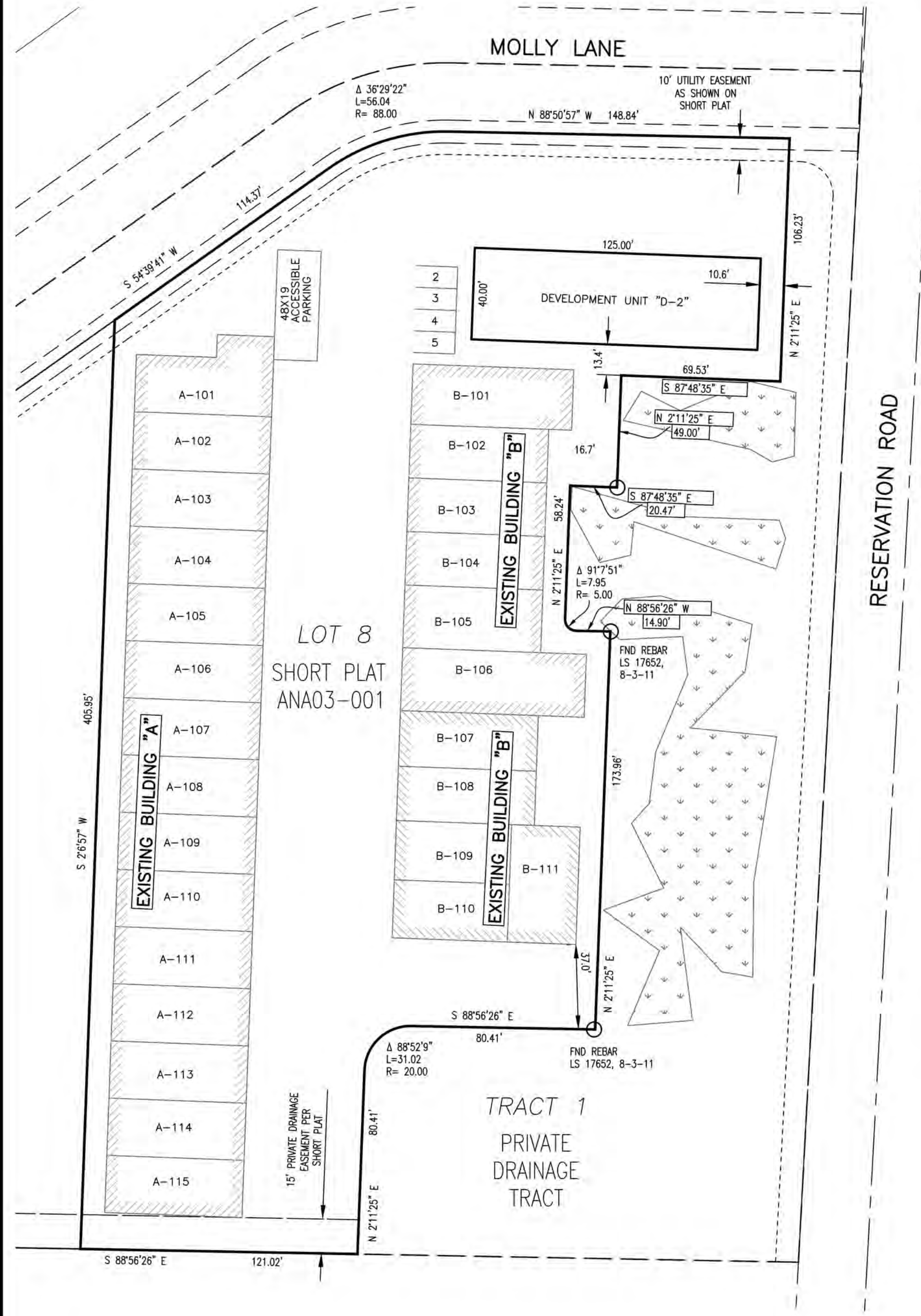


EXHIBIT #06:

SITE PLAN & PARKING PLAN

PREMIUM WAREHOUSE AND STORAGE

A CONDOMINIUM
AMENDMENT No. 3
SURVEY MAP AND PLANS
A PORTION OF THE SW 1/4 OF SECTION 3, T34 N, R2 E WM
PURPOSE TO SUBDIVIDE UNIT D-2

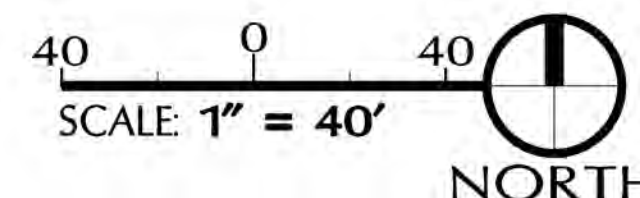
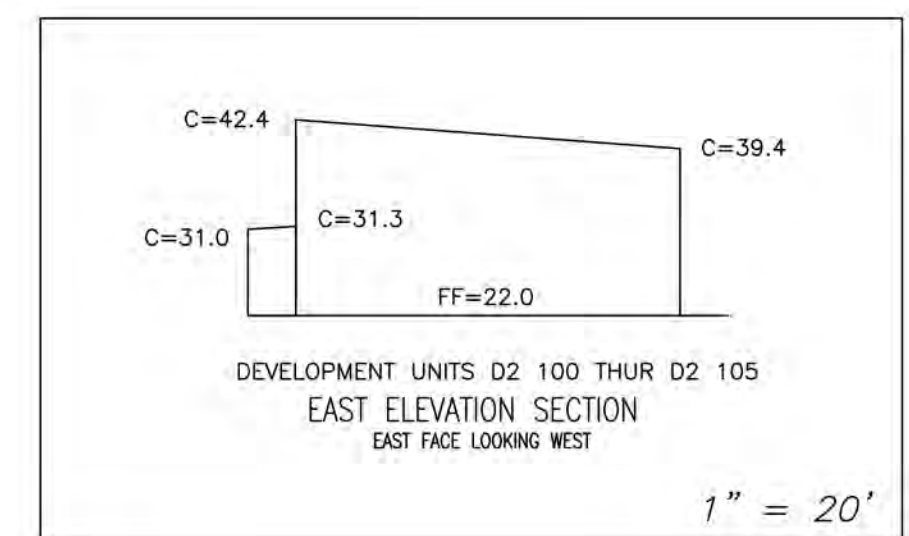


UNIT AREAS

UNIT	AREA
D-100	900 SQ FT
D-101	931 SQ FT
D-102	931 SQ FT
D-103	931 SQ FT
D-104	900 SQ FT
D-105	20 SQ FT

LEGEND

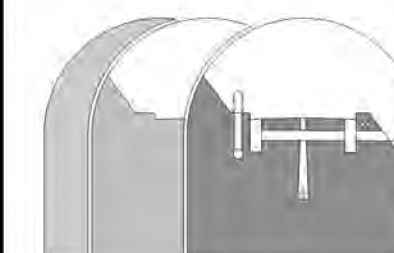
- RECOVERED SURVEY MARKER 8-3-11
- C CEILING ELEVATION
- FF FINISHED FLOOR
- CE COMMON ELEMENT



PREMIUM WAREHOUSE AND STORAGE A CONDOMINIUM PLAT

IN A PORTION OF THE NW 1/4 OF THE SW 1/4 OF SECTION 3,
TOWNSHIP 34 NORTH, RANGE 2 EAST, W.M.,
SKAGIT COUNTY, WASHINGTON

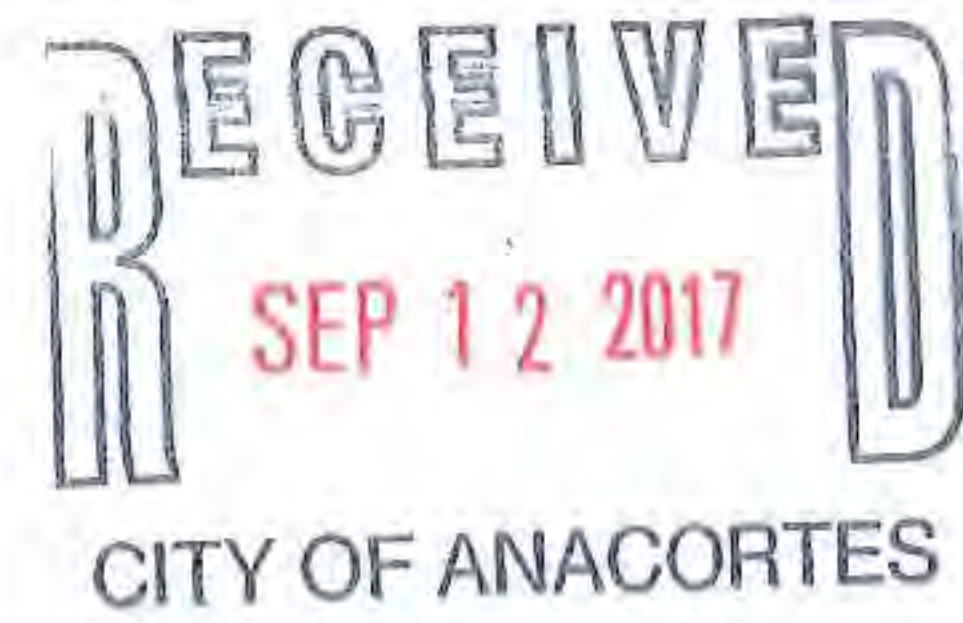
OWNERS
K & K SOLUTIONS, LLC



Sound Development Group
ENGINEERING, SURVEYING & LAND DEVELOPMENT SERVICES

P.O. Box 1705 • 1111 Cleveland Avenue, Suite 202
Mount Vernon, WA 98273
Tel: 360-404-2010 Fax: 360-404-2013

To: City Planning Department
From: Kirk and Kelly Moore
Smarter Than Your Dog (STYD)
Re: Questions on proposed Conditional Use Permit
Date: 9/11/17



Exterior

There will be no change and little impact on the exterior of the facility. Are currently used will be maintained and kept clean.

Waste

Describe in detail how animal waste is being taken care of.

Urine is treated with a medical grade enzymatic cleaner. Solid wastes are collected immediately and triple bagged for disposal as recommended by Skagit County. Our facility is very clean.

14 Existing lined spots

14 Proposed un-lined parking

4 spaces available if needed parallel to roll up doors

PREMIUM WAREHOUSE AND STORAGE

A CONDOMINIUM

AMENDMENT NO. 3

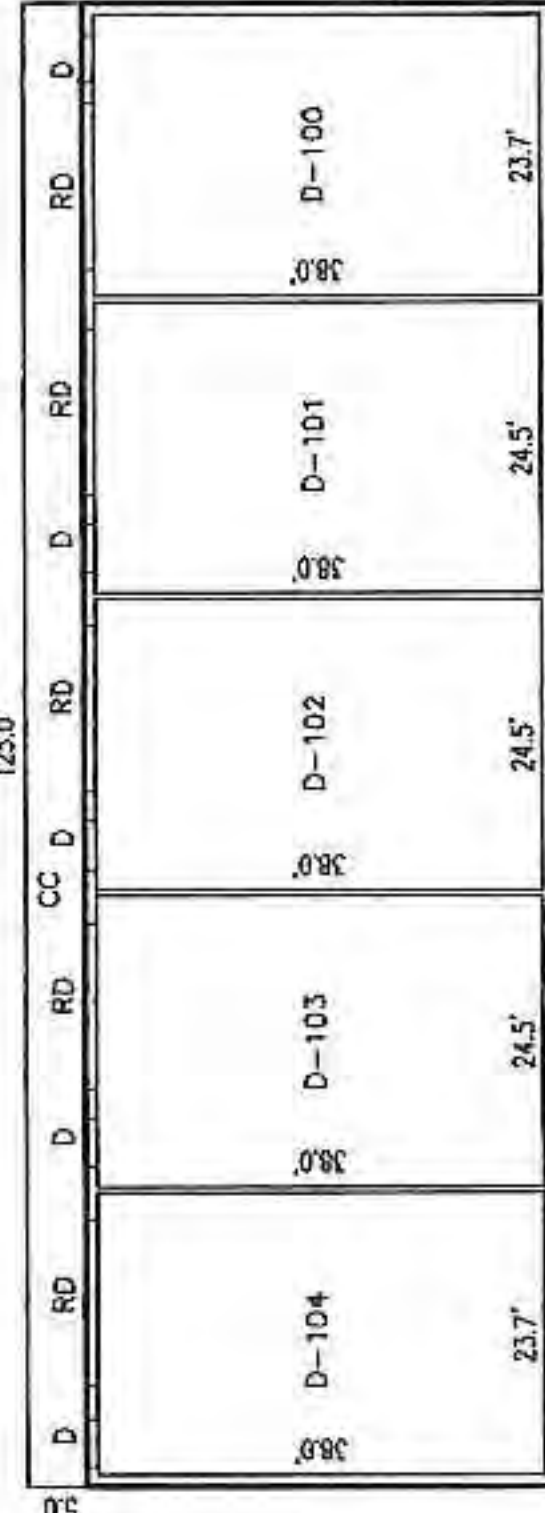
SURVEY MAP AND PLANS

A PORTION OF THE SW 1/4 OF SECTION 3, T34 N, R2 E, WM

PURPOSE TO SUBDIVIDE UNIT D-2

RECEIVED
SEP 12 2017
CITY OF ANACORTES

DEVELOPMENT UNIT "D-2"



D- 4'- EXTERIOR ENTRY DOOR
RD- 10'x14' ROLL UP OVERHEAD DOOR
SP- DEDICATED SPRINKLER CONTROL ROOM
CC- 5'x125' CONCRETE DRIVE AND ENTRY SLAP TO EXTERIOR ENTRANCES

1" = 20'

UNIT AREAS

UNIT	AREA SQ FT
D-100	900
D-101	931
D-102	931
D-103	931
D-104	900
D-105	20

LEGEND

- RECOVERED SURVEY MARKER B-3-11
- c CEILING ELEVATION
- FF FINISHED FLOOR
- CE COMMON ELEMENT

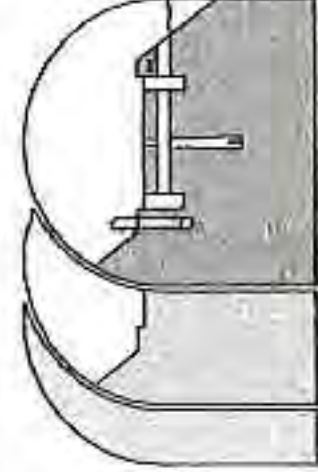


40 0 40
SCALE 1" = 40'
NORTH

PREMIUM WAREHOUSE AND STORAGE A CONDOMINIUM PLAT

IN A PORTION OF THE NW 1/4 OF THE SW 1/4 OF SECTION 3,
TOWNSHIP 34 NORTH, RANGE 2 EAST, W.M.,
SKAGIT COUNTY, WASHINGTON

OWNERS
K & K SOLUTIONS, LLC



Sound Development Group
ENGINEERING, SURVEYING & LAND DEVELOPMENT SERVICES
P.O. Box 1705 • 1111 Cleveland Avenue, Suite 202
Mount Vernon, WA 98273
Tel: 360-404-2010 Fax: 360-404-2013

EXHIBIT #07:

**SIGNED CITY COUNCIL FINDINGS OF FACT,
CONCLUSIONS OF LAW, & DECISION, CUP-2015-0002
-SMARTER THAN YOUR DOG**



**CITY COUNCIL'S
FINDINGS OF FACT, CONCLUSIONS OF LAW,
& DECISION:**

**Closed-Record Public
Hearing Date:**

Monday, June 15, 2015, @ 7:00 PM

**Open-Record Public
Hearing Date:**

Wednesday, May 27, 2015, @ 7:00 PM

File Number:

CUP-2015-0002

Related File:

CUP-2012-0002

Project Title:

"Smarter than your dog" Conditional-Use Permit

Project Location:

9119 & 9121 Molly Lane, Anacortes, WA 98221

The subject property is located in a portion of Section 03;
Township 34 North; Range 02; Willamette Meridian.

Tax Parcel #:

P127035

Applicant/Owner:

Debra Exley & Dan August
13672 Harbor Lane
Anacortes, WA 98221

Subject Proposal:

The applicant has applied for a Conditional-Use Permit to permit
the expansion of their business into an additional space located at
9121 Molly Lane (Unit 103).

Existing Land Use:

"Smarter than your dog" is located in a multitenant warehouse
building which has manufacturing and industrial uses therein.

**Lot Square Footage /
Acreage:**

11,326 ± Square Feet (0.26 acre)

Current Zoning: Light Manufacturing 1 (LM1) Zoning District

**Comprehensive Plan
Designation:** Light Manufacturing 1

Surrounding Zoning & Land Uses:

Direction	Zoning:	Present Land-Use:
North:	Light Manufacturing 1 (LM1)	Manufacturing & Industrial
South:	Light Manufacturing 1 (LM1)	Manufacturing & Industrial
East:	Light Manufacturing 1 (LM1)	Manufacturing & Industrial
West:	Light Manufacturing 1 (LM1)	Manufacturing & Industrial

FINDINGS OF FACT:

I. GENERAL BACKGROUND:

- 1.1 On September 9, 2011, former Planning Director Ryan Larsen issued an administrative interpretation (#11-001) which concludes that the proposed dog training and day care services land use appears appropriate in the HM and LM1 Zone.
- 1.2 Based on this administrative interpretation, on March 29, 2012, the applicant submitted a Conditional Use Permit (File #: CUP-2012-0002) to permit the subject business at 9119 Molly Lane, Units B101 and B102. An open-record public hearing was conducted by the Planning Commission on May 9, 2012. The Planning Commission recommended approval to City Council. On June 4, 2012, a closed-record public hearing was conducted on June 4, 2012 regarding the subject CUP. City Council's Findings of Fact, Conclusions of Law, and Decision were signed by Mayor Dean Maxwell on June 18, 2012.
- 1.3 The applicant currently has an existing business called "Smarter than your Dog" which consists of dog training and day care services located within two (2) suites in an existing warehouse building totaling 3,000 ± square feet. This use is not listed in AMC Chapter 17.19 as either a permitted use or conditional use. Additionally, dog training and day care are not identified in the definitions of "kennels" or "veterinary clinics" as listed in AMC 17.06 –Definitions.
- 1.4 On April 17, 2015, the City of Anacortes' Department of Planning, Community, & Economic Development received the subject Conditional-Use Permit to permit an expansion of the existing business into one unit located at 9121 Molly Lane consisting of approximately an additional 1,000 square feet.
- 1.5 Per AMC § 17.10.100(F), "Expansion of an approved conditional use by expanding the land area by more than ten percent or by increasing the land covered by buildings by more than ten percent will require a new conditional use

permit.” The proposed expansion exceeds this 10% threshold thus requiring a new Conditional Use Permit.

- 1.6 The subject application was deemed complete on April 24, 2015.
- 1.7 The project site is located in the City of Anacortes’ Light Manufacturing 1 (LM1) Zoning District.
- 1.8 Pursuant to AMC Chapter 17.70, the subject development was reviewed for proximity to critical areas. The applicant currently has a business within two (2) suites located within an existing warehouse located at 9119 Molly Lane. Now the applicant wishes to expand into one (1) additional suite located within a warehouse currently undergoing construction. Critical areas review was already performed associated with the construction of the new commercial building.

II. NOTICE OF APPLICATION & PUBLIC HEARING:

- 2.1 Notice of the application and hearing is required to be mailed to property owners within 300-feet, posted on-site and published in the newspaper.

Notice of Application & Hearing was published in the Anacortes American Newspaper on April 29, 2015. The subject property was posted with Public Notice Signage in three (3) areas on April 27, 2015. Property owners within 300 feet of the project site were mailed notice of application & hearing on April 24, 2015. Agencies /departments of jurisdiction were emailed notice of application & hearing on April 24, 2015 (**See Exhibit 3**). The notice of the application and hearing was provided consistent with these requirements pursuant to AMC § 17.10.100(E) and § 17.62.010.

- 2.2 Applicable city departments have reviewed the application and department recommendations, if any, are incorporated into the recommended project conditions. All applicable ordinances and standards will apply when the site plan accompanies a Building Permit application. All departments will impose those standards through the Plan Review process. It is noted that additional issues will be addressed in City staff’s review of the Building Permit Application that will follow on from approval, if granted, of this application.
- 2.3 The 14-day public comment period for the project Notice of Application & Hearing ended on Wednesday May 13, 2015, However, comment was accepted up until the open-record public hearing. Any comment received from departments/agencies of jurisdiction and/or the public are referenced in the attached exhibit list.
- 2.4 An open-record public hearing was scheduled before the Planning Commission on May 27, 2015, at 7:00 PM. A closed-record public hearing to hear any appeals of the Planning Commission’s recommendation and to make a decision on the application will be held by the City Council on June 15, 2015.

- 2.5 At the conclusion of the open-record public hearing the Planning Commission deliberated and voted 6-0 to recommend approval to City Council of the subject CUP permit application subject to staff's suggested conditions of approval.
- 2.6 No appeals of the Planning Commission's recommendation of approval to City Council was received by Planning Department staff.
- 2.7 At the conclusion of the closed-record public hearing, the City Council deliberated and voted to approve the subject Conditional Use Permit.

III. STATE ENVIRONMENTAL POLICY ACT:

- 3.1 Pursuant to WAC 197.11.800 & AMC Chapter 18.04, the subject proposal is exempt from SEPA environmental review.

IV. PUBLIC COMMENTS RECEIVED:

- 4.1 Several written comments /emails were received regarding the CUP (**Exhibit 5**).

V. AGENCY & DEPARTMENT COMMENTS RECEIVED:

- 5.1 Agency & Department comments received to date are as follows (**Exhibit 6**):

Agency & Departments:	
1.	Public Works Department
2.	Street Department
3.	Water Department
4.	Solid Waste Department
5.	Samish Indian Nation Tribal Historic Preservation Office

VI. 2012 COMPREHENSIVE PLAN:

- 6.1 The Comprehensive Plan contains general policies and goals to guide development. The following goals and policies potentially apply to this project:

City of Anacortes' Comprehensive Plan General City Goals 1 and 3.

General City Goal 1: Create and maintain a high quality of life and environment that maximizes the opportunity for all citizens to share the social, psychological, physical, and economic benefits of Anacortes /Fidalgo Island; aesthetics and health are key components of quality of life.

General City Goal 3: Promote compatible land uses and improve visual appearance in each and every zoning district.

6.1.1 The subject proposal is consistent with the goals of the City of Anacortes' Comprehensive Plan listed above.

VII. ZONING ORDINANCE/CODE:

7.1 The City Zoning Map establishes zone boundaries and the City Zoning Ordinance establishes (1) the permitted use of land in the various zones, and (2) development standards.

7.2 The subject property is located in the Light Manufacturing 1 (LM1) Zoning District.

7.2.1 Pursuant to AMC § 17.19.010, the purpose of the LM1 zone is "intended primarily to accommodate industrial type uses that do not need water access or proximity to the central business district or to the Commercial Avenue corridor."

7.3 According to an Administrative Interpretation issued by the Planning Department (discussed above), a dog training and day care use is permitted in the LM1 Zoning District via an approved Conditional Use Permit. The applicant was granted an approved Conditional Use Permit by City Council on June 18, 2012.

7.4 According to AMC 17.10.100(F), "Expansion of an approved conditional use by expanding the land area by more than ten percent or by increasing the land covered by buildings by more than ten percent will require a new conditional use permit." The proposed expansion into an additional suite located at 9121 Molly Lane exceeds this ten (10) percent threshold. Therefore, a new approved Conditional Use Permit is required.

7.5 According to AMC § 17.10.100(B)(2), a Conditional-Use Permit shall be granted by the City only if the applicant demonstrates they meet certain criteria. The criteria of approval and staff analysis is as follows:

7.5.1. The conditional use is designed in a manner which is compatible with the character and appearance of existing, or proposed, development in the vicinity of the subject property and is consistent with the purpose of the zone in which the subject property is located.

Staff Analysis: The expansion of an existing business will be compatible with the character of the existing development as it will be contained within a suite located within a warehouse building currently being constructed.

7.5.2. The location, size and height of buildings, structures, walls and fences, and screening vegetation for the conditional use shall not hinder neighborhood circulation or discourage the permitted development or use of neighboring properties;

Staff Analysis: No changes to the neighborhood's vehicular or pedestrian circulation is proposed. The expansion of the existing business will be contained within a warehouse building currently being constructed.

7.5.3. The conditional use is designed in a manner that is compatible with the physical characteristics of the subject property;

Staff Analysis: Development of the site will comply with setbacks, emergency service access, landscaping, screening, storm drainage and other onsite development standards required by the city code as the proposed expansion of the business will occur within one (1) additional suite within a warehouse building currently being constructed that was approved by both the Building and Planning Departments. Therefore, the project will be compatible with the physical characteristics of the subject property.

7.5.4. Requested modifications to standards are limited to those which will mitigate impacts in a manner equal to or greater than the standards of this title or will not be detrimental to the surrounding neighborhood;

Staff Analysis: No modifications to standards have been requested.

7.5.5. The conditional use is not in conflict with the health and safety of the community;

Staff Analysis: The proposal meets the minimum provisions of the Zoning title of the Municipal Code which are held to be the minimum requirements adopted for the promotion of the public health, safety, and general welfare.

7.5.6. The conditional use is such that pedestrian and vehicular traffic associated with the use will not be hazardous or conflict with existing and anticipated traffic in the neighborhood, and adequate pedestrian and vehicular connections to the arterials and adjacent areas as well as appropriate circulation within the project are provided consistent with city policies and standards for circulation patterns in the area;

Staff Analysis: There is adequate room for clients of the business to park within established parking areas at both the existing warehouse building where the business is located at and in the building under construction once complete.

7.5.7. The conditional use will be supported by adequate public facilities or services and will not adversely affect public services to the surrounding area or conditions can be established to mitigate adverse impacts on such facilities; and

Staff Analysis: The current business and proposed expansion is supported by public facilities and services and will not adversely affect public services to the surrounding area. A public restroom is located across from Unit #101 at 9119 Molly Lane.

7.5.8. The conditional use is in compliance with the Comprehensive Plan.

Staff Analysis: The proposal is consistent with the Comprehensive Plan as detailed above.

7.5.9 The subject proposal is consistent with the above development regulations and CUP criteria of approval. The proposed land use is permitted in the underlying zoning district.

VIII. CONCLUSIONS OF LAW:

1. The City Council bases its Findings of Fact, Conclusions of Law & Decision on the entire record, including all testimony and exhibits. Any finding which would be deemed a Conclusion of Law, and any Conclusion of Law which should be deemed a finding is hereby adopted as such.
2. The proposed conditional use permit as conditioned conforms to the general purposes of the City's Comprehensive Plan, the city's planning standards and specifications of the zoning ordinance, including Section 17.10.100 – *Conditional use permits (except for bed and breakfast establishments)*, and other ordinances applicable to the proposal.

IX. STAFF RECOMMENDATION:

The Department of Planning, Community, and Economic Development recommend that the subject Conditional Use Permit be approved by City Council subject to staff's suggested conditions of approval as listed below.

X. DECISION:

Based on the foregoing information and analysis submitted by the applicant, and the City regulatory authority to implement the policies, standards, and the regulations of the Comprehensive Plan, and the Anacortes Municipal Code (AMC), the Anacortes City Council hereby approves/ approves with conditions/ or denies the subject conditional-use permit to permit the expansion of "Smarter than your Dog" at 9121 Molly Lane, Anacortes, WA subject to the following conditions of approval:

1. The scope of this project shall not exceed that as set-out in the conditional use permit application (including attachments), and in accordance with the determinations made and conditions imposed.
2. The location of any outdoor fencing shall be reviewed and approved by the Planning Director prior to placement and use.
3. A building permit shall be secured for proposed tenant improvements and the change of use property to occupancy of the building.
4. The applicant shall be responsible for reimbursement to the City of Anacortes for the cost of posting, mailing, and publication of the public hearing for the subject CUP. Payment shall be made prior to building permit approval.
5. The applicant shall adhere to the hygiene, barking, training, & immunization procedures contained in the applicant's business narrative (**Exhibit #1**).

INTRODUCED, PASSED, AND APPROVED BY THE CITY COUNCIL OF THE CITY OF ANACORTES on this 15th day of June 2015.

CITY OF ANACORTES, WASHINGTON



LAURIE M. GERE, MAYOR

Approved as to form and legality:



Darcy Swetnam, WSBA# 40530
City Attorney

ATTEST:



Steve D. Hoglund, City Clerk Treasurer

JUDICIAL APPEAL:

AMC § 17.08.090 - Notice of appeal of any final action taken under this title must be filed with the Superior Court and served on the city attorney for the city within twenty-one (21) days of the date on which such final action was taken. For purpose of appeals from decisions of the Anacortes City Council, the "date of final action" shall mean the date on which the city council made its decision by vote taken at a regular or special public meeting.

EXHIBITS:

EXHIBIT NUMBER:	NAME OF EXHIBIT:
Exhibit #1	Master Permit Application & Business Narrative
Exhibit #2	Planning Director's Administrative Interpretation
Exhibit #3	Notice of Application & Hearing
Exhibit #4	CUP Criteria of Approval
Exhibit #5	Public Comments Received
Exhibit #6	Agency & Department Comments Received
Exhibit #7	Site Plan

EXHIBIT #08:

**SIGNED CITY COUNCIL FINDINGS OF FACT,
CONCLUSIONS OF LAW, & DECISION, CUP-2012-0002
-SMARTER THAN YOUR DOG**



Planning, Community, and Economic Development
904 – 6th Street
P.O. Box 547
Anacortes, WA 98221-0547

**FINDINGS OF FACT,
CONCLUSIONS OF LAW
& DECISION**

File No: CUP-2012-0002

Project Title: Smarter Than Your Dog Conditional Use Permit

Location: 9119 Molly Lane, Units B-101 & B-102

Applicant/Contact: Debra L. Exley
13672 Harbor Lane
Anacortes, WA 98221

Public Hearing Date: May 9, 2012

Nature of Request: Conditional Use Permit

Current Zoning: Light Manufacturing 1 (LM1)

2010 Comprehensive Plan
Land Use Designation: LM1

CITY COUNCIL DECISION: APPROVE WITH CONDITIONS

CITY COUNCIL APPROVAL DATE: JUNE 18, 2012

I. INTRODUCTION AND PROCEDURAL MATTERS

At their June 4, 2012 meeting, the Anacortes City Council held a closed record review of the Planning Commission's advisory report / recommendation regarding the subject application, of which there were no appeals.

The Council considered the project record, which includes the minutes of the open-record public hearing conducted by the Planning Commission on May 9, 2012. The Planning Commission's advisory report includes a recommendation for approval of the conditional use permit, which the Council considered in addition to the environmental information developed pursuant to the SEPA ordinance, other oral and written reports and exhibits presented by interested persons.

II. FINDINGS OF FACT

1. The information contained in Sections I, II, and III of the Planning Commission's Recommendation (Exhibit 29) is found by the City Council to be supported by the evidence in the project record and by this reference is adopted as portion of the Council's findings and conclusions. A copy of said report is available in the Planning, Community and Economic Development Department.

III. CONCLUSIONS OF LAW

1. If approved as conditioned below, the development is consistent with the 2010 Comprehensive Plan and meets the requirements and intent of the Anacortes Municipal Code.

IV. DECISION

Based on the foregoing Findings of Fact and Conclusions of Law, the Anacortes City Council APPROVES conditional use permit for Smarter Than Your Dog subject to the following conditions:

1. The scope of this project shall not exceed that as set-out in the conditional use permit application (including attachments), and as necessary to comply with permit conditions.
2. The location of the outdoor fenced area shall be reviewed and approved by the Planning Director prior placement and use.
3. A building permit shall be secured for proposed tenant improvements and the change of use prior to occupancy of the building.
4. The applicant shall be responsible for reimbursement to the City for the cost of posting, mailing and publication of the public hearing for this proposal. Payment shall be made prior to building permit issuance.
5. The applicant shall adhere to the hygiene, barking and indoor training procedures as outlined in the applicant's testimony at the open record public hearing (provided in written format in Exhibit 28), and shall address with the Public Works Department

the potential environmental impact of the outdoor dog elimination/waste area on the adjacent wetlands and buffers.

These Findings of Fact and Conclusions of Law were adopted by the Anacortes City Council on **June 18, 2012.**

CITY OF ANACORTES, WASHINGTON

By H. Dean Maxwell
H. Dean Maxwell, Mayor

APPROVED AS TO FORM:

Bradford E. Furlong
Bradford E. Furlong, WSBA# 12924
City Attorney

ATTEST:

Steve Hoglund
Steve Hoglund, City Clerk

Judicial Appeal:

Section 17.08.090 AMC - Notice of appeal of any final action taken under this title must be filed with the Superior Court and served on the city attorney for the city within twenty-one (21) days of the date on which such final action was taken. For purpose of appeals from decisions of the Anacortes City Council, the "date of final action" shall mean the date on which the city council made its decision by vote taken at a regular or special public meeting.

Attachment:

Planning Commission Recommendation (Exhibit 29)

Exhibit:

The following exhibits were offered and entered into the record (see list attached).



Planning, Community, and Economic Development
904 - 6th Street
P.O. Box 547
Anacortes, WA 98221-0547

**PLANNING COMMISSION
FINDINGS OF FACT, CONCLUSIONS OF LAW & RECOMMENDATION**

File No:	CUP-2012-0002
Project Title:	Smarter Than Your Dog Conditional Use Permit
Location:	9119 Molly Lane, Units B-101 & B-102
Applicant/Contact:	Debra L. Exley 13672 Harbor Lane Anacortes, WA 98221
Public Hearing Date:	May 9, 2012
Nature of Request:	Conditional Use Permit
Current Zoning:	Light Manufacturing 1 (LM1)
2010 Comprehensive Plan Land Use Designation:	LM1

**PLANNING COMMISSION
RECOMMENDATION:**

Approve, with conditions

EXHIBIT 29

I. INTRODUCTION AND PROCEDURAL MATTERS

Debra Exley (applicant) requests approval of conditional use permit in order to conduct a dog training and dog day care business in an existing building located in the LM1 zone.

The public hearing on the application was held on May 9, 2012 before the Planning Commission. The Planning, Community & Economic Development (PCED) Department was represented by Ms. Libby Grage, Senior Planner and Mr. Don Measamer, Assistant Director - PCED. Ms. Debra Exley and Mr. Dan Exley spoke as proponents of the application. The following members of the audience testified regarding the application: Mary Ryland (no address given), Mike Kurtz (4090 Edith Point Rd.), Martha Hall (2617 16th St.), and Dawn Greenfield (14162 Gibraltar Road).

After due consideration of the record and evidence elicited during the public hearing, the following shall constitute the findings of fact, conclusions and recommendation of the Planning Commission.

II. FINDINGS OF FACT

1. Summary of Proposal. The applicant is requesting a Conditional Use Permit to conduct a dog training and dog day care business in an existing building located in the LM1 zone. The proposed use consists of private and group session dog and owner training, dog day care, periodic community education programs related to canine care, and limited retail of products that support training. The use would occupy two suites within an existing warehouse condo building, totaling an area of approximately 3,000 square feet.
2. A small outdoor fenced area for dogs to relieve themselves is proposed to be located to the north of the building.
3. Site and Vicinity. The site is generally located in southwest quarter of Section 03, Township 34 N, Range 02 E WM, on the south side of Molly Lane, approximately 140' west of Reservation Road. The site address is 9119 Molly Lane (Units B101-102).
4. The site consists of two storage/warehouse structures and associated improvements, including landscaping and parking.
5. Adjacent Zoning and Uses. Surrounding properties consist of a car dealership to the north, undeveloped land and additional warehouse buildings to the west, a single family home and undeveloped land to the south, and wetlands and a detention pond to the east. All surrounding properties are zoned LM1.
6. Public Comments/Issues of Concern. PCED received written comments from several neighboring storage condo owners relating to concerns about sanitation, parking, barking and control of dogs. The applicant provided oral responses to these concerns at the hearing and also submitted a written version of these responses. Other than the applicant(s), four (4) members of the audience spoke in favor of the request. No one spoke in opposition.

7. The proposed outdoor dog waste/elimination area is proposed to be located in a fenced area to the north of the building. There are wetlands and buffers located on an adjacent property to the east of the site. Potential impacts from the waste/elimination area on the adjacent wetlands and possible mitigation measures, if necessary, should be determined and implemented prior to its use.
8. Applicable Review Criteria. Criteria for Conditional Use Permit review are found in AMC Section 17.10.100, *Conditional use permits (except for bed and breakfast establishments)*. The application, as conditioned, meets the criteria outlined in Section 17.10.100.B1 and 2 AMC.
9. AMC Section 17.10.100.E.1 states that "the proposed use must be determined to be one of the uses specified under the conditional use subsection of the appropriate use district. If the proposed use is not listed, but is in the opinion of the administrator clearly similar to uses listed, and is otherwise in conformance with the requirements of the section, the administrator shall accept the application and forward it to the Planning Commission with their recommendation relative to the appropriateness or similarity of the proposed use."

The proposed use is not listed under the conditional use section of the LM1 zone, but is similar to a kennel, which is listed as a conditional use, and as such, is appropriate in the zone.
10. Applicable Review Process. Proper notice of the application and public hearing was provided consistent with relevant Municipal Code requirements. Applicable City departments reviewed the proposal for consistency with pertinent Anacortes Municipal Code Titles and Chapters and the 2010 Comprehensive Plan. PCED staff recommended approval, with conditions, of the Conditional Use Permit application. The PCED Staff Recommendation dated May 3, 2012 (Exhibit 1) provides an analysis of consistency with the applicable items.
11. The required open-record public hearing was held before the Planning Commission on May 9, 2012. In reviewing conditional use permit applications, the Planning Commission shall record their recommendations, their reasons for recommendation, and any conditions recommended to be placed on the application, with the record being sent to City Council (17.10.100.E AMC).
12. The proposal is categorically exempt from the requirements of SEPA.

III. CONCLUSIONS OF LAW

1. The Planning Commission has jurisdiction to hold the open record public hearing and to send recommendations and any conditions recommended to be placed on the application to the City Council pursuant to Section 17.10.100.E AMC.
2. The Planning Commission having fully reviewed the above-referenced PCED Staff Recommendation dated May 3, 2012 (Exhibit 1) hereby adopts said document as properly

setting forth the issues, the land use requests, consistency with the existing regulations, policies, conditions and their effect upon the request. It is therefore adopted by the Planning Commission as a conclusion as if set forth in full herein. The Planning Commission recommends the addition of one condition in order to memorialize the applicant's proposed operating procedures that address indentified concerns of neighboring owners, such as sanitation, barking and control of dogs, as well as to address potential impacts of the outdoor waste/elimination area on adjacent wetlands and buffers.

3. The proposed conditional use permit as conditioned conforms to the general purposes of the city comprehensive plan, the city's planning standards and specifications of the zoning ordinance, and other ordinances applicable to the proposal.
4. The Planning Commission bases its Findings of Fact and Conclusions of Law on the entire record, including all testimony and exhibits. Any finding which would be deemed a Conclusion of Law and any Conclusion of Law which should be deemed a finding is hereby adopted as such.

IV. RECOMMENDATION

Based on the foregoing Findings of Fact and Conclusions of Law, the Anacortes Planning Commission hereby recommends APPROVAL of the conditional use permit application, subject to the following conditions:

1. The scope of this project shall not exceed that as set-out in the conditional use permit application (including attachments), and as necessary to comply with permit conditions.
2. The location of the outdoor fenced area shall be reviewed and approved by the Planning Director prior placement and use.
3. A building permit shall be secured for proposed tenant improvements and the change of use prior to occupancy of the building.
4. The applicant shall be responsible for reimbursement to the City for the cost of posting, mailing and publication of the public hearing for this proposal. Payment shall be made prior to building permit issuance.
5. The applicant shall adhere to the hygiene, barking and indoor training procedures as outlined in the applicant's testimony at the open record public hearing (provided in written format in Exhibit 28), and shall address with the Public Works Department the potential environmental impact of the outdoor dog elimination/waste area on the adjacent wetlands and buffers.

These Findings of Fact, Conclusions of Law and Decision were adopted by the Anacortes Planning Commission on May 10, 2012.

CITY OF ANACORTES, WASHINGTON
PLANNING COMMISSION

By Lin Folsom
Lin Folsom, Acting Chair

Appeals:

Any aggrieved party shall have five working days from date of the action to appeal the recommendation of the planning commission to the city council. The appeal shall be in writing and is to be filed with the city clerk. (17.10.100.E AMC)

Attachments:

Staff Recommendation (Exhibit 1)

Exhibits:

The following exhibits were offered and entered into the record (see list attached).

PLANNING COMMISSION HEARING EXHIBIT LIST

Last updated 5/10/12

Project Number: CUP-2012-0002
Project Name: Smarter Than Your Dog
Meeting Date: May 9, 2012

Exhibit Number	Document	Dated	Date Received
1	Staff Report / Recommendation	5/2/12	-
2	Vicinity Map	-	-
3	Project Narrative	-	3/29/12
4	Site Plan	-	-
5	Applicant responses to CUP criteria	-	3/29/12
6	Administrative Interpretation for "Smarter Than Your Dog"	9/9/11	-
7	Comments from Joel Douglas, Harbor Land Co.	-	4/19/12
8	Master Permit Application	-	3/29/12
9	Title report	-	3/29/12
10	Letter of complete application	4/16/12	-
11	Notice of Application/Hearing & Affidavit of Posting	-	-
12	Comments from Wayne L. Weiderman	4/30/12	5/1/12
13	Comments from Terry Low	4/30/12	5/1/12
14	Comments from Patrik Swanljung	4/28/12	5/1/12
15	Comments from Joyce Humenik	5/2/12	5/2/12
16	Comments from Dave Scott	5/2/12	5/2/12
17	Comments from Carol Foster	5/2/12	5/2/12
18	Comments from Kamiyo Culbertson	5/2/12	5/2/12
19	Comments from Ginger Sherbourne	5/2/12	5/2/12
20	Comments from Jan Latta	5/2/12	5/2/12
21	Comments from Dana Wells	5/2/12	5/2/12
22	Comments from Karen McGrath	5/2/12	5/2/12
23	Comments from Dave Rytand	5/2/12	5/2/12
24	Comments from Debbie Cole	5/2/12	5/3/12
25	Comments from Mary Rytand	5/2/12	5/3/12
26	Comments from Christina & Ramon Anderson	5/3/12	5/4/12
27	Comments from Kitty Hardy	5/4/12	5/4/12
28	Written testimony from Deb Exley	-	5/9/10
29	Planning Commission Recommendation	5/10/12	



Planning Commission Agenda Bill

Meeting Date: 9/27/2017 **Agenda Item:** 5B

Subject: State Route 20 /Sharpe's Corner Vicinity Improvements, SDP-2017-0001

Staff Contact: Kevin Cricchio, AICP, WPIT, Associate Planner

Approved for Submittal to Commission by	
X	Don Measamer, Director

Action Type	
X	Public Hearing
X	Discussion
X	Possible Action

Summary & Background: The applicant (WSDOT) has applied for a shoreline permit(s), which includes a Shoreline Substantial Development Permit (SSDP), a Shoreline Conditional Use Permit (SCUP), and a Shoreline Variance to replace the existing signal located at SR-20 /SR-20 Spur Interchange (referred to as Sharpe's Corner) with a multi-lane roundabout. Additional improvements include the widening of SR-20 and providing a pedestrian path between Sharpe's Corner and March Point Road. The project site is located in the Light Manufacturing 1 (LM1) Zoning District and in the Conservancy Shoreline Environment. A SCUP is required as development includes roads & associated facilities along with upland fill while a Shoreline Variance is required as improvements extend within the Conservancy Shoreline Environment's 100-foot setback as measured from the ordinary high water mark. An open-record public hearing before the Planning Commission has been scheduled for **6:00 PM on September 27, 2017**. Please bring your packets with you to the hearing.

Recommended Motion:

I move that the Planning Commission make a motion to recommend approval to the City Council concerning the subject Shoreline Substantial Development Permit (SSDP), Shoreline Conditional Use Permit (SCUP), and Shoreline Variance subject to staff suggested conditions of approval.

Attachments:

Planning Commission's Draft Findings of Fact, Conclusions of Law, & Recommendation

Exhibit #01, Master Permit Application; JARPA; Project Description; Issued SEPA DNS; SEPA Checklist; Summary of Outreach; Biological Assessment; & Hydraulic Analysis

Exhibit #02, Wetland & Stream Assessment Report; Wetland & Buffer Mitigation Report

Exhibit #03, Shoreline Conditional Use Permit Criteria of Approval

Exhibit #04, Shoreline Variance Criteria of Approval

Exhibit #05, GIS Map

Exhibit #06, Notice of Application & Hearing

Exhibit #07, Agency & Department Comments Received

Exhibit #08, Public Comments Received

Exhibit #09, Site Photos

Exhibit #10, Third Party Review of Hydraulic Report

Exhibit #11, Plans



**PLANNING COMMISSION'S DRAFT FINDINGS OF FACT,
CONCLUSIONS OF LAW, & RECOMMENDATION:**

OPEN-RECORD PUBLIC

HEARING DATE: Wednesday, September 27, 2017, @ 6:00 PM

CLOSED-RECORD PUBLIC

HEARING DATE: Monday, October 9, 2017, @ 6:00 PM

FILE NUMBER: SDP-2017-0001

PROJECT TITLE: State Route 20 (SR-20) / Sharpe's Corner Vicinity Improvements

PROJECT LOCATION: The proposed project is located at the SR-20 /SR-20 Spur Interchange (Sharpe's Corner). More specifically, the project is located at State Route (SR) 20 between Milepost (MP) 47.04 and 48.40 and SR-20 Spur MP 47.58 and MP 48.40 within a portion of Sections 5 & 8, Township 34 North; Range 02 East; Willamette Meridian.

**APPLICANT &
LANDOWNER:**

Washington State Department of Transportation
1043 Goldenrod Road, Suite 101
Burlington, WA 98233

**STAFF REPORT
PREPARED BY:**

Kevin Cricchio, AICP, WPIT
Associate Planner
City of Anacortes
904 6th Street
Anacortes, WA 98221

SUBJECT PROPOSAL: The applicant has applied for a shoreline permit(s), which includes a Shoreline Substantial Development Permit (SSDP), a Shoreline Conditional Use Permit (SCUP), and a Shoreline Variance to replace the existing signal located at SR-20 /SR-20 Spur Interchange (referred to as Sharpe's Corner) with a multi-lane roundabout. Additional improvements include the widening of SR-20 and providing a pedestrian path between

Sharpe's Corner and March Point Road. The project site is located in the Light Manufacturing 1 (LM1) Zoning District and in the Conservancy Shoreline Environment. A SCUP is required as development includes roads & associated facilities along with upland fill while a Shoreline Variance is required as improvements extend within the Conservancy Shoreline Environment's 100-foot setback as measured from the ordinary high water mark.

PURPOSE: The purpose of the project is to reduce the number and severity of accidents and to improve traffic operations and corridor safety within the project limits.

SUBJECT PARCEL(S): This project does not involve any subject parcels.

EXISTING LAND USE: State Route Twenty (SR-20) within a state right-of-way

CURRENT ZONING: Light Manufacturing 1 (LM1) Zoning District

SURROUNDING ZONING & LAND USES:

Direction:	Zoning:	Present Land-Use:
North:	Light Manufacturing 1	Vacant Land, Fidalgo Bay, Fidalgo Bay Aquatic Reserve
South:	Light Manufacturing 1	Commercial & Retail Businesses
East:	Light Manufacturing 1	State Route 20
West:	Light Manufacturing 1	State Route 20

SHORELINE ENVIRONMENT /

DESIGNATION: Conservancy

DRAFT FINDINGS OF FACT:

I. GENERAL BACKGROUND /PROJECT CHRONOLOGY:

1. A pre-application conference was held with Planning Department staff on February 2, 2017, as is required per AMC Table 19.20.030-1.
2. WSDOT conducted numerous meetings prior to application submittal as part of public outreach associated with the subject proposal. PCED determined that this sufficed in meeting the neighborhood meeting requirements per AMC Table 19.20.030-1.
3. On July 26, 2017, the applicant submitted to PCED an application for a Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, and Shoreline Variance to permit improvements to State Route (SR) 20/ and the Sharpe's corner vicinity.

4. On August 9, 2017, PCED deemed the subject applications complete.

II. NOTICE OF APPLICATION (NOA) & NOTICE OF HEARING (NOH):

1. According to AMC 18.16.050, Shoreline Substantial Development Permits (SSDP), Shoreline Conditional Use Permits (SCUP), and Shoreline Variances require that public notice be mailed to landowners within 300-feet of the subject proposal, posted onsite, and published in the City's newspaper of record.
2. Accordingly, on August 3, 2017, the Notice of Application (NOA) and Notice of Hearing (NOH) was mailed to neighboring landowners within 300-feet of the proposed development on despite there being no subject parcel involved.
3. Additionally, on August 3, 2017, the project area was posted with nine (9) public notice signs advertising the Notice of Application and Hearing
4. On August 3, 2017, the Notice of Application and Hearing was posted at city hall, the library, the local USPS office, and on the city's website.
5. Furthermore, on August 9, 2017, the Notice of Application and Hearing was published in the Anacortes American Newspaper.
6. On August 3, 2017, both agencies and departments of jurisdiction were solicited for comment.
7. The thirty-day (30) comment period ended at 5:00 PM on September 11, 2017. However, comment was accepted by PCED up until the close of the open-record public hearing on September 27, 2017.

III. CRITICAL AREA REVIEW:

The proposed project was reviewed for conformance with Appendix "A" of the City of Anacortes' 2010, Shoreline Master Program (SMP) and Chapter 17.70 of the Anacortes Municipal Code. Appendix "A" of the SMP regulates critical areas within the shoreline environment while AMC Chapter 17.70 regulates critical areas outside of shoreline jurisdiction. However, most if not all of the proposed work within city limits lie only within shoreline jurisdiction.

WETLANDS:

According to both the wetland & stream assessment report and wetland & buffer mitigation report (**See Exhibit #2**), **eleven (11) wetlands** were delineated within the project area. **Wetlands #1 thru 7, and #11** are located within the City of Anacortes. Wetland #8 & 10 however are located solely within the jurisdiction of Skagit County. Lastly, wetland #9 is located within both jurisdictions –the City of Anacortes & Skagit County.

STREAMS:

Additionally, two (2) streams, Aqua Creek and Unnamed Stream; and Fidalgo Bay were delineated as part of the proposed project. Aqua Creek is located west of Sharpe's Corner. It flows under Fidalgo Bay Road through a culvert into a wetland (Wetland #5) and then through a culvert under SR-20 into Fidalgo Bay. Aqua Creek is a fish-bearing creek with perennial flow. Unnamed Stream is located east of Sharpe's Corner on the south side of SR-20. The stream has been heavily impacted by the existing golf course and pump house that regulate water levels in the vicinity. The stream lacks a defined channel. No fish are present in the stream.

DITCHES:

Lastly, there are two-jurisdictional ditches that are impacted by the proposed project. Ditch 1 is located solely in Skagit County's jurisdiction while Ditch 2 is located solely in the City of Anacortes. Both ditches will be filled and another constructed. Sheet-flow from SR-20 and the adjacent development's parking lot drain to Ditch 2. Ditch 2 then drains to wetland #9. Conveyance and drainage are the primary functions of both ditches. These functions will be restored following construction.

PROJECT AREA WETLANDS, CREEKS/STREAMS, & SHORELINE:			
Wetland #:	Jurisdiction:	Wetland Size (in acres):	Buffer Width (in feet):
1	City of Anacortes	0.04	110
2	City of Anacortes	0.03	110
3	City of Anacortes	5.15	110
4	City of Anacortes	0.06	110
5	City of Anacortes	1.38	225
6	City of Anacortes	0.01	110
7	City of Anacortes	0.07	110
11	City of Anacortes	0.10	225
Aqua Creek	Fish-Bearing Creek /Stream	N/A	50
Unnamed Stream	Non-Fish Bearing Creek /Stream	N/A	50
Fidalgo Bay	Shoreline of the State	N/A	225
9	City of Anacortes & Skagit County	~1.15	110
8	Skagit County	1.04	110
10	Skagit County	~0.22	110

WETLAND IMPACTS:

There are **four (4) impacted wetlands (#6, #8, #9, & #10)** identified and classified within the project area. These impacts are permanent and direct resulting in the placement of fill within the respective wetland to construct a road. The project will permanently impact 0.17 acres of the four (4) wetlands listed above. Of the 0.17 permanent/ direct

impacts to wetlands, 0.01 acre occurs in the City of Anacortes with the remaining 0.16 acres occurring with Skagit County's jurisdiction.

There also are short-term and temporary impacts to wetlands associated with the proposed project. Short-term and temporary impacts last for a limited time and the function of the wetland returns to pre-impact performance with one (1) growing season of impact. Temporary or short-term impacts include the cutting vegetation and /or minor soil disturbance to permit project construction. A total of 0.09 acres of temporary/ short-term impacts to wetlands /buffers will occur. Of this 0.09 acres of temporary /short-term impacts, 0.02 acres will occur in the City of Anacortes with the remaining 0.07 acre of impact occurring with Skagit County's jurisdiction.

WETLAND BUFFER IMPACTS:

Buffers adjacent to the wetlands are generally disturbed by development or are within the maintained right-of-way. The proposed project will permanently affect 0.18 acre of the buffer of wetland #6, 8, 9, and 10. Of the 0.18 acre of impact, 0.06 acre occur in the City of Anacortes with the remaining 0.12 acre occurring within Skagit County's jurisdiction.

The project will also have temporary impacts to these buffers consisting of 0.10 acres due to construction access. Of the 0.10 acres of temporary wetland buffer impacts, 0.05 acre lies in the City of Anacortes with the remaining 0.05 acre within Skagit County's jurisdiction.

FIDALGO BAY WETLAND BUFFER /SHORELINE IMPACTS:

No in-water work or fill in Fidalgo Bay is proposed. There will be however permanent wetland buffer impacts of 0.18 acre associated with the roundabout construction at Sharpe's Corner.

Additionally, temporary buffer impacts of 0.04 acre are anticipated due to construction access. Both permanent and temporary impacts to these wetland buffers will occur within the City of Anacortes.

IMPACT TO WETLAND FUNCTIONS:

According to the wetland & stream assessment report and wetland & buffer mitigation report, the functions of wetlands can be divided into **three (3) major categories: water quality, hydrologic, and habitat functions**. Wetlands 6, 8, 9, & 10 have been determined to have low to moderate water quality function, low hydrologic function, and low to moderate habitat function. Water quality and hydrologic functions are primarily impacted by removing wetland area that both detains and slows storm flows from SR-20. Most of these impacts occur to the linear wetland ditches. WSDOT

proposes mitigation at the Fidalgo Bay mitigation site, which will provide significantly higher water quality, hydrologic, and habitat functions than those impacted.

WETLAND COMPENSATORY MITIGATION:

The proposed project will permanently affect 0.17 acres of a Category III wetland that lie within city limits. WSDOT proposes to mitigate these wetland impacts by creating wetlands at a 1:1 replacement ratio at the Fidalgo Bay Mitigation Site. The Fidalgo Bay Mitigation Site is a 5.95-acre property that is located at the corner of SR-20 and March Point Road within the City of Anacortes. It was constructed in 2007-2009 by WSDOT as compensatory mitigation associated with SR-20 –Quiet Cove to SR-20 Spur safety improvements project. It is surrounded by a functional 75-foot wide vegetated buffer that is adjacent to the Fidalgo Bay Aquatic Reserve. The mitigation site provides wetland restoration, habitat, and water quality /quantity treatment. The proposed mitigation will be contained within a larger existing mitigation site with a functioning buffer. The created wetland at the Fidalgo Bay Mitigation Site will exceed both the type and level of wetland functions impacted by the project.

WETLAND BUFFER COMPENSATORY MITIGATION:

The proposed project will permanently impact 0.18 acres of Category III wetland buffer along with 0.18 acres of Fidalgo Bay buffer. WSDOT proposes to mitigate these impacts within a fully functioning 75-foot forest and shrub buffer (1.46 acres) located at the Fidalgo Bay Mitigation Site. Furthermore, WSDOT will both restore and enhance the wetland buffer at a 2:1 ratio along Wetland 9 and Fidalgo Bay. The wetland buffer at Wetland #8 will be restored to a higher functioning shrub buffer than pre-impact development.

FIDAGLO BAY WETLAND BUFFER COMPENSATORY MITIGATION:

According to the wetland & stream assessment report and wetland & buffer mitigation report, a total of 0.31 acres of buffer along Fidalgo Bay will be enhanced with a mix of trees and shrubs indigenous to Western Washington.

SUMMARY OF IMPACTS TO WETLANDS:	
Permanent /direct wetland impacts	0.17 acres
Short-term /temporary wetland impacts	0.09 acres
Permanent /direct wetland buffer impacts	0.18 acres
Short-term /temporary wetland buffer impacts	0.11 acres
Permanent Fidalgo Bay Buffer Impact	0.18 acres
Short-term /temporary Fidalgo Bay Buffer Impact	0.04 acres
Total Area of the Fidalgo Bay Wetland Mitigation Site	5.95 acres

Total Area & Type of Wetland Mitigation	0.17 acres of Category III wetland with functioning buffer at the Fidalgo Bay Mitigation Site
Total Area & Type of Buffer Mitigation	On-site restoration of 0.33 acre of wetland buffer and 0.31 acre of Fidalgo Bay buffer. Functioning 75-foot buffer (1.46 acres) on Fidalgo Bay Mitigation Site
Years of Monitoring	Site monitoring is complete meeting year 10 standards at year 5. Three years of onsite buffer restoration monitoring

SUMMARY OF COMPENSATORY MITIGATION FOR IMPACTED WETLANDS:						
Wetland #:	Activity Proposed:	Wetland Rating Category:	Duration of Impact:	Proposed Mitigation Type	Impact Area:	Mitigation Area:
6	Fill	3	Permanent	Fidalgo Bay Mitigation Site	<435.6 SQ' (<0.01 Acre)	Same as Impacted (1:1)
6	Equipment Access	3	Temporary	On-Site Restoration	<435.6 SQ' (<0.01 Acre)	Same as Impacted (1:1)
8	Fill & Excavation	3	Permanent	Fidalgo Bay Mitigation Site	3,920 SQ' (0.09 Acre)	Same as Impacted (1:1)
8	Equipment Access	3	Temporary	On-Site Restoration	3,049 SQ' (0.07 Acre)	Same as Impacted (1:1)
9	Fill	3	Permanent	Fidalgo Bay Mitigation Site	<435.6 SQ' (<0.01 Acre)	Same as Impacted (1:1)
9	Equipment Access	3	Temporary	On-Site Restoration	435.6 SQ' (0.01 Acre)	Same as Impacted (1:1)
10	Fill & Excavation	3	Permanent	Fidalgo Bay Mitigation Site	3,049 SQ' (0.07 Acre)	Same as Impacted (1:1)
10	Equipment Access	3	Temporary	On-Site Restoration	435.6 SQ' (0.01 Acre)	Same as Impacted (1:1)

As is discussed above, wetland #6 is located solely in the City of Anacortes while wetlands # 8 & 10 are located solely in Skagit County's jurisdiction. Wetland #9 however is located in both jurisdictions - the City of Anacortes and Skagit County.

FIDALGO BAY MITIGATION SITE & APPENDIX "A", SHORELINE MASTER PROGRAM:

The mitigation site will contain 1.39 acres of re-established wetland and 0.45 acres of enhanced wetland. A total of 0.17 acre of wetland creation /re-establishment will be used for this project. The proposed project will permanently (directly) impact 0.17 acre of Category III wetland. Early coordination between WSDOT, USACE, and the Department of Ecology indicated wetland mitigation (re-establishment/creation(R/C)) at the Fidalgo Bay Mitigation Site to replace lost wetland functions would be acceptable (USACE, Ecology, pers. comm. 2016). Interagency guidelines for advance permittee-responsible mitigation (Ecology et al. 2012) allow for lower mitigation ratios if a mitigation effort is established and meeting performance standards prior to using the credits since there is no temporal loss of wetland function. The City of Anacortes requires that mitigation be consistent with the Ecology/USACE interagency guidelines (Ecology et al. 2006a), have no net loss of wetland function, shows a preference for restoration of wetlands from upland sites, and prefers mitigation on-site or within the sub-basin.

Appendix "A" of the 2010, City of Anacortes' Shoreline Master Program regulates wetlands within the shoreline environment while Chapter 17.70 of the Anacortes Municipal Code regulates critical areas outside of shoreline jurisdiction. The vast majority of the project that is within city limits is within the shoreline environment and thus subject only to the SMP. No impacted wetlands within the project area are outside of the shoreline environment. The proposed 1:1 R/C ratio appears to be consistent with Table A-4-3 of the SMP. The mitigation site has been built out with no additional plantings needed. WSDOT currently has a 1.39 acre credit and will apply 0.17 acres for the Sharpes' corner project to this balance.

PRIORITY HABITATS & SPECIES (PHS):

After reviewing Washington State Department of Fish and Wildlife's (WDFW) website, no Priority Habitats or Species have been identified in the project area. However, according to the wetland & stream assessment report both wetlands, streams, riparian habitats, and biodiversity areas and corridors are considered Priority Habitats, which are present in the project area. WDFW documents Priority Habitats and Species in Fidalgo Bay documenting coastal estuary, open-water, and gravel beaches for an abundance of waterfowl and shorebirds.

On August 3, 2017, City of Anacortes' Department of Planning, Community, and Economic Development solicited the Washington State Department of Fish for comment regarding the proposed project. No comment however was received.

BIOLOGICAL ASSESSMENT:

WSDOT completed a biological assessment in accordance with the Endangered Species Act for the proposed project. WSDOT's biological assessments are completed through a programmatic agreement with the services (**See Exhibit #01**).

FLOODPLAIN:

After a review of FEMA's website, the proposed project appears to be located outside of a designated floodplain (Firm # 5303170080A).

CULTURAL RESOURCES:

According to a Cultural Resource Report dated August 2013, prepared by Archaeological and Historic Services (AHS), Eastern Washington University, no cultural resources or historic properties were identified. The project can proceed as proposed with regard to cultural resources.

IV. AGENCY & DEPARTMENT COMMENTS RECEIVED:

Please see **Exhibit #07** for Agency /Department comments received.

V. PUBLIC COMMENTS RECEIVED:

Please see **Exhibit #08** for public comments received.

VI. STATE ENVIRONMENTAL POLICY ACT:

The subject proposal is not exempt from SEPA environmental review per WAC 197.11.800. WSDOT however acted as the SEPA lead agency and on June 13, 2017, issued a Determination of Non-Significance (DNS).

VII. SHORELINE MANAGEMENT ACT:

1. Proposed development lies within two hundred (200) feet of a shoreline of statewide significance (RCW 90.58.030(2)(f)) and is thus subject to conformance with the City of Anacortes' Shoreline Master Program (SMP).
2. A portion of the proposed improvements to State Route 20 (SR-20) / Sharpe's Corner project area lie in the "Conservancy" Shoreline Environment / Designation.
3. The purpose of the "Conservancy" Shoreline Environment / Designation is to protect and restore the public benefits and ecological functions of open-space, floodplain, natural areas and other sensitive lands (e.g., valuable historic, educational, or scientific research areas, areas of high scenic value) where they exist within the City, while allowing a variety of compatible uses. It is the most suitable designation for shoreline areas that possess a specific resource or value that can be protected without excluding or severely restricting all other uses. It

should be applied to those areas that would most benefit the public if their existing character is maintained, but which are also able to tolerate limited or carefully planned development or resource use. Permitted uses may include recreational, cultural, and historic uses provided these activities are in keeping with the goals of protection and restoration as stated in Section 5.8 of the 2010, City of Anacortes, Shoreline Master Program.

4. The subject proposal is not exempt from obtaining an approved Shoreline Substantial Development Permit (SSDP) per WAC 173.27.040.
5. According to Table 5.1 of the SMP, “roads and associated facilities (e.g., sidewalks, bike lanes, storm drainage, etc.)” require an approved Shoreline Conditional Use Permit (SCUP) in the “Conservancy” Shoreline Environment / Designation.
6. Additionally, “upland fill” as is proposed also requires an approved Shoreline Conditional Use Permit (SCUP) in the “Conservancy” Shoreline Environment / Designation per Table 5.1 of the SMP.
7. According to Table 5.2 of the SMP, non-water dependent uses in the “Conservancy” Shoreline Environment / Designation are required to have a 100-foot setback as measured from the respective ordinary high water mark.
8. The proposed development is located within the “Conservancy” Shoreline Environment / Designation’s 100-foot setback requirement as measured from the ordinary high water mark and thus a Shoreline Variance is required.
9. According to AMC 18.16.100(B), “The decision maker per AMC 19.20.030 Types of Review is authorized to approve, approve with conditions, or deny shoreline permits consistent with the procedures in AMC Chapter 19.20 Application Procedures is authorized to approve, approve with conditions, or deny shoreline permits consistent with the procedures in AMC Chapter 19.20 Application Procedures.
10. According to AMC Table 19.20.030-1, Shoreline Conditional Use Permits and Shoreline Variances go before the Planning Commission for a decision.
11. According to AMC Table 19.20.030-1, for Shoreline Substantial Development Permits valued at \$1 million or more or on a site of 3-acres or more go before City Council for a decision. The proposed project has been valued at \$10,300,000.
12. At the applicant’s request, said shoreline permits are being processed collectively under the highest number of review /procedure per AMC 19.20.040(A). Therefore, the subject SSDP, SCUP, and Shoreline Variance are undergoing a consolidated review. These shoreline permits have been processed as a Type 4 level of review per AMC Table 19.20.030-1. The Planning Commission will make a recommendation of approval or disapproval to City Council following

the open-record public hearing. City Council will make a decision on the subject applications following a close-record public hearing on the matter.

13. The subject shoreline permit were also reviewed for conformance with the Criteria for granting Shoreline Conditional Use Permits per Section 3.1(D) –of the Shoreline Master Program as follows:

A. That the proposed use will be consistent with the policies of RCW 90.58.020 and the policies of the Master Program.

STAFF ANALYSIS:

Washington State Department of Transportation has complied with the applicable policies of the City of Anacortes, 2010, Shoreline Master Program and RCW 90.58.020 –Legislative findings –State Policy enunciated –Use Preference.

B. That the proposed use will not interfere with the normal public use of public shorelines.

STAFF ANALYSIS:

The proposed project will not interfere with the normal public use of public shorelines of the state. Proposed improvements will improve safety, reduce congestion, and provide a public trail that promotes non-motorized access.

C. That the proposed use of the site and design of the project will be compatible with other authorized uses within the area and with uses planned for the area under the comprehensive plan and this master program.

STAFF ANALYSIS:

The project will be compatible with both existing and projected land uses in the project area. Properties adjacent to the project area are mostly commercial /retail. The proposed project maintains essential transportation infrastructure while improving both the safety and traffic flow in the City of Anacortes and Skagit County.

D. That the proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located; and

STAFF ANALYSIS:

WSDOT has both avoided and minimized impacts to critical areas located within the project area. Total avoidance however was not feasible due to constraints with topography, safety, design guidelines, and project constructability. Furthermore, proposed improvements are limited to the existing right-of-way of SR-20.

E. That the public interest will suffer no substantial detrimental effect.

STAFF ANALYSIS:

The project includes improvements to motor vehicle safety, a reduction to congestion at Sharpe's corner, and the creation of a public trail that promotes non-motorized pedestrian access. All of these improvements are in the public interest with no detrimental effects.

14. Per Section 3.2(C)(1) –of the Shoreline Master Program, the subject shoreline permit was reviewed for conformance with the criteria of granting upland variances. Variance Permits for development that will be located landward of the ordinary high water mark, including those areas designated by the Department of Ecology as wetlands pursuant to WAC 173-22, may be authorized provided the applicant can demonstrate all of the following:

A. That the strict requirements of the bulk, dimensional, or performance standards set forth in the Master Program preclude or significantly interfere with a reasonable use of the property not otherwise prohibited by the Master Program.

STAFF ANALYSIS:

The applicant, the Washington State Department of Transportation (WSDOT) considered numerous alternatives when undergoing project design. A Variance to the "Conservancy" Shoreline Environment /Designation is needed to the required 100-foot setback from the ordinary high water mark. Both the existing highway, existing right-of-way, and proposed improvements thereto, are within close proximity to the shoreline and thus do not comply with the required 100-foot setback requirement.

B. That the hardship described in subsection (a) above is specifically related to the property, and is the result of unique conditions such as irregular lot shape, size, or natural features and the application of the Master Program, and not, for example, from deed restrictions or the applicant's own actions.

STAFF ANALYSIS:

The hardship described above is related to the subject property and unique conditions associated with it including the proximity to the shoreline of Fidalgo Bay. The proposed project involves road repairs and a reconfiguration to the intersection at Sharpe's Corner. State-Route-20 is located within an existing right-of-way (ROW).

- C. *That the design of the project will be compatible with other authorized uses in the area and will not cause adverse effects to adjacent properties or the shoreline environment.*

STAFF ANALYSIS:

The project will be compatible with both existing and projected land uses in the project area. Properties adjacent to the project area are mostly commercial /retail. The proposed project maintains essential transportation infrastructure while improving both the safety and traffic flow in the City of Anacortes and Skagit County.

- D. *That the variance requested will not constitute a grant of special privilege not enjoyed by the other properties in the area.*

STAFF ANALYSIS

If approved, the variance will not constitute a grant of special privilege not enjoyed by other properties in the vicinity. The project entails creating a safer and improved access to the SR-20 /SR-20 Spur Interchange (Sharpe's Corner) resulting in less congestion on the existing highway system.

- E. *That the variance requested is the minimum necessary to afford relief.*

STAFF ANALYSIS

During project design, WSDOT has done their due diligence in both avoiding and minimizing impacts to critical areas located within the project vicinity. Additionally, the variance is the minimum necessary to afford relief as the project entails improvements to an existing highway within an existing right-of-way. Re-location or reconfiguration of SR-20 from proximity to the Fidalgo Bay shoreline is not possible.

- F. *That the public interest will suffer no substantial detrimental effect.*

STAFF ANALYSIS

The project includes improvements to motor vehicle safety, a reduction to congestion at Sharpe's corner, and the creation of a public trail that promotes non-motorized pedestrian access. All of these improvements are in the public interest with no detrimental effects.

15. The subject proposal is/is not consistent with the State of Washington's Shoreline Management Act and the City of Anacortes' 2010, Shoreline Master Program and development regulations listed therein for developments located in the "Conservancy" shoreline environment/designation.

VIII. ZONING ORDINANCE/CODE:

1. The City's Zoning Map establishes zoning district boundaries and the City Zoning Ordinance establishes (1) the permitted use of land in the various zones, and (2) development standards.
2. The subject property is located in the Light Manufacturing 1 (LM1) Zoning District of the City of Anacortes.
3. According to AMC 17.19.010, the purpose of the Light Manufacturing 1 Zoning District "is to primarily accommodate industrial type uses that do not need water access or proximity to the central business district or to the Commercial Avenue corridor."
4. Transportation facilities (i.e., roads, highways, etc.) are not listed as a permitted or conditional use in the Light Manufactured 1 Zoning District per AMC 17.19.020 thru 17.19.040. It is assumed however that transportation facilities are permitted in the underlying zoning district. Furthermore, the project entails improvements to existing transportation facilities /highway within a Washington State owned right-of-way.
5. The subject proposal is, is not consistent with the above development regulations. The proposed land use is, is not permitted in the underlying zoning district.

IX. CONCLUSIONS OF LAW:

1. The requirements of the State Environmental Policy Act have, have not been complied with.
2. The public notice requirements of the Shoreline Management Act have, have not been complied with.
3. The project is/is not consistent with the underlying shoreline environment /designation and general goals, policies and development regulations of the Anacortes Shoreline Master Program; the Shoreline Management Act; the general purposes of the City's comprehensive plan; the city's planning standards and specifications of the zoning ordinance; and other ordinances applicable to the proposal.
4. The Planning Commission bases its Findings of Fact, Conclusions of Law & Recommendation on the entire record, including all testimony and exhibits. Any finding, which would be deemed a Conclusion of Law, and any Conclusion of Law which should be deemed a finding is hereby adopted as such.

X. STAFF RECOMMENDATION:

The Department of Planning, Community, and Economic Development recommends that the Planning Commission make a recommendation of approval to City Council concerning the

subject Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, and Shoreline Variance subject to staff's suggested conditions of approval as listed below.

XI. DECISION:

Based on the foregoing information and analysis, the environmental documents submitted by the applicant, and the City's regulatory authority to implement the policies, standards, and regulations of the Shoreline Master Plan, Comprehensive Plan, and the Anacortes Municipal Code (AMC), the Planning Commission recommends **approval or disapproval** of the subject Shoreline Substantial Development Permit, Shoreline Conditional Use Permit, & Shoreline Variance subject to the conditions of approval as listed below.

XII. CONDITIONS OF APPROVAL:

1. The scope of the project shall not exceed that as set-out in the shoreline permit application (including attachments), and in accordance with the determinations made and conditions imposed.
2. All applicable permits (local, state, & federal) shall be secured before any construction activities begin onsite and copies provided to the City of Anacortes' PCED.
3. The applicant shall be responsible for reimbursement to the City of Anacortes for the full cost of both third party review and the posting, mailing and publication of the public hearing.
4. If any artifacts or human remains are found upon excavation, the Samish Indian Nation; the City of Anacortes' Department of Planning, Community, & Economic Development; the City of Anacortes' Police Department, and the State of Washington's Department of Archaeology and Historic Preservation (DAHP) shall be immediately notified and the work in the immediate area cease. Pursuant to RCW § 27.53.060 it is unlawful to destroy any historic or prehistoric archaeological resources. RCW 27.44 and § 27.53.060 require that a person obtain a permit from the Washington State Department of Archaeology and Historic Preservations before excavating, removing, or altering Native American human remains or archaeological resources in Washington.
5. Development shall comply with AMC § 18.16.130 regulating the time limit for shoreline permits as follows:
 - A. Construction, or substantial progress toward completion, must begin within two (2) years after approval of the permit. Substantial progress toward construction shall include, but not limited to, the letting of bids, making of contracts, purchasing of materials involved in development, but shall not include development or uses which are inconsistent with the Shoreline Management Act or the city's master program. In determining the running two-year period hereof, there shall not be included the time during which development was not actually pursued by construction and the pendency of litigation reasonably related thereto made it reasonable not to so pursue; provided, that the city may, in its discretion, extend the two-year time period for a reasonable

time based on factors, including the inability to expeditiously obtain other governmental permits which are required prior to the commencement of construction.

- B. Five-Year Permit Authorization. If construction has not been completed within five years of approval by the City of Anacortes, the city will review the permit, with prior notice to parties of record, and, upon showing of good cause, either extend the permit for one additional year, or terminate the permit. Prior to the city authorizing any permit extensions, it shall notify any parties of record and the Department of Ecology. Note: Only one single extension is permitted.
6. Development shall comply with all recommendations and specifications of the Wetland & Stream Assessment Report and Wetland & Buffer Mitigation Report dated December 2016 and March 2017 respectively.
 7. Development shall comply with all recommendations and specifications of the revised drainage analysis dated July 31, 2017.
 8. Hours of construction /work are limited to 7:00 AM to 10:00 PM unless a noise variance is obtained.
 9. Noise levels shall not to exceed those standards as established by the state pursuant to Chapter 70.107 RCW and contained in Chapter 173.60 WAC.
 10. The applicant /landowner shall comply with federal statutes including but not limited to: the Endangered Species Act, the Clean Water Act, the Marine Mammal Protection Act, and other federal statutes.
 11. The project shall comply with all applicable Shoreline Master Program regulations, including but not limited to, Section 5.8 Conservancy Environment, Chapter 6 Environmental Protection General Regulations, Section 8.13 Transportation Facilities, and Section 9.7 Fill.
 12. Pursuant to SMP DR-6.3.10, the landowner shall submit to PCED periodic monitoring of the proposed onsite mitigation that is proposed as part of this project for five (5) years from the date of completed development to ensure the success of the mitigation.
 13. No in-water work within Fidalgo Bay or the two delineated streams /creeks discussed above is permitted.
 14. Orange construction fencing shall be installed at the project boundary's clearing limits.
 15. Project impacted wetlands, streams/creeks, and the fidalgo bay shoreline discussed above shall have high visibility construction fencing place around the respective buffers. Please contact the Planning Department for an inspection once this is done.
 16. Erosion Control Measures and Best Management Practices shall be implemented at all times during construction activities.
 17. Any upland fill proposed shall be located, designed, and constructed to protect shoreline ecological functions and ecosystem-wide processes pursuant to SMP DR-9.7.9.

18. All roads and drainage systems shall be maintained to prevent erosion and/or water quality degradation pursuant to SMP DR-8.13.6.
19. Development shall comply with the Department of Ecology's 2012, Stormwater Management Manual for Western Washington as amended in December 2014.
20. WSDOT shall coordinate and collaborate with the City of Anacortes' Fire and Police Departments to make sure that emergency service access is available at all times thru the project area during construction.

These Findings of Fact, Conclusions of Law, and Recommendation were adopted by the City of Anacortes' Planning Commission on **September 27, 2017**.

**CITY OF ANACORTES, WASHINGTON
PLANNING COMMISSION**

By _____
Marty Laumbattus, Planning Commission Chair

JUDICIAL APPEAL:

Per AMC 19.20.030-1 and 19.20.240(A), there is no further administrative appeal available for this decision. Appeals of the decision may be made to Superior Court pursuant to Chapter 36.70C RCW."

EXHIBITS:

EXHIBIT NUMBER:	NAME OF EXHIBIT:
Exhibit #1	Master Permit Application; JARPA; Project Description; Issued SEPA DNS; SEPA Checklist; Summary of Outreach; Biological Assessment; & Hydraulic Analysis
Exhibit #2	Wetland & Stream Assessment Report; Wetland & Buffer Mitigation Report
Exhibit #3	Shoreline Conditional Use Permit Criteria of Approval
Exhibit #4	Shoreline Variance Criteria of Approval
Exhibit #5	GIS Map
Exhibit #6	Notice of Application & Hearing
Exhibit #7	Agency & Department Comments Received
Exhibit #8	Public Comments Received
Exhibit #9	Site Photos
Exhibit #10	Third Party Review of Hydraulic Report
Exhibit #11	Plans

EXHIBIT #01:

**MASTER PERMIT APPLICATION; JARPA; PROJECT
DESCRIPTION; ISSUED SEPA DNS; SEPA CHECKLIST;
SUMMARY OF OUTREACH; BIOLOGICAL
ASSESSMENT; & HYDRAULIC ANALYSIS**

EXHIBIT #02:

WETLAND & STREAM ASSESSMENT REPORT; & WETLAND & BUFFER MITIGATION REPORT

EXHIBIT #03:

SHORELINE CONDITIONAL USE PERMIT CRITERIA OF APPROVAL

EXHIBIT #04:

SHORELINE VARIANCE CRITERIA OF APPROVAL

EXHIBIT #05:

GIS MAP

EXHIBIT #06:

NOTICE OF APPLICATION & HEARING

EXHIBIT #07:

AGENCY & DEPARTMENT COMMENTS RECEIVED

EXHIBIT #08:

PUBLIC COMMENTS RECEIVED

EXHIBIT #09:

SITE PHOTOS

EXHIBIT #10:

THIRD PARTY REVIEW OF HYDRAULIC REPORT

EXHIBIT #11:

PLANS

EXHIBIT #01:

**MASTER PERMIT APPLICATION; JARPA; PROJECT
DESCRIPTION; ISSUED SEPA DNS; SEPA CHECKLIST;
SUMMARY OF OUTREACH; BIOLOGICAL
ASSESSMENT; & HYDRAULIC ANALYSIS**



PLANNING, COMMUNITY, & ECONOMIC DEVELOPMENT DEPARTMENT

MASTER PERMIT APPLICATION

Mailing Address: P.O. Box 547, Anacortes, WA 98221

Office Location: 904 6th Street, Anacortes WA 98821

Phone: (360) 299-1984, Fax: (360) 293-1938

PERMITS REQUESTED FROM THE CITY OF ANACORTES:		
☐ Accessory Dwelling Unit (ADU)	☐ Annexation Request	☐ Administrative Interpretation
☐ Administrative Conditional Use Permit	☐ Binding Site Plan (Preliminary)	☐ Binding Site Plan (Final)
☐ Boundary Line Adjustment (BLA)	☐ Clearing Permit	☐ Code (AMC) Amendment
☐ Comprehensive Plan Amendment	☐ Conditional Use Permit (CUP)	☐ Cottage Housing
☐ Essential Public Facility	☐ Extension of Time for Approval	☐ Floodplain Development Permit
☐ Grade and Fill Permit	☐ Home Occupation Permit	☐ Lot Certification
☐ Manufactured Home Subdivision	☐ Minor Permit Revision	☐ Plat (Preliminary)
☐ Plat (Final)	☐ Plat Amendment /Modification	☐ Reasonable Use Exception
☐ Rezone Request	☐ SEPA Environmental Review	☐ Shoreline Exemption
☒ Shoreline Substantial Development Permit	☒ Shoreline Conditional Use Permit	☒ Shoreline Variance
☐ Short Plat /Subdivision (Preliminary)	☐ Short Plat /Subdivision (Final)	☐ Special Use Permit
☐ Stormwater Management Manual Adjustments & Exceptions	☐ Variance (Level 1)	☐ Variance (Level 2)

PROJECT & SITE INFORMATION:	
SITE ADDRESS: SR 20 between Milepost (MP) 47.04 and 48.40, and SR 20 Spur MP 47.58 and MP 48.40.	PROJECT NAME: State Route (SR) 20/Sharpes Corner Vicinity - Improvements
PARCEL NUMBER(S): N/A	SECTION, TOWNSHIP, & RANGE 5&8, 34 N, 2 E
LOT SQUARE FOOTAGE & ACREAGE: N/A	PROJECT VALUATION: ~\$10,300,000
LEGAL DESCRIPTION:	PRESENT ZONING: LM1 - Light Manufacturing
PRESENT USE OF PROPERTY: Commercial, industrial, scattered rural residential, recreational	CUT & FILL (CY) PROPOSED: 15,180 CY Cut / 6,140 CY Fill
PRE-APPLICATION CONFERENCE REQUIRED: ☒ Yes ☐ No Meeting held 02/02/2017	WATER SOURCE: ☐ City of Anacortes ☐ Private Well ☐ Community Well
SEWAGE DISPOSAL: ☐ City of Anacortes ☐ Septic Tank	ROAD ACCESS: ☐ City Road ☒ State Highway ☐ Private Road
CRITICAL AREAS WITHIN 300 FEET: ☒ Yes ☐ No	WATER BODIES WITHIN 200 FEET: ☒ Yes ☐ No
FLOODPLAIN: Flood Zone: No FIRM Panel # Date of Panel:	
LOT COVERAGE AREA CALCULATIONS: Existing Square Footage: Proposed Square Footage:	
IMPERVIOUS SURFACE AREA CALCULATIONS: Existing Impervious Square Footage: 2,003,730 SF New Impervious Surface: 52,490 SF	

PROPERTY OWNER INFORMATION: ☐ Multiple owners attached	
NAME: George Carlson	MAILING ADDRESS: 1043 Goldenrod Road, Suite 101
CITY, STATE, ZIP: Burlington, WA 98233-3415	PHONE #: 360.757.5995
FAX #:	EMAIL ADDRESS: carlsog@wsdot.wa.gov
APPLICANT INFORMATION: ☒ Same as property owner	
NAME:	MAILING ADDRESS:
CITY, STATE, ZIP:	PHONE #:
FAX #:	EMAIL ADDRESS:
CONTACT PERSON: ☐ Same as property owner ☐ Same as applicant	
NAME: Kevin Stuber	MAILING ADDRESS: 1043 Goldenrod Road, Suite 101
CITY, STATE, ZIP: Burlington, WA 98233-3415	PHONE #: 360.757.5994
FAX #:	EMAIL ADDRESS: stuber@wsdot.wa.gov
DESCRIPTION OF SUBJECT PROPOSAL:	
PROPOSED WORK: _____ _____ WSDOT proposes to replace the existing signal with a multi-lane roundabout. Additional improvements include _____ widening SR 20 between Sharpes Corner and the SR 20/Miller Road/Gibraltar Road intersection for southbound _____ truck-climbing lane, converting the SR 20/Miller Rd./Gibraltar intersection into a multi-lane roundabout, and _____ providing a pedestrian path between Sharpes Corner and March Point Road. Work includes right-of-way _____ acquisition, traffic control, relocation of utilities (above and below ground), erosion control, clearing and grubbing, _____ excavation and fill, paving and, pavement marking, illumination, signing, and landscaping. _____ _____ _____	

NOTES:

- ☒ I am the property owner and I grant permission to city staff to enter the project site to verify presence or absence of critical areas and to perform inspections of the work proposed by this application; or
- ☐ Attached is a letter of authorization stating that I have the consent of the property owner to submit the subject application on their behalf. Additionally, the property owner has granted permission to city staff to enter the project site in order to verify the presence or absence of critical areas and to perform inspections of work proposed by this application.
- ☐ A notarized affidavit (see below) is required to be completed by all persons having an ownership interest in the subject property and the applicant, if different from the property owner(s). If the signatory is not listed as the owner in the title report, or if the signatory is signing on behalf of an entity, documentation authorizing the signatory to sign the affidavit on behalf of the individual or entity shall provided.

SIGNATURE REQUIRED:

I certify that the information, statements, answers above regarding the subject application(s) are true and correct to the best of my knowledge and belief.

Signature: _____

Title: Mt. Baker Environmental Manager

Print Name: George Carlson

Company: WSDOT

Date: 08/01/2017



WASHINGTON STATE

Joint Aquatic Resources Permit Application (JARPA) Form^{1,2} [\[help\]](#)

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.



US Army Corps
of Engineers
Seattle District

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

Part 1—Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [\[help\]](#)

State Route (SR) 20/Sharpes Corner Vicinity - Improvements

Part 2—Applicant

The person and/or organization responsible for the project. [\[help\]](#)

2a. Name (Last, First, Middle)

Carlson, George

2b. Organization (If applicable)

Washington State Department of Transportation (WSDOT)

2c. Mailing Address (Street or PO Box)

1043 Goldenrod Road, Suite 101

2d. City, State, Zip

Burlington, WA 98233-3415

2e. Phone (1)

(360) 757-5995

2f. Phone (2)

2g. Fax

(360) 757-5050

2h. E-mail

carlsog@wsdot.wa.gov

¹Additional forms may be required for the following permits:

- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- If your project might affect species listed under the Endangered Species Act, you will need to fill out a Specific Project Information Form (SPIF) or prepare a Biological Evaluation. Forms can be found at <http://www.nws.usace.army.mil/Missions/CivilWorks/Regulatory/PermitGuidebook/EndangeredSpecies.aspx>.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

²To access an online JARPA form with [\[help\]](#) screens, go to

http://www.epermitting.wa.gov/site/alias_resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.

Part 3—Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [\[help\]](#)

3a. Name (Last, First, Middle)			
Stuber, Kevin			
3b. Organization (If applicable)			
WSDOT			
3c. Mailing Address (Street or PO Box)			
1043 Goldenrod Road, Suite 101			
3d. City, State, Zip			
Burlington, WA 98233-3415			
3e. Phone (1)	3f. Phone (2)	3g. Fax	3h. E-mail
(360) 757-5995		(360) 757-5050	stuberk@wsdot.wa.gov

Part 4—Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [\[help\]](#)

- ☒ Same as applicant. (Skip to Part 5.)
- ☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)
- ☐ There are multiple upland property owners. Complete the section below and fill out [JARPA Attachment A](#) for each additional property owner.
- ☐ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete [JARPA Attachment E](#) to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
4b. Organization (If applicable)			
4c. Mailing Address (Street or PO Box)			
4d. City, State, Zip			
4e. Phone (1)	4f. Phone (2)	4g. Fax	4h. E-mail

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [\[help\]](#)

- ☐ There are multiple project locations (e.g. linear projects). Complete the section below and use [JARPA Attachment B](#) for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]			
☐ Private			
☐ Federal			
☒ Publicly owned (state, county, city, special districts like schools, ports, etc.)			
☐ Tribal			
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)			
5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]			
This project is located on SR 20 between Milepost (MP) 47.04 and 48.40, and SR 20 Spur MP 47.58 and MP 48.40.			
5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]			
The majority of the project corridor is located within the Anacortes city limits; however, the southern portion of the project is within unincorporated Skagit County.			
5d. County [help]			
Skagit			
5e. Provide the section, township, and range for the project location. [help]			
¼ Section	Section	Township	Range
	5 & 8	34 North	2 East
5f. Provide the latitude and longitude of the project location. [help]			
Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)			
48.4636 Latitude / -122.5818 Longitude			
5g. List the tax parcel number(s) for the project location. [help]			
The local county assessor's office can provide this information.			
The improvements will occur within state right of way that does not have a tax parcel number.			
5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]			
Name	Mailing Address	Tax Parcel # (if known)	
DOM-LE PROPERTIES LLC	5475 PRESERVE DR. GREENWOOD VILLAGE, CO 80121	P19934	
SIGNAL HILL GAMILY LP	2633 CHERRY AVE SIGNAL HILL, CA 90755	P20014	
SIMILK INC	12885 CASINO DR ANACORTES, WA 98221	P19984	
FIDALGO/SIGNAL PROP LLC	2633 CHERRY AVENUE SIGNAL HILL , CA 90755	P20013	

5i. List all wetlands on or adjacent to the project location. [\[help\]](#)

A WSDOT biologist identified and delineated eleven wetlands within the project limits. They were determined to be the following:

Wetland 1: Category III, Palustrine Emergent (PEM) Depressional 0.04 acre in size.

Wetland 2: Category III, PEM 0.03 acre in size.

Wetland 3 (WSDOT-Owned Fidalgo Bay Mitigation Site): Category III, Palustrine Scrub-Shrub/Palustrine Emergent (PSS/PEM) Depressional 5.15 acres in size.

Wetland 4: Category III, PEM, Depressional 0.06 acre in size.

Wetland 5: Category I, Estuarine Emergent (EEM) Saltwater Tidal Fringe 1.38 acres in size.

Wetland 6: Category III, PEM Depressional 0.01 acre in size.

Wetland 7: Category III, PEM, Depressional 0.07 in size.

Wetland 8: Category III, Palustrine Forested/Palustrine Scrub-shrub/Palustrine Emergent (PFO/PSS/PEM), Slope 1.04 acres in size.

Wetland 9: Category III, Palustrine emergent/Palustrine Scrub-Shrub (PEM/PSS), Depressional ~ 1.15 acres in size.

Wetland 10: Category III, Palustrine Forested/Palustrine Emergent (PFO/PEM), slope ~ 0.22 acre in size.

Wetland 11: Category II, Estuarine Emergent (EEM), 0.10 acre in size.

This determination is based on the 2014 Department of Ecology (DOE) Wetland Rating System, the city of Anacortes, and Skagit County's Critical Areas Ordinance (CAO), which employs DOE's most current rating system.

For additional information, please see the Wetland & Stream Assessment beginning on Page 10.

5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [\[help\]](#)

WSDOT identified and delineated two streams and two jurisdictional ditches within the project limits, and one water body adjacent to the project limits. They are as follows:

Agua Creek is a Type-F stream that originates southwest of Fidalgo Bay Road. It flows under Fidalgo Bay Road into Wetland 5, then under SR 20 into Fidalgo Bay.

Unnamed Stream 1 is a historically mapped, non-fish bearing stream that originates south of the Swinomish Golf Links golf course. It flows through the golf course and into Wetland 9, then conveyed through a pump house/tide gate and into Fidalgo Bay.

Jurisdictional Ditch 1 receives stormwater sheet flow from SR 20 and upslope development (graveyard to the west) which drains into Wetland 10. The ditch is approximately 560-feet in length, 0.3-feet in depth, and 2-feet in width.

Jurisdictional Ditch 2 receives stormwater sheet flow from SR 20 and upslope development (parking lot) which drains into Wetland 9. The ditch is approximately 370-feet in length, 0.5-feet in depth, and 2-feet in width.

Fidalgo Bay is a 650-acre Aquatic Reserve managed by the Washington Department of Natural Resources. The Bay is a Category I Estuarine/marine, Saltwater tidal fringe/mudflat located along the northern boundary of the project.

For additional information, please see the Wetland & Stream Assessment Report beginning on Page 6.

5k. Is any part of the project area within a 100-year floodplain? [\[help\]](#)

☐ Yes ☒ No ☐ Don't know

5l. Briefly describe the vegetation and habitat conditions on the property. [\[help\]](#)

Development has affected much of the corridor; however, undeveloped areas consist of big-leaf maple, Douglas fir, western hemlock, western red cedar, Pacific madrone, red alder, salmonberry, and pea-fruit rose. Introduced species include blackberry, Scotch broom, common tansy, Canada thistle, reed canarygrass, and dandelion.

Field reviews found no state or federally listed threatened or endangered species, critical habitat, priority habitat, or species of concern and the Washington State Department of Natural Resources Heritage Information System has no record of rare plants or high quality ecosystems in the project area. The system did however, have several records of high quality ecosystems about 3,000 feet west of the project associated with the upland forests surrounding Whistle Lake.

5m. Describe how the property is currently used. [\[help\]](#)

Currently, the site is a transportation corridor within state right of way.

5n. Describe how the adjacent properties are currently used. [\[help\]](#)

Adjacent properties are primarily commercial development with scattered rural residential, recreational, and open space land to the west, low density residential to the south, commercial and industrial development to the east, and Fidalgo Bay to the north.

5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [\[help\]](#)

There are no above ground structures within the existing or proposed right of way. Underground structures include a stormwater conveyance system and stormwater cross culverts that convey runoff under the roadway and into side slopes and ditches, and culverts that convey Aqua Creek and Unnamed stream under the roadway. All are functioning as originally designed.

5p. Provide driving directions from the closest highway to the project location, and attach a map. [\[help\]](#)

From I-5 take exit 230 (SR 20 Burlington/Anacortes) and turn west onto SR 20 and proceed for 12 miles to arrive at the project site.

Part 6—Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [\[help\]](#)

WSDOT proposes to replace the existing signal with a multi-lane roundabout. Additional improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd. /Gibraltar Rd. intersection for a southbound truck-climbing lane, converting the SR 20/Miller Rd. /Gibraltar intersection into a multi-lane roundabout, and providing a pedestrian path between Sharpes Corner and March Point Road.

Work includes right of way acquisition, traffic control, relocation of utilities (above and belowground), erosion control, clearing and grubbing, excavation and fill, paving and, pavement marking, illumination, signing, and landscaping.

6b. Describe the purpose of the project and why you want or need to perform it. [\[help\]](#)

The purpose of the project is to improve safety and relieve congestion in the vicinity of SR 20/SR 20 Spur Interchange (referred to as Sharpes Corner), and the SR 20/Miller Rd. /Gibraltar Rd. intersection.

6c. Indicate the project category. (Check all that apply) [\[help\]](#)

- ☐ Commercial
 ☐ Residential
 ☐ Institutional
 ☒ Transportation
 ☐ Recreational
☐ Maintenance
 ☐ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [\[help\]](#)

☐ Aquaculture	☐ Culvert	☐ Float	☐ Retaining Wall (upland)
☐ Bank Stabilization	☐ Dam / Weir	☐ Floating Home	☒ Road
☐ Boat House	☐ Dike / Levee / Jetty	☐ Geotechnical Survey	☐ Scientific Measurement Device
☐ Boat Launch	☐ Ditch	☐ Land Clearing	☐ Stairs
☐ Boat Lift	☐ Dock / Pier	☐ Marina / Moorage	☐ Stormwater facility
☐ Bridge	☐ Dredging	☐ Mining	☐ Swimming Pool
☐ Bulkhead	☐ Fence	☐ Outfall Structure	☐ Utility Line
☐ Buoy	☐ Ferry Terminal	☐ Piling/Dolphin	
☐ Channel Modification	☐ Fishway	☐ Raft	

☐ Other:

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [\[help\]](#)

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

The final sequence of construction will be determined by the contractor, but will generally be as follows:

SR 20 at Miller/Gibraltar, and SR 20/Sharpes Corner

- Begin project: Notify public, install safety items such as signs and temporary traffic control.
- Perform surveying and staking, placing of high-visibility fence to protect sensitive areas, install Best Management Practices (BMPs), and perform clearing and grubbing as needed.
- Perform saw cutting, remove asphalt, begin earthwork, construct new ditch channel, install new stormwater structures, reconstruct the roadway prism, repave roadway, install curbing, and pavement markings.
- Sharpes Corner: Modify safety items and traffic control, install temporary illumination, continue working to complete roundabout, complete pedestrian path, and perform final paving and striping.

Equipment: Construction will require the use of excavators, cranes, bulldozers, earthwork graders, earthwork loaders, vibratory compactors, dump trucks, pavement grinders, curb machine, planning machines, asphalt paving machines, rollers, pavement striping trucks, drill auger trucks, cutoff saws, chainsaws, portable generators, portable air compressors, portable light generators, and hand tools.

Staging: Construction staging and equipment storage locations will be determined by the contractor, however, the contractor is required to prepare and submit a project specific Spill Prevention Control and Countermeasures (SPCC) Plan that identifies the locations(s) where equipment and materials will be staged, used, and stored, and the distances(s) from nearby waterways and sensitive areas. The SPCC plan will also identify proper handling and disposal procedures if pre-existing contamination is discovered. No on-site construction activities may commence until WSDOT has accepted the SPCC Plan.

Floodplain: This project is not located within a designated 100-year floodplain.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [\[help\]](#)

- If the project will be constructed in phases or stages, use [JARPA Attachment D](#) to list the start and end dates of each phase or stage.

Start Date: March, 2018 End Date: September, 2018 ☐ See JARPA Attachment D

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [\[help\]](#)

~ \$10,300,000

6h. Will any portion of the project receive federal funding? [\[help\]](#)

- If **yes**, list each agency providing funds.

☐ Yes ☒ No ☐ Don't know

Part 7–Wetlands: Impacts and Mitigation

- ☒ Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [\[help\]](#)

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [\[help\]](#)

☐ Not applicable

WSDOT has avoided and minimized impacts to wetlands and buffers to the greatest extent practicable. Total avoidance was not possible due to constraints with topography, safety, design guidelines and project constructability.

Impacts were minimized through slope and shoulder width modifications, removal of a by-pass lane, alignment modifications, and stormwater design changes. These modifications resulted in a reduction of 0.15 acre of wetland impact and 0.25 acre of buffer impact.

During construction, the contractor will be required to adhere to a Temporary Erosion and Sediment Control (TESC) plan and BMPs to minimize the possibility of sediments or construction related contaminants from entering sensitive areas or leaving the site.

For Avoidance and Minimization of Impacts, please refer to page 22 of the Wetland & Buffer Mitigation Plan.

7b. Will the project impact wetlands? [\[help\]](#)

☒ Yes ☐ No ☐ Don't know

7c. Will the project impact wetland buffers? [\[help\]](#)

☒ Yes ☐ No ☐ Don't know

7d. Has a wetland delineation report been prepared? [\[help\]](#)

- If Yes, submit the report, including data sheets, with the JARPA package.

☒ Yes ☐ No**7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System?** [\[help\]](#)

- If Yes, submit the wetland rating forms and figures with the JARPA package.

☒ Yes ☐ No ☐ Don't know**7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands?** [\[help\]](#)

- If Yes, submit the plan with the JARPA package and answer 7g.
- If No, or Not applicable, explain below why a mitigation plan should not be required.

☒ Yes ☐ No ☐ Don't know**7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan.** [\[help\]](#)

The plan is to replace impacted wetland acreage and functions at the existing, and functioning, Fidalgo Bay Mitigation Site (FBMS), restore temporary wetland and buffer impacts on-site, and enhance Fidalgo Bay buffer areas to mitigate for shoreline buffer impacts.

WSDOT used a watershed approach by taking a landscape view of the lower Skagit River and Fidalgo Bay watershed, how it functions, and the need for improvement. Limiting factors in the Skagit River delta include loss of intertidal habitat and shoreline modification (riprap and dikes) and corresponding lost riparian vegetation, and disruption of sediment processes contributing to loss of forage fish habitat (WSCC 2002). Water quality is also a problem in Fidalgo Bay. Watershed restoration efforts have been underway including placing Fidalgo Bay into an Aquatic Reserve to protect and restore nearshore processes and function. The Fidalgo Bay Mitigation Site is located along Fidalgo Bay and provides wetland restoration, habitat for shoreline and wetland associated birds, riparian habitat, and water quality/quantity treatment adjacent to the Aquatic Reserve.

For additional details, see the Wetland & Buffer Mitigation Plan, beginning on page 22.

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [\[help\]](#)

Activity (fill, drain, excavate, flood, etc.)	Wetland Name ¹	Wetland type and rating category ²	Impact area (sq. ft. or Acres)	Duration of impact ³	Proposed mitigation type ⁴	Wetland mitigation area (sq. ft. or acres)
Fill	Wetland 6	Category III PEM Depressional Outflow	<0.01 Acre	Perm.	Fidalgo Bay Mitigation Site	Same as impacted area
Equipment Access			<0.01 Acre	Temp.	On Site Restoration	
Fill & Excavation	Wetland 8	Category III PFO/PSS/PEM Slope	0.09 Acre	Perm.	Fidalgo Bay Mitigation Site	Same as impacted area
Equipment Access			0.07 Acre	Temp.	On Site Restoration	

Fill	Wetland 9	Category III PEM/PSS Depressional Outflow	<0.01 Acre (<1% of 0.01)	Perm.	Fidalgo Bay Mitigation Site	Same as impacted area
Equipment Access			0.01 Acre	Temp.	On Site Restoration	
Fill & Excavation	Wetland 10	Category III PFO/PEM Slope	0.07 Acre	Perm.	Fidalgo Bay Mitigation Site	Same as impacted area
Equipment Access			0.01 Acre	Temp.	On Site Restoration	

¹ If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.

² Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.

³ Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.

⁴ Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: *Wetland & Buffer Restoration Plan, Page 14.*

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [\[help\]](#)

Wetland 6: Approximately 0.4 CY of fill will be required to construct the Sharpes Corner roundabout.

Wetland 8: Approximately 5 CY of fill will be required to widen the southbound truck-climbing lane.

Wetland 9: Approximately 18 CY of fill will be required to construct the pedestrian path between Sharps Corner and March Point Road.

Wetland 10: Approximately 15 CY of fill will be required to widen the southbound truck-climbing lane.

Fill materials consists of gravel borrow, crushed base rock, and asphalt, and all fill material will be provided from a WSDOT approved source.

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [\[help\]](#)

Wetland 8: Approximately 194 CY of excavation will be required to widen the southbound truck-climbing lane.

Wetland 10: Approximately 279 CY of excavation will be required to widen the southbound truck-climbing lane.

Excavated materials consists of gravel borrow, crushed base rock, asphalt, and existing soils. Unusable material will be disposed of at a WSDOT approved site.

Part 8—Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, "waterbodies" refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [\[help\]](#)

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment. [\[help\]](#)

☐ Not applicable

WSDOT has avoided and minimized impacts to streams, buffers, and jurisdictional ditches to the greatest extent practicable. Total avoidance was not possible due to constraints with topography, safety, design guidelines and project constructability.

Impacts were minimized through site-specific design techniques including slope and shoulder width modifications, removal of a by-pass lane, alignment modifications, and stormwater design changes.

Temporary BMPs used to control erosion and sediment during construction will include, but are not limited to, geotextile-encased check dams, geotextile silt fences, erosion control blanket, straw wattles, mulching, and stabilized construction entrances.

The contractor will be required to perform all construction activities consistent with the most recent version of the WSDOT Construction Manual, and Standard Specifications for Road, Bridge, and Municipal Construction Manual; and be in compliance with water quality standards (RCW 90.48 and WAC 173-201A).

For Avoidance and Minimization Measures, please refer to the Wetland & Buffer Mitigation Plan, beginning on page 22.

8b. Will your project impact a waterbody or the area around a waterbody? [\[help\]](#)

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [\[help\]](#)

- If Yes, submit the plan with the JARPA package and answer 8d.
- If No, or Not applicable, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [\[help\]](#)

The project will replace impacted jurisdictional ditches on-site; therefore, no loss of water quantity or quality will occur.

8e. Summarize impact(s) to each waterbody in the table below. [\[help\]](#)

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name ¹	Impact location ²	Duration of impact ³	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Fill	JD Ditch 1	Truck Climbing Lane	Perm.	6.9 CY	1,111 sq. ft.
Fill	JD Ditch 2		Perm.	1.92 CY	624 sq. ft.

¹ If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.

² Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.

³ Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [\[help\]](#)

Jurisdictional Ditch 1: Approximately 6.9 CY of fill will be required to widen the southbound truck-climbing lane.

Jurisdictional Ditch 2: Approximately 1.92 CY of fill will be required to construct the Sharpes Corner roundabout.

The contractor will provide all permanent fill materials from a WSDOT approved source.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [\[help\]](#)

Not applicable.

Part 9—Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [\[help\]](#)

Agency Name	Contact Name	Phone	Most Recent Date of Contact
City of Anacortes	Libby Grage	360-299-1986	6/20/17
City of Anacortes	Don Measamer	360-299-1942	6/20/17
U.S. Army Corps of Engineers (USACE)	Sandra Manning	206-764-6912	6/13/17
DOE	Caroline Corcoran	425-649-7004	1/17/17

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [\[help\]](#)

- If **Yes**, list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: <http://www.ecy.wa.gov/programs/wq/303d/>.

☒ Yes ☐ No Fidalgo Bay is listed as impaired waters for benz(a)anthracene and chrysene.

9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [\[help\]](#)

- Go to <http://cfpub.epa.gov/surf/locate/index.cfm> to help identify the HUC.

171100020502; Fidalgo Island-Frontal Padilla Bay

9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [\[help\]](#)

- Go to <http://www.ecy.wa.gov/water/wria/index.html> to find the WRIA #.

The project is identified as being within WRIA 03 Lower Skagit - Samish, although it does not connect with the Skagit or Samish River system.

9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help] Go to http://www.ecy.wa.gov/programs/wq/swqs/criteria.html for the standards. ☐ Yes ☐ No ☒ Not applicable
9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help] - If you don't know, contact the local planning department. - For more information, go to: http://www.ecy.wa.gov/programs/sea/sma/laws_rules/173-26/211_designations.html. ☐ Urban ☐ Natural ☐ Aquatic ☒ Conservancy ☐ Other:
9g. What is the Washington Department of Natural Resources Water Type? [help] Go to http://www.dnr.wa.gov/forest-practices-water-typing for the Forest Practices Water Typing System. ☐ Shoreline ☒ Fish ☐ Non-Fish Perennial ☐ Non-Fish Seasonal
9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help] If No, provide the name of the manual your project is designed to meet. ☐ Yes ☒ No Name of manual: This project is designed to meet the 2014 Highway Runoff Manual
9i. Does the project site have known contaminated sediment? [help] If Yes, please describe below. ☐ Yes ☒ No
9j. If you know what the property was used for in the past, describe below. [help] SR 20 and SR 20 Spur were the western segments of SR 536 from 1964 until 1973. From Sharpes Corner to Coupeville SR 20 was designated SR 525 until 1972 when the SR 20 designation was extended westward.
9k. Has a cultural resource (archaeological) survey been performed on the project area? [help] If Yes, attach it to your JARPA package. ☒ Yes ☐ No
9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [help] Listed species that may occur within the project vicinity include Canada Lynx, Streaked Horned lark, and Western Yellow-Billed Cuckoo and Marbled Murrelet. Chinook salmon, steelhead trout, several species of rockfish, bull trout, and Orca critical habitat EW mapped in Fidalgo Bay.
9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [help] Priority Habitats and Species in Fidalgo Bay include coastal estuary, open water, and gravel beaches for an abundance of waterfowl and shorebirds. Fidalgo Bay is also used by a spawning stock of Pacific herring.

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at <http://apps.oria.wa.gov/opas/>.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.
- For a list of addresses to send your JARPA to, click on [agency addresses for completed JARPA](#).

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [\[help\]](#)

- For more information about SEPA, go to www.ecy.wa.gov/programs/sea/sepa/e-review.html.
- ☒ A copy of the SEPA determination or letter of exemption is included with this application.
- ☐ A SEPA determination is pending with _____ (lead agency). The expected decision date is _____.
- ☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [\[help\]](#)
- ☐ This project is exempt (choose type of exemption below).
 - ☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt?

 - ☐ Other: _____
- ☐ SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [\[help\]](#)

LOCAL GOVERNMENT

Local Government Shoreline permits:

- ☒ Substantial Development ☒ Conditional Use ☒ Variance
- ☐ Shoreline Exemption Type (explain): _____

Other City/County permits:

- ☐ Floodplain Development Permit ☒ Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

- ☐ Hydraulic Project Approval (HPA) ☐ Fish Habitat Enhancement Exemption – [Attach Exemption Form](#)

You must submit a check for \$150 to Washington Department of Fish and Wildlife, unless your project qualifies for an exemption or alternative payment method below. **Do not send cash.**

Check the appropriate boxes

- ☐ \$150 check enclosed. Check # _____
Attach check made payable to Washington Department of Fish and Wildlife.
- ☐ My project is exempt from the application fee. (Check appropriate exemption):
 - ☐ HPA processing is conducted by applicant funded WDFW staff.
Agreement # _____
 - ☐ Mineral prospecting and mining
 - ☐ Project occurs on farm and agricultural land.
(Attach a copy of current land use classification recorded with the county auditor, or other proof of current land use)
 - ☐ Project is modification of an existing HPA originally applied for, prior to July 10, 2012.
HPA # _____

Washington Department of Natural Resources:

☐ Aquatic Use Authorization

Complete [JARPA Attachment E](#) and submit a check for \$25 payable to the Washington Department of Natural Resources.
Do not send cash.

Washington Department of Ecology:

☒ Section 401 Water Quality Certification

FEDERAL GOVERNMENT**United States Department of the Army permits (U.S. Army Corps of Engineers):**

☒ Section 404 (discharges into waters of the U.S.) ☐ Section 10 (work in navigable waters)

United States Coast Guard permits:

☐ Private Aids to Navigation (for non-bridge projects)

Part 11—Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [\[help\]](#)

11a. Applicant Signature (required) [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. gac (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. gac (initial)

George Carlson

Applicant Printed Name



Applicant Signature

7/18/17

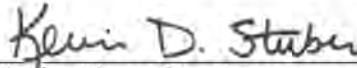
Date

11b. Authorized Agent Signature [\[help\]](#)

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Kevin Stuber

Authorized Agent Printed Name



Authorized Agent Signature

7/18/17

Date

11c. Property Owner Signature (if not applicant) [\[help\]](#)

Not required if project is on existing rights-of-way or easements (provide copy of easement with JARPA).

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Property Owner Printed Name

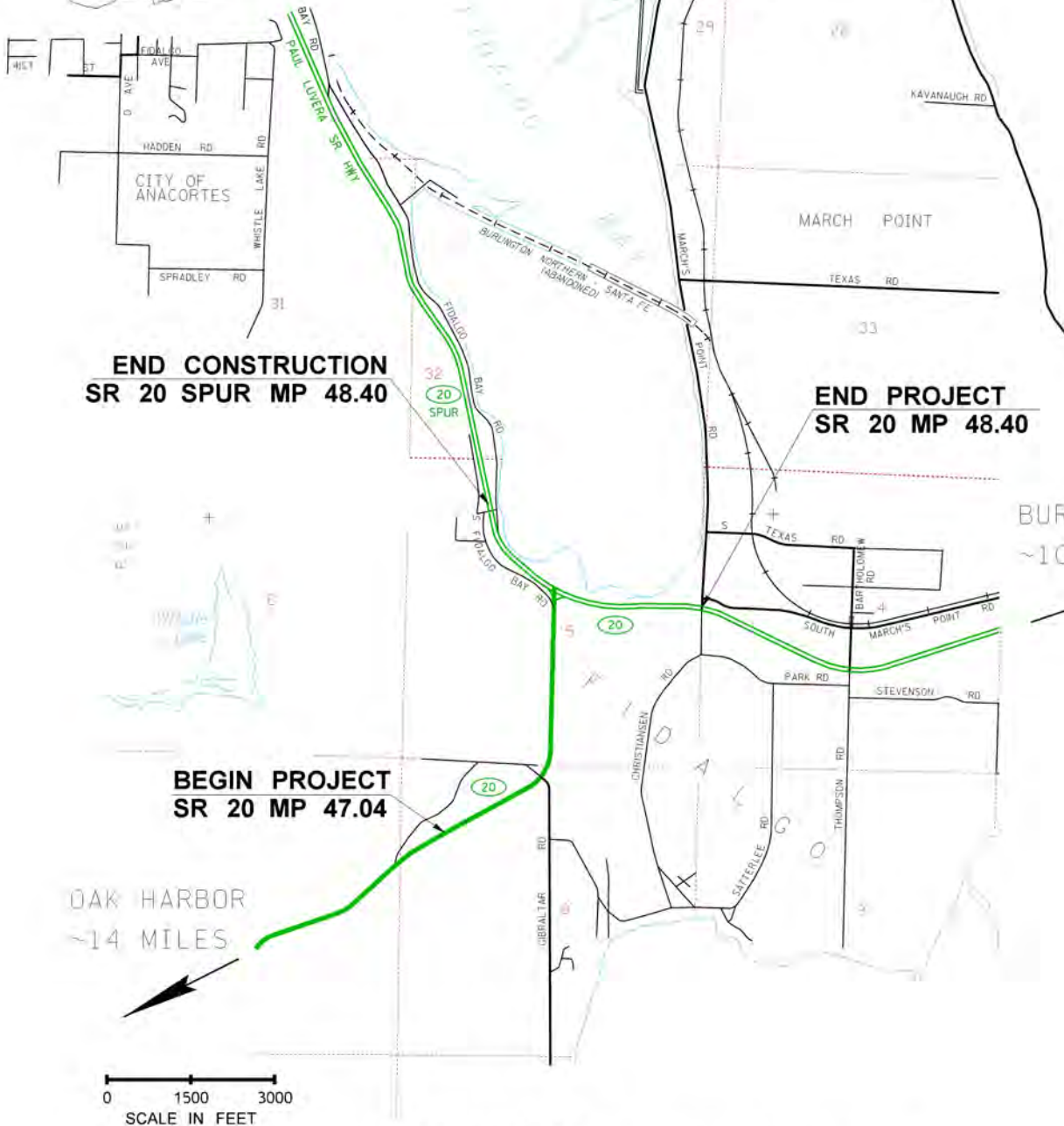
Property Owner Signature

Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than \$10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-011 rev. 09/2016

**SR 20 SHARPES CORNER
VICINITY IMPROVEMENTS
MP 47.04 TO 48.40
48.4636°N 122.5818°W**



PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

WATER BODY: FIDALGO BAY

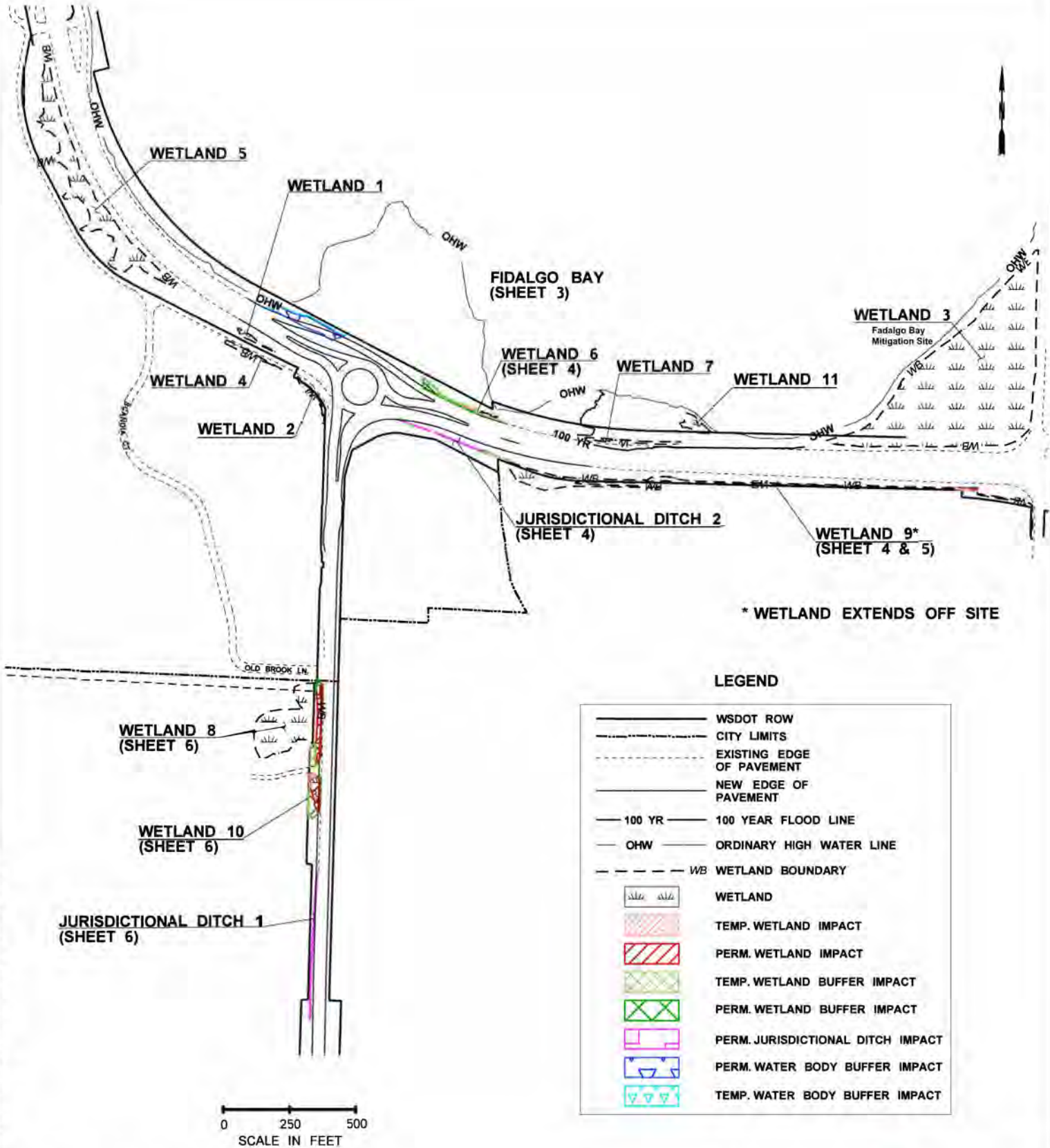
DATE: JUNE 2017



**Washington State
Department of Transportation**

SHEET: 1

OF: 10



PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

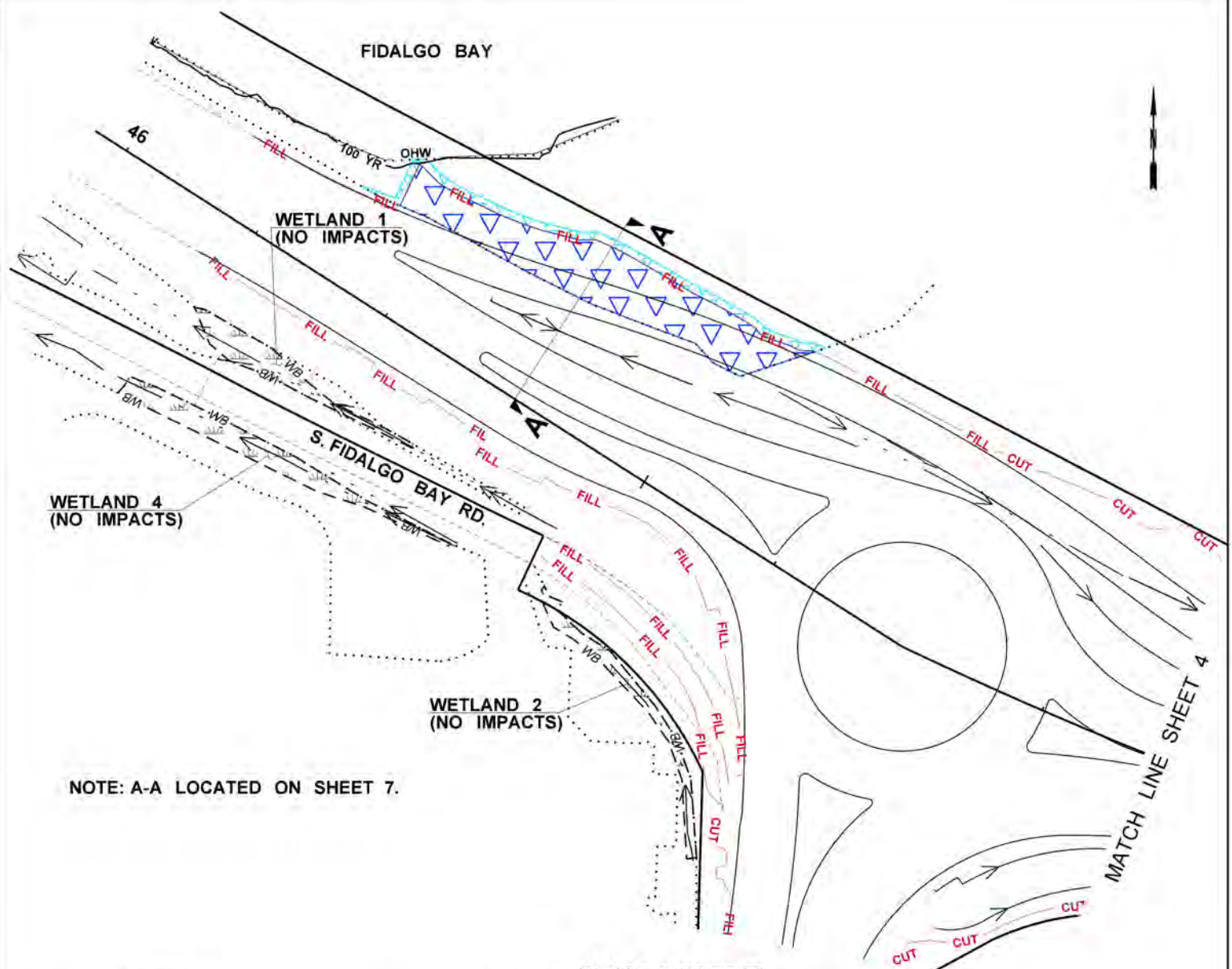
WATER BODY: FIDALGO BAY

DATE: JUNE 2017



Washington State
Department of Transportation

SHEET: 2 OF: 10



LEGEND

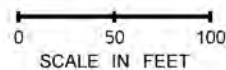
	WSDOT ROW
	CITY LIMITS
	EXISTING EDGE OF PAVEMENT
	NEW EDGE OF PAVEMENT
	NEW PEDESTRIAN/BICYCLE PATH
	CUT/FILL LINE
	EXISTING DITCH
	NEW DITCH
	JURISDICTIONAL DITCH
	100 YR 100 YEAR FLOOD LINE
	OHW ORDINARY HIGH WATER LINE
	EXISTING CULVERT
	WB WETLAND BOUNDARY
	WETLAND BUFFER
	WETLAND

IMPACT QUANTITIES

ACRES			
WATERBODY	FID. BAY	TOTALS	IMPACT LEGEND
PERM. BUFFER IMPACT	0.18	0.18	
TEMP. BUFFER IMPACT	0.04	0.04	

GENERAL NOTES:

- 2) TEMPORARY IMPACTS ARE CALCULATED
5 FEET FROM CUT/FILL LINES.



PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

COUNTY:	SRAST
NEAR:	ANACORTES

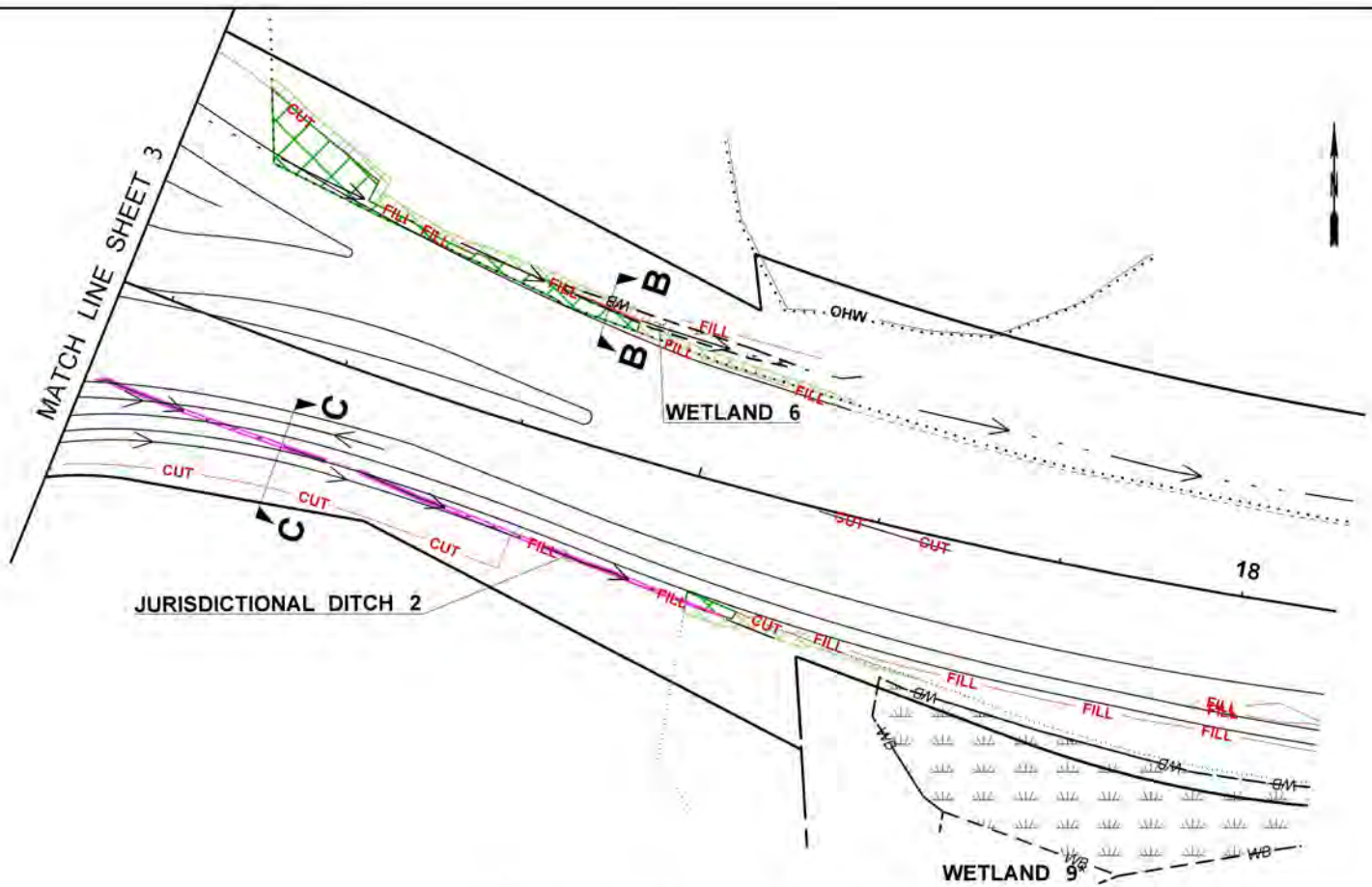
WATER BODY: FIDALGO BAY

DATE: JUNE 2017



Washington State
Department of Transportation

SHEET: 3 OF: 10



NOTE: B-B LOCATED ON SHEET 7.
C-C LOCATED ON SHEET 8.

* WETLAND EXTENDS
OFF SITE

WETLAND QUANTITIES

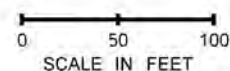
	ACRES			
WETLAND #	6	9	TOTALS	
DOE CATEGORY	III	III		IMPACT LEGEND
WETLAND AREA	0.01	~1.15	~1.16	
PERM. WETLAND IMPACT	< 0.01	< 0.01	< 0.01	
TEMP. WETLAND IMPACT	< 0.01	0.01	0.01	
PERM. WETLAND BUFFER IMPACT	0.06	< 0.01	0.06	
TEMP. WETLAND BUFFER IMPACT	0.04	0.02	0.06	

JURISDICTIONAL DITCH QUANTITIES

	CUBIC YARD (SQUARE FEET)		
DITCH #	2		IMPACT LEGEND
DITCH VOLUME	2.32 (743)		
PERM. DITCH IMPACT	1.92 (624)		

GENERAL NOTES:

- 2) TEMPORARY IMPACTS ARE CALCULATED 5 FEET FROM CUT/FILL LINES.
- 3) SEE SHEET 3 FOR LEGEND.



PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

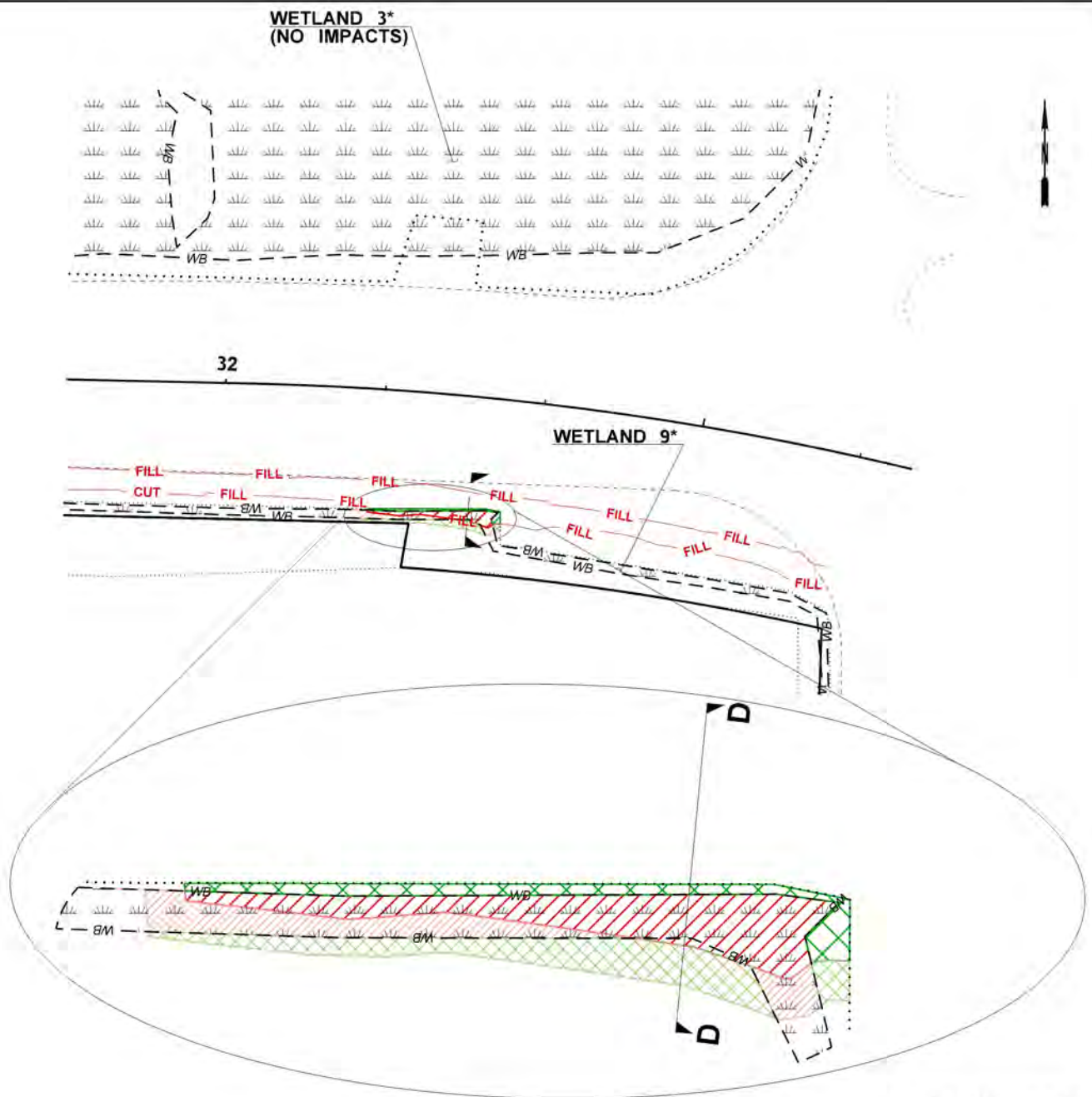
WATER BODY: FIDALGO BAY

DATE: JUNE 2017



Washington State
Department of Transportation

SHEET: 4 OF: 10



NOTE: D-D LOCATED ON SHEET 8.

* WETLAND EXTENDS OFF SITE

GENERAL NOTES:

- 2) TEMPORARY IMPACTS ARE CALCULATED
5 FEET FROM CUT/FILL LINES.
3) SEE SHEET 3 FOR LEGEND.

WETLAND QUANTITIES
ACRES

WETLAND #	9	
DOE CATEGORY	III	IMPACT LEGEND
WETLAND AREA	~1.15	
PERM. WETLAND IMPACT	< 0.01	
TEMP. WETLAND IMPACT	0.01	
PERM. WETLAND BUFFER IMPACT	< 0.01	
TEMP. WETLAND BUFFER IMPACT	0.02	

PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS:SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

COUNTY:	SRAST
NEAR:	ANACORTES

WATER BODY: FIDALGO BAY

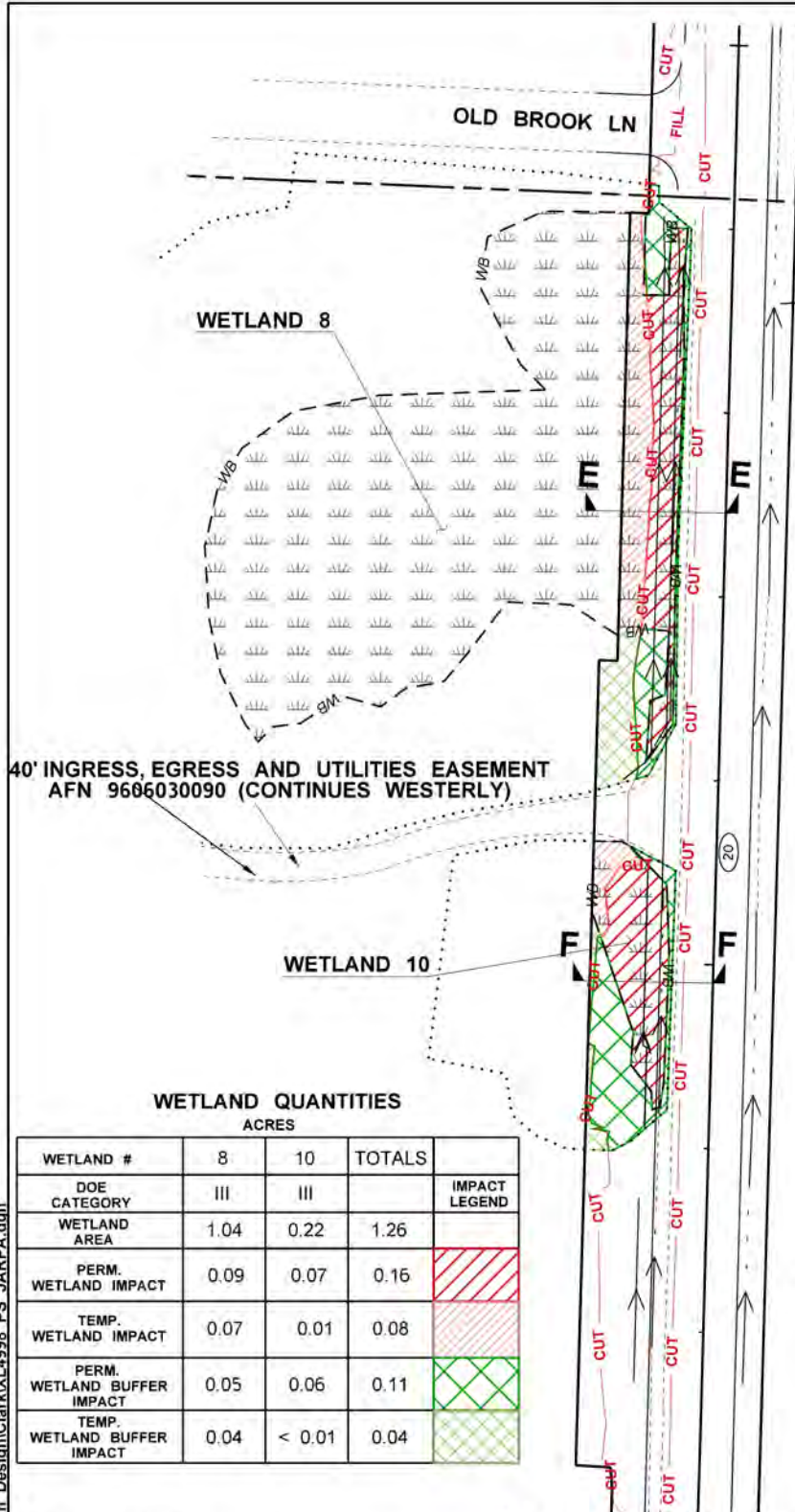
DATE: JUNE 2017



Washington State
Department of Transportation

SHEET: 5 OF: 10

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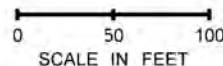
WETLAND QUANTITIES
ACRES

WETLAND #	8	10	TOTALS	IMPACT LEGEND
DOE CATEGORY	III	III		
WETLAND AREA	1.04	0.22	1.26	
PERM. WETLAND IMPACT	0.09	0.07	0.16	
TEMP. WETLAND IMPACT	0.07	0.01	0.08	
PERM. WETLAND BUFFER IMPACT	0.05	0.06	0.11	
TEMP. WETLAND BUFFER IMPACT	0.04	< 0.01	0.04	

GENERAL NOTES:

- 1) TEMPORARY IMPACTS ARE CALCULATED TO NEW RIGHT OF WAY LINE.
- 3) SEE SHEET 3 FOR LEGEND.

MATCH LINE THIS SHEET



MATCH LINE THIS SHEET

JURISDICTIONAL DITCH 1

NOTE:

- E-E LOCATED ON SHEET 9.
F-F LOCATED ON SHEET 9.
G-G LOCATED ON SHEET 10.

JURISDICTIONAL DITCH QUANTITIES
CUBIC YARD (SQUARE FEET)

DITCH #	1	IMPACT LEGEND
DITCH VOLUME	6.85 (1111)	
PERM. DITCH IMPACT	6.85 (1111)	

PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

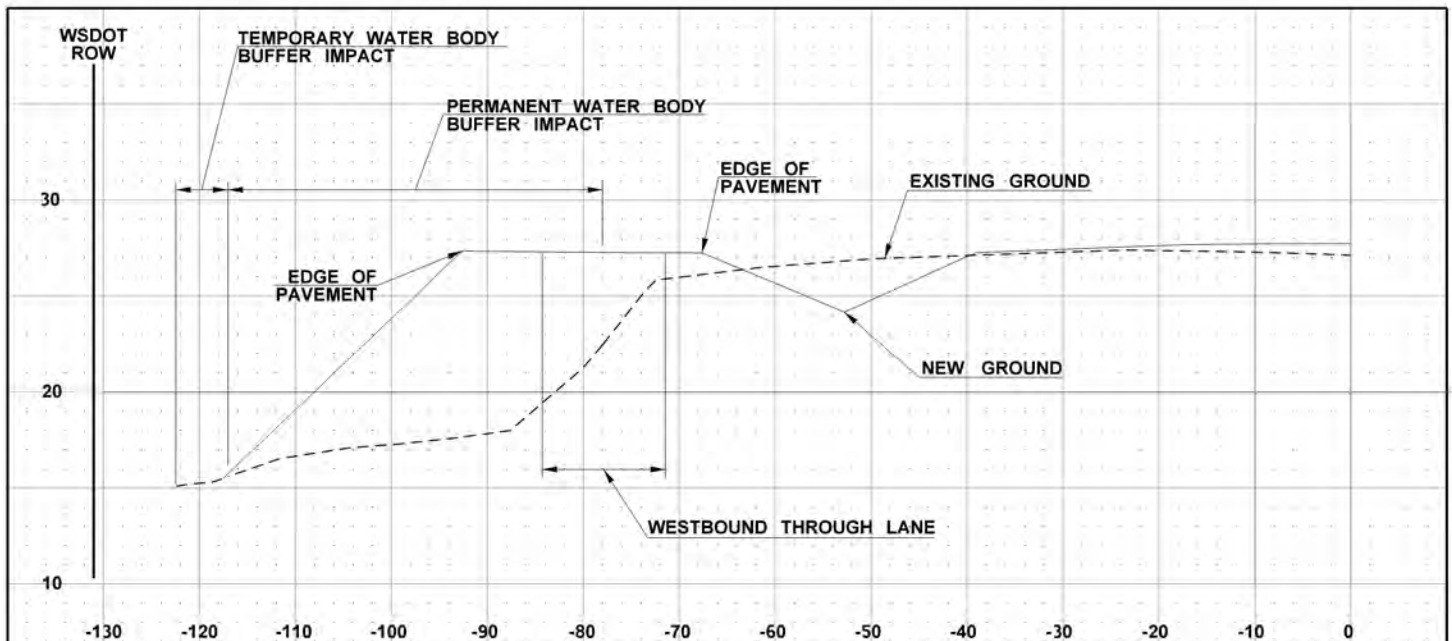
WATER BODY: FIDALGO BAY

DATE: JUNE 2017

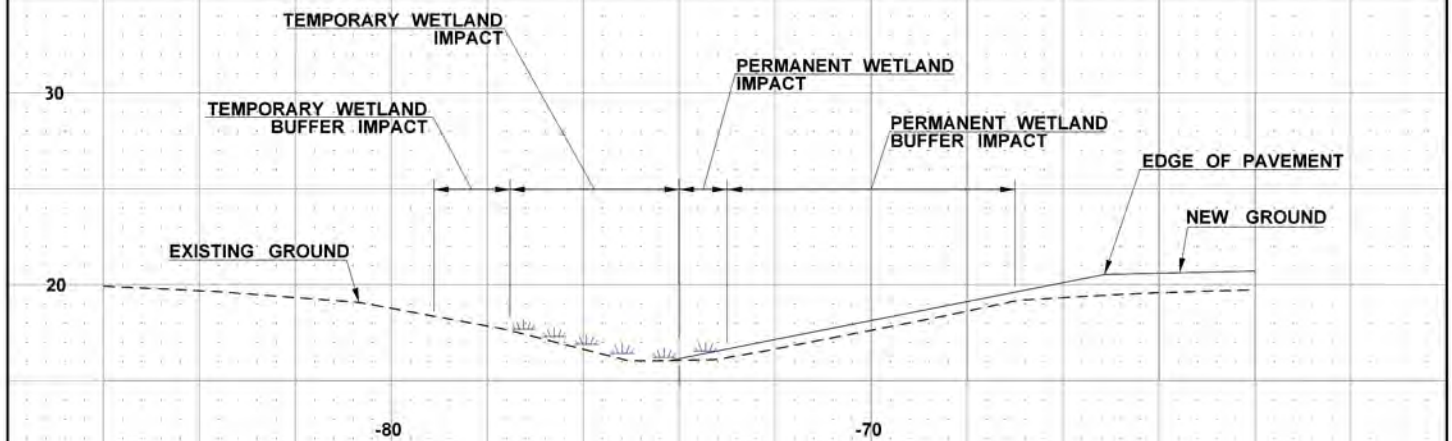


**Washington State
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SHEET: 6 OF: 10



**SECTION A-A
SEE SHEET 3**



**SECTION B-B
SEE SHEET 4**



PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

WATER BODY: FIDALGO BAY

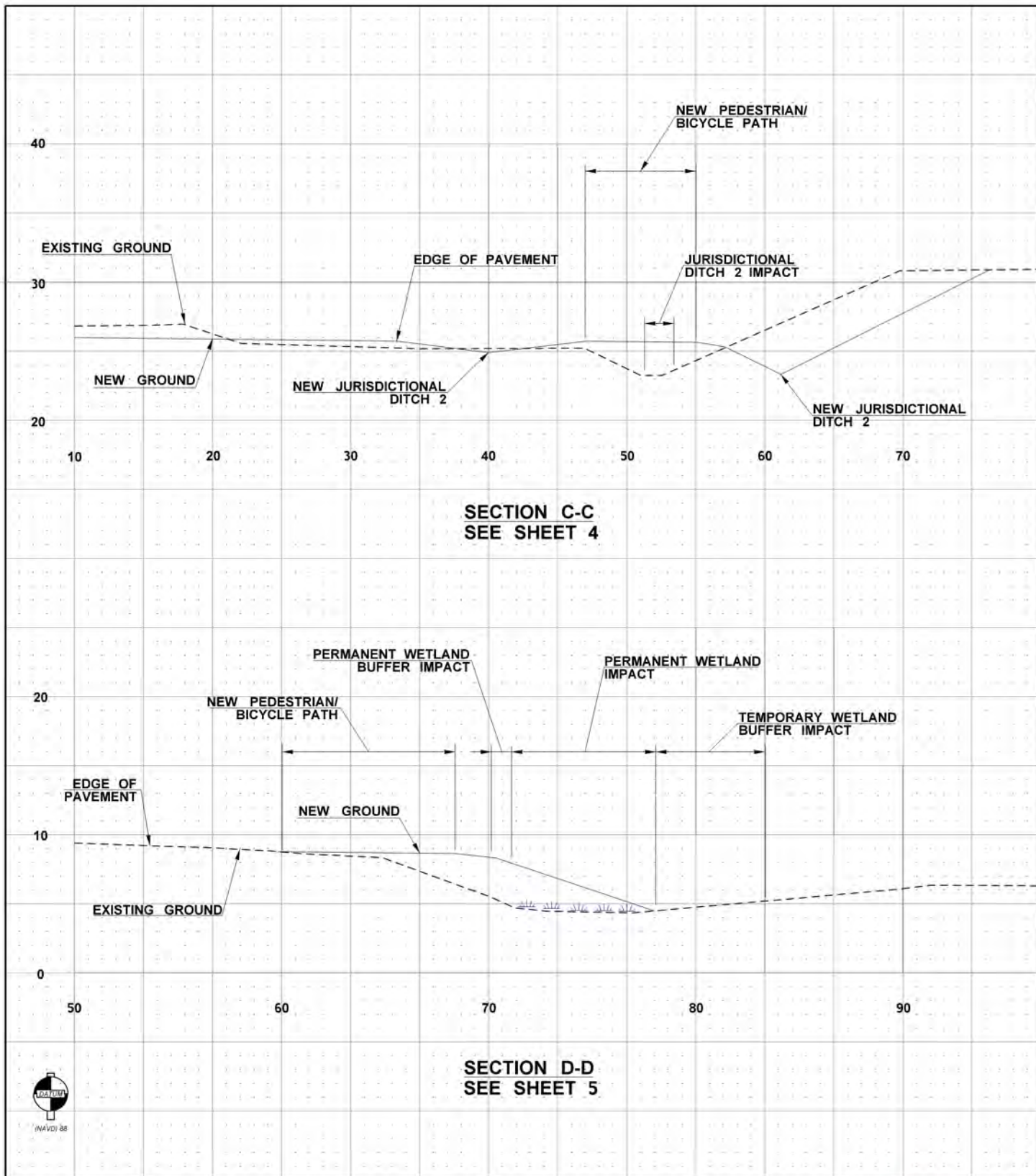
DATE: JUNE 2017



**Washington State
Department of Transportation**

SHEET: 7 OF: 10

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PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

WATER BODY: FIDALGO BAY

DATE: JUNE 2017

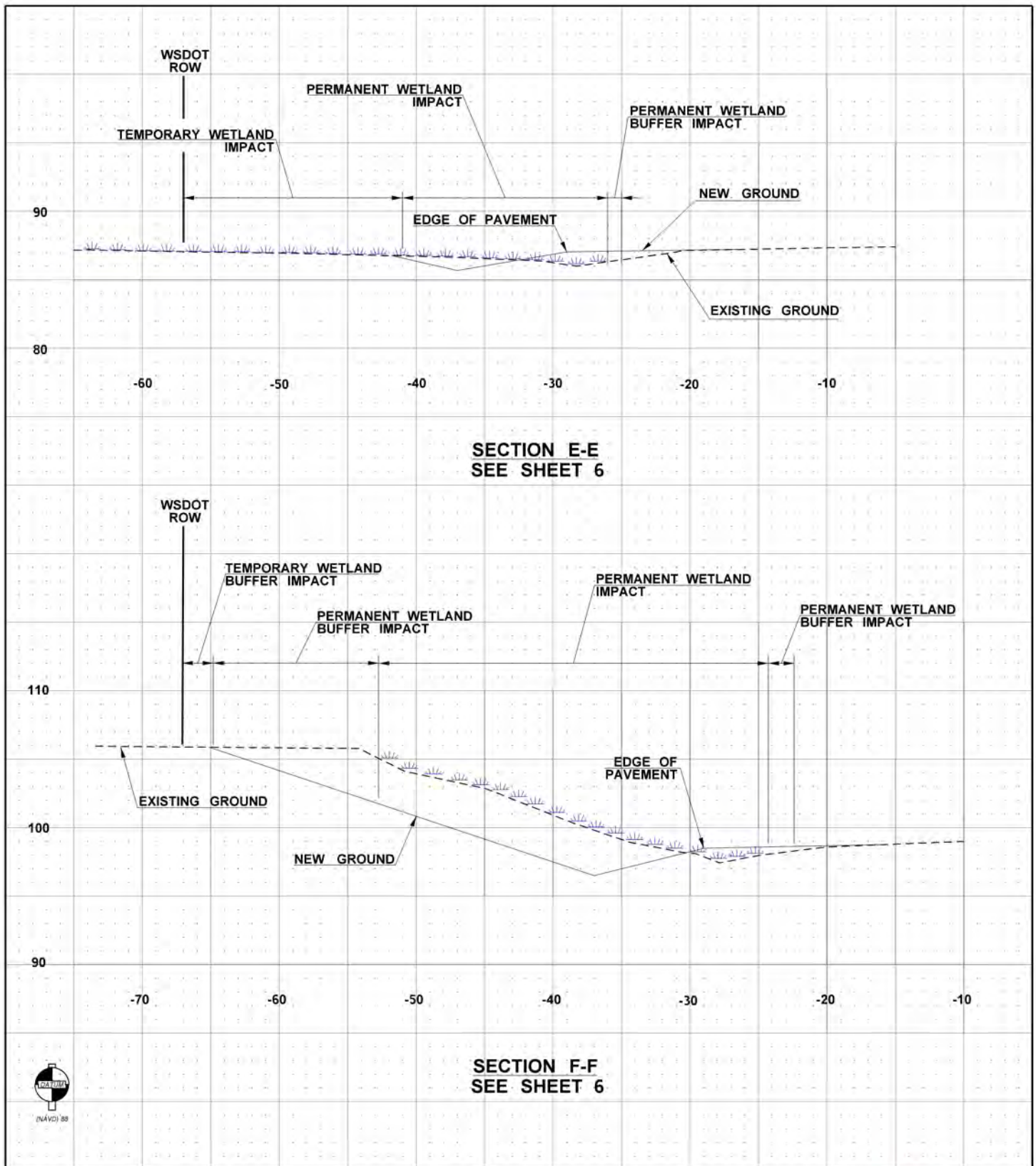


Washington State
Department of Transportation

SHEET: 8

OF: 10

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PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

WATER BODY: FIDALGO BAY

DATE: JUNE 2017

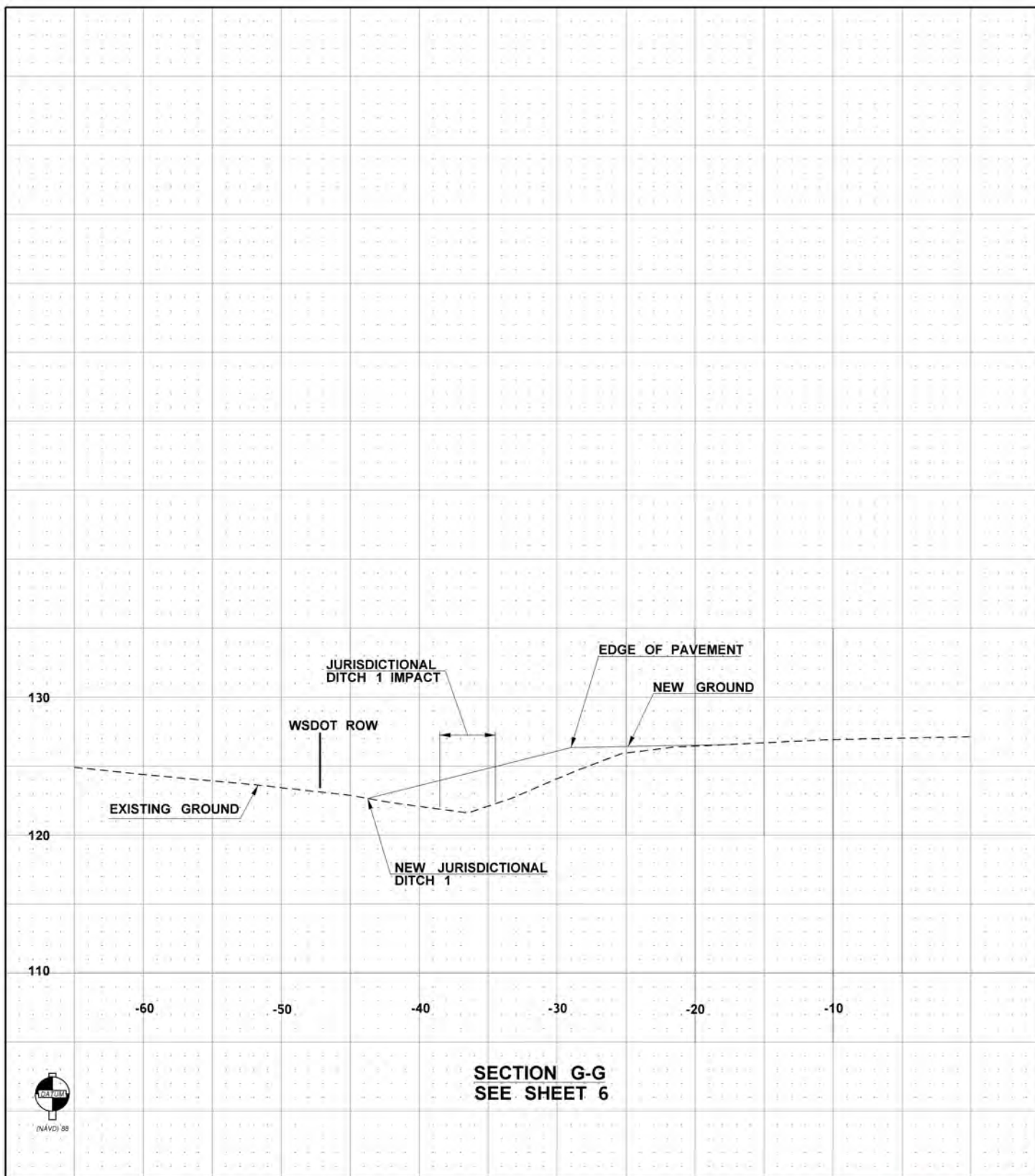


Washington State
Department of Transportation

SHEET: 9

OF: 10

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PROJECT NAME: SR 20 SHARPES CORNER VICINITY IMPROVEMENTS

PURPOSE: MITIGATE TRAFFIC BUILDUPS

PROPOSED: MULTILANE ROUNDABOUT

LOCATION: SR 20 MP 47.04 TO MP 48.40

DATUM: HORIZONTAL: PROJECT VERTICAL: NAVD 88

ADJACENT PROPERTY OWNERS: SEE LIST PROVIDED IN APPLICATION

REFERENCE: NWS-2017-519

APPLICANT: WSDOT

COUNTY: SKAGIT

NEAR: ANACORTES

WATER BODY: FIDALGO BAY

DATE: JUNE 2017



Washington State
Department of Transportation

SHEET: 10

OF: 10

State Route (SR) 9 Sharpes Corner Improvements Project

Project Description

Project Purpose

The purpose of this project is to improve safety and relieve congestion at the SR 20/SR 20 Spur Interchange (referred to as Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd. /Gibraltar Road intersection for a southbound truck-climbing lane, converting the SR 20/Miller Rd. /Gibraltar intersection into a multi-lane roundabout, and providing a pedestrian path between Sharpes Corner and March Point Road.

The roundabout is designed to be long-term remedy to improving safety by reducing traffic speed and improving traffic flow.

Project Description

Work includes right of way acquisition, traffic control, relocation of utilities (above and belowground), erosion control, clearing and grubbing, excavation and fill, paving and, pavement marking, illumination, signing, and landscaping.

Right of Way & Construction Easements

WSDOT will acquire portions of nine separate parcels for conversion to State right of way.

Temporary Traffic Control and Detours

During construction, temporary traffic control and construction signage will be required to alert the public traveling through the project areas. Emergency services, schools, and transit services will be notified of traffic control prior to the start of construction, and emergency vehicles will be given the highest priority during traffic-controlled events.

There are no detours associated with this project.

Best Management Practices (BMPs)

During construction, the contractor will be required to adhere to a Temporary Erosion and Sediment Control (TESC) plan and use appropriate Best Management Practices

(BMPs) as described in the Highway Runoff Manual.

Temporary BMPs would include, but not be limited to, geotextile silt fence, erosion control blanket, straw wattles.

Utility Relocations

This project has gas, water, communication lines, and electrical lines within the existing and proposed right of way. All utilities will require some form of relocation and/or adjustment.

Excavation and Fill

The project will require approximately 15,180 Cubic Yards (CY) of excavation and 6,140 CY of fill will be required to construct the intersection improvement. Quantities include pavement, crush surfacing base course, and select borrow. *See Excavation Depths and Ground Disturbing Activates Exhibit.*

Stormwater

To enhance treatment of runoff from SR 20, runoff will flow through Compost Amended Vegetated Filter Strips which will be installed in multiple locations throughout the project. A small Infiltration Pond will be installed north of the new Miller/Gibraltar roundabout to provide flow control. New Storm Sewer facilities in the form of grate inlets, catch basins and storm sewer pipe will be installed, directing runoff to existing discharge and outfall locations. Existing drainage patterns will be maintained wherever possible, with some new roadside ditches connecting to the existing system or being relocated slightly to accommodate widening. Existing outfalls will be maintained.

Discipline Study Findings

Wetland Assessment and Mitigation

WSDOT biologists delineated wetlands and streams according to local, state, and federal guidelines within the project limits. Eleven wetlands were identified by WSDOT biologists. Buffers within the project area have been paved, developed, mowed and/or landscaped; therefore, wetland buffer functions have been significantly reduced.

WSDOT has avoided and minimized impacts to the wetland and its buffer to the greatest extent practicable, however, total avoidance of the wetland buffer was not possible. This project will have permanent wetland impacts of 0.17 acre (7,405 SF), and temporary wetland impacts of 0.09 acre (3,920 SF). This project will have permanent buffer impacts of 0.18 acre (7,841 SF), and temporarily buffer impacts of 0.11 acre (4,356 SF).

To mitigate for unavoidable wetland impacts, WSDOT proposes replacing impacted wetland acreage and functions at the Fidalgo Bay Mitigation Site. Permanent buffer impacts will be mitigated with on-site buffer restoration and a functioning buffer on the Fidalgo Bay Mitigation Site. Temporary wetland buffer impacts mostly occur to maintained herbaceous vegetation while temporary Fidalgo Bay buffer impacts occur to both maintained herbaceous and native tree and shrub vegetation. All temporary wetland and buffer impacts will be restored on-site with native vegetation.

Cultural Resources – No Historic Properties Affected

A Cultural Resource Survey and Report completed in August of 2013 found no historic properties within the area of potential effects not eligible for inclusion in the national register, and determined no historic property's would be affected.

The State Historic Preservation Office (SHPO) agreed with the finding and provided concurrence on 09/20/2013.

Endangered Species Act

Listed species that may occur in the general vicinity of the project include Puget Sound Chinook, Puget Sound steelhead, yellow eye rockfish, canary rockfish, Boccaccio rockfish, southern resident killer whale, bull trout, marbled murrelet, streaked horned lark, western yellow-billed cuckoo, and Canada lynx.

Based on the effects and exposure analyses and implementation of all impact and avoidance and minimization measures, the biological assessments concluded that the project activities "May Affect, but are Not Likely to Adversely Affect" bull trout and bull trout critical habitat, steelhead, Chinook salmon and critical habitat, rockfish and rockfish critical habitat, southern resident killer whale critical habitat, and marbled murrelet. A "No Effect" determination was made for streaked horned lark, western yellow-billed cuckoo, and Canada lynx.

Hazardous Materials

A search of Ecology's Facility Site Atlas found 15 documented contaminated sites within 0.5 mile the project footprint. A National Priority List Site (Shell Opus Puget Sound Refinery) exists within one mile. The sites included a hazardous waste generator, underground storage tanks (UST), leaking underground storage tanks (LUST), emergency hazardous material tier 2 chemical reports, local source control, construction stormwater general permit, independent cleanups, a landfill, sand and gravel pit, a non-enforcement final, a 401 coastal zone management project site, a 401 coastal zone mitigation site, and an enforcement action.

A hazardous materials specialist accompanied the geotechnical drill crew in January 2017 during borings by the existing Chevron gas station and Sharpes Corner to assess if contamination still

exists and/or is migrating towards the project area. The two boring locations adjacent to and just down-gradient from the existing Chevron did not warrant sampling as no indication of contamination was observed. The boring holes at the corner of SR 20 and Sharpes Corner were not able to be drilled.

Although documentation exists that the two USTs have been removed as well as completed remedial activities, there is a low to moderate potential to encounter petroleum hydrocarbons and heating oil contamination in the soil. WSDOT will employ visual and olfactory screening of excavated material during construction of this project.

State Route (SR) 20 Sharpes Corner Interchange Improvements Project

Site Description

Environmental Setting

The project is located just south of Fidalgo Bay in the central portion of Fidalgo Island, in both the City of Anacortes and Unincorporated Skagit County. The project area lies within the Puget Sound basin, a formerly glaciated area that is now partially submerged and depressed. Water resources in the project area drain north to Fidalgo Bay. The project lies in the lower Skagit River Water Resource Inventory Area. There are no major streams flowing into Fidalgo Bay.

Aqua Creek is located just west of Sharpe's Corner, originating southwest of Fidalgo Bay Road on the hill slope at about 400 ft. elevation. The stream flows below Fidalgo Bay road through a culvert into an estuarine wetland and then through another culvert under SR 20 into Fidalgo Bay. On-site investigation found sculpin species present in the stream.

Shoreline modification in Fidalgo Bay (rip-rap and dikes) and corresponding disruption of sediment and nutrient transport processes and riparian vegetation removal were identified in a limiting factors analysis as contributing to loss of forage fish spawning areas. The Skagit Delta has experienced significant loss of intertidal habitat due to dikes and tide gates. Endangered Species Act listed fish and marine mammal species that may occur in the general vicinity of the project area include Puget Sound Chinook, Puget Sound steelhead, yellow eye rockfish, canary rockfish, Boccaccio rockfish, and southern resident killer whale.

The project area lies within the western hemlock vegetation zone of western Washington, where undeveloped, upland forested areas consist of big-leaf maples, Douglas firs, western hemlocks, western red cedars, beaked hazelnut, Himalayan blackberry, oso-berry, and salmonberry. Species common in wetland areas include red alder, willow, salmonberry, cattail, horsetail, reed canarygrass, soft rush, and bentgrasses. Endangered Species Act listed terrestrial species that may occur in the general vicinity of the project include marbled murrelet, streaked horned lark, western yellow-billed cuckoo, and Canada lynx.

Habitat conditions for terrestrial species within the project area are primarily mixed forested areas to the south west and wetland plant communities associated with Whistle Lake. Wildlife to be expected includes beaver, coyote, muskrat, black-tailed deer, and a variety of small mammals, raptors, passerine birds, reptiles, and waterfowl. Bald eagles perch on suitable-sized trees along the riparian corridors and feed on salmon. The project area contains 11 delineated wetlands.

Surrounding Land Use

Current use of the adjacent properties includes residential and commercial areas, recreational areas including Swinomish Golf Links, and the Fernhill cemetery. Most of the work will occur within the Washington State Department of Transportation (WSDOT) right-of-way. WSDOT will purchase parts of nine parcels to convert to State right-of-way. Highway 20 is an important transportation corridor that provides freight mobility and access to the local community of Anacortes.

DETERMINATION OF NONSIGNIFICANCE (DNS)

Project title: State Route (SR) 20/Sharpes Corner Vicinity - Improvement

Description of proposal: The Washington State Department of Transportation (WSDOT) proposes to improve safety and relieve congestion at the SR 20/SR 20 Spur Interchange (referred to as Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd. /Gibraltar Road intersection for a southbound truck-climbing lane, converting the SR 20/Miller Rd. /Gibraltar intersection into a multi-lane roundabout, and providing a pedestrian path between Sharpes Corner and March Point Road.

Work includes right of way acquisition, traffic control, relocation of utilities (above and belowground), erosion control, clearing and grubbing, excavation and fill, paving and, pavement marking, illumination, signing, and landscaping.

Proponent: WSDOT

Location of proposal, including street address, if any: This project is located on SR 20 between Milepost (MP) 47.04 and 48.40, and SR 20 Spur between MP 47.58 and 48.40. The project limits are within Sections 5 and 8, of Township 34 North, Range 2 East, Willamette Meridian, in Skagit County.

Lead Agency: Washington State Department of Transportation

The lead agency for this proposal has determined that it does not have a significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of the completed Environmental Checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date of issuance. Comments must be submitted by June 29, 2017.

Responsible Official: Cameron Kukes

Position/Title: Regional Environmental Programs Manager

Address: P.O. Box 330310, Seattle, WA 98133-9710

Phone: (206) 440-4548

Date: 6/13/2017

Signature: 

ENVIRONMENTAL CHECKLIST
STATE ENVIRONMENTAL POLICY ACT (SEPA), CHAPTER 43.21C

The State Environmental Policy Act (SEPA), Chapter 43.21C requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. The purpose of this checklist is to provide the information to help you and the agency identify impacts for your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an Environmental Impact Statement is required. The checklist questions apply to all parts of the proposal, even if they are planned over a period of time. Attach any additional information that will help describe the proposal or its environmental effects. Be prepared to explain answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

A. BACKGROUND

1. Name of proposed project, if applicable:

State Route (SR) 20/Sharpes Corner Vicinity – Improvements

2. Name of applicant:

Washington State Department of Transportation (WSDOT)

3. Address and phone number of applicant and contact person:

**WSDOT
NW Region
15700 Dayton Ave North
P.O. Box 330310
Seattle, WA 98133-9710**

Contact person: **Kevin D. Stuber** Phone: **(360) 757-5994**

4. Date checklist was prepared: **June 14, 2017**

5. Agency requesting checklist: **WSDOT**

6. Proposed timing or schedule (including phasing, if applicable):

This project will be advertised in October of 2017. Construction will occur between March and September of 2018. Planting and plant establishment will continue for three years after final construction.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Endangered Species Act (ESA) Programmatic Biological Assessment (PBA) (WSDOT, 10/28/16)
Wetland and Stream Assessment (WSDOT 12/19/16)
Wetland and Buffer Mitigation Report (WSDOT 3/24/17)
Section 106 Cultural Resource Survey (Eastern Washington University, 8/23/13)
Hazardous Materials Analysis (WSDOT, 4/27/17)
Hydraulic Report (WSDOT)
Temporary Erosion and Sediment Control (TESC) Plan
Spill Prevention Control and Countermeasure Plan (SPCC Plan)

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None identified.

10. List any government approvals or permits that will be needed for your proposal, if known.

USFWS ESA Concurrence (4/12/16)
DAHP Section 106 Concurrence 9/30/03
Section 404 USACE NW Permit
Section 401 Ecology
Section 402 Construction Stormwater General Permit
Shoreline Substantial Development Permit
Shoreline Conditional Use Permit
Shoreline Variance
Critical Area Ordinance Review
Noise Variance/Exemption

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

WSDOT proposes to improve safety and relieve congestion at the SR 20/SR 20 Spur Interchange (referred to as Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd./Gibraltar Road intersection for a southbound truck-climbing lane, converting the SR 20/Miller Rd./Gibraltar intersection into a multi-lane roundabout, and providing a pedestrian path between Sharpes Corner and March Point Road.

Work includes right of way acquisition, traffic control, relocation of utilities (above and belowground), erosion control, clearing and grubbing, excavation and fill, paving and, pavement marking, illumination, signing, and landscaping.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

This project is located on SR 20 between Milepost (MP) 47.04 and 48.40, and SR 20 Spur between MP 47.58 and 48.40. The project limits are within Sections 5 and 8, of Township 34 North, Range 2 East, Willamette Meridian, in Skagit County.

B. ENVIRONMENTAL ELEMENTS

1. Earth

- a. General description of the site: (Flat, rolling, hilly, steep slopes, mountainous, other)

Flat to rolling.

- b. What is the steepest slope on the site (approximate percent slope)?

The steepest slopes within the project limits are approximately 50 percent.

- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

SR 20 south of Sharpes Corner soils are mapped La Conner very gravelly loamy sand, deep, and moderately well drained.

SR 20 Spur to Anacortes soils are mapped Coveland gravelly loam, very deep and somewhat poorly drained.

SR 20 Sharpes Corner soils are mapped tidal hydraquents, consisting of deep, poorly drained soils occurring in tidelands.

This project will not affect agricultural land.

- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

No.

- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

The purpose of excavation and fill is to remove the existing roadway and reconfigure the SR 20 Sharpes Corner intersection into a roundabout, conversion of the southbound truck climbing shoulder into a truck climbing lane, and conversion of the SR 20/Miller-Gibraltar intersection into a roundabout.

Excavated materials will consist of asphalt, crushed surfacing base course, gravel borrow, and existing soils. Fill materials will consist of gravel borrow, crushed surfacing base course, asphalt, and soil for planting and landscaping.

The total affected area, approximately 12.98 acres, will require approximately 15,180 Cubic Yards (CY) of excavation and 6,140 CY of fill.

All materials will be provided by, and disposed of at a WSDOT approved source or site.

- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes. Erosion is always a possibility during earth disturbing activities that include clearing and grubbing, grading, or other miscellaneous work.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Approximately 40 percent (from right of way to right of way).

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

During construction, a TESC plan will be used to guide the implementation of Best Management Practices (BMPs) designed to minimize the possibility of sediments or construction related contaminants leaving the site.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

During construction, there will be a temporary increase in dust particles and engine emissions. Air quality will return to pre-construction levels when the project is complete.

By eliminating the stopping configuration, the intersections could see a reduction of carbon emissions by 30 to 60 percent.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

During construction, the contractor will be required to use modern construction practices and adhere to all applicable federal, state, and local air quality regulations. These regulations cover temporary construction conditions such as dust, smoke, and emissions.

WSDOT has implemented a "No Idle Policy" to avoid operating engines unnecessarily and to reduce pollutants.

3. Water

- a. Surface Water:

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

WSDOT identified and delineated eleven wetlands, two streams, and two jurisdictional ditches within the project area, and one water body adjacent to the project limits. They are as follows:

Wetland 1 is a Category III, Palustrine emergent (PEM), depressional outflow wetland approximately 0.04 acre in size. No discernable outlet was found.

Wetland 2 is a Category III, PEM, depressional outflow wetland approximately 0.03 acre in size. Wetland 2 outflows through a culvert into a detention pond and into Wetland 4.

Wetland 3 (WSDOT-Owned Fidalgo Bay Mitigation Site) is a Category III, Palustrine Scrub/Shrub (PSS)/PEM, depressional wetland approximately 5.15 acres in size. Wetland outlets on the west side of the mitigation site to Fidalgo Bay.

Wetland 4 is a Category III, PEM, depressional outflow wetland approximately 0.06 acre in size. Water flows west through rock-lined ditches and eventually into Wetland 5.

Wetland 5 is a Category I, Estuarine Emergent (EEM) Saltwater tidal fringe wetland approximately 1.38 acres in size and is associated with Fidalgo Bay. Wetland 5 receives water from Aqua Creek, stormwater culverts, and tidal inundation.

Wetland 6 is a Category III, PEM, depressional outflow wetland approximately 0.01 acre in size. During extreme storm events, water flows east through a roadside ditch and into Wetland 7.

Wetland 7 is a Category III, PEM, depressional outflow wetland approximately 0.07 acre in size. During extreme storm events, water flows east through a roadside ditch and into Wetland 3.

Wetland 8 is a Category III, Palustrine Forested (PFO)/PSS/PEM, slope wetland approximately 1.04 acres in size. Wetland outlets to a stormwater ditch and eventually into Fidalgo Bay.

Wetland 9 is a Category III, PEM/PSS, depressional outflow wetland approximately 1.15 acres in size. Water flows from the wetland via a regulated pump house directly into Fidalgo Bay.

Wetland 10 is a Category III, PFO/PEM, slope wetland approximately 0.22 acre in size. Wetland outlets to a roadside ditch that flows north through Wetland 8 and eventually Fidalgo Bay.

Wetland 11 is a Category II, Estuarine Emergent (EEM), saltwater tidal fringe wetland approximately 0.10 acre in size and is associated with Fidalgo Bay.

Aqua Creek is a Type F (Fish Bearing) perennial stream that originates southwest of Fidalgo Bay Road. It flows under Fidalgo Bay Road into Wetland 5, then under SR 20 into Fidalgo Bay.

Unnamed stream is a non-fish bearing stream that originates south of the Swinomish Golf Links golf course. It flows through the golf course and into Wetland 9, then conveyed through a pump house/tide gate and into Fidalgo Bay.

Ditch 1 receives stormwater sheet flow from SR 20 and upslope development (graveyard to the west) and drains into Wetland 10. The ditch is approximately 560 feet in length, 0.3-feet in depth, and 2-feet in width.

Ditch 2 receives stormwater sheet flow from SR 20 and upslope development (parking lot) and drains into Wetland 9. The ditch is approximately 370-feet in length, 0.5-feet in depth, and 2-feet in width.

Fidalgo Bay is a 650-acre Aquatic Reserve managed by the Washington Department of Natural Resources. The Bay is a Category I Estuarine/marine, Saltwater tidal fringe/mudflat located along the northern boundary of the project.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Construction will occur within Wetlands 6, 8, 9, and 10, adjacent to Wetlands 1, 2, 3, 4, 5, 7, 11, within Jurisdictional Ditch 1 and 2, and adjacent to Fidalgo Bay.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

The following fill and/or excavation quantities are required to construct this project.

Wetland 6: 0.4 CY of fill and no excavation.

Wetland 8: 5 CY of fill and 194 CY of excavation.

Wetland 9: 18 CY of fill and no excavation.

Wetland 10: 15 CY of fill and 279 CY of excavation.

Ditch 1: Approximately 7 CY of fill.

Ditch 2: Approximately 2 CY of fill.

All materials will be provided by, and disposed of at a WSDOT approved source or site.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No.

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No.

b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

No. Water will not be withdrawn or discharged to groundwater.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Existing stormwater sheet flows off SR 20 onto vegetated side slopes where it disperses and infiltrates naturally, or into an existing drainage system that outfalls to Fidalgo Bay.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

Not as a result of this project.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

This project will maintain existing stormwater runoff patterns.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

This project will provide treatment for all new and replaced impervious surfaces (a total 1.28 acres). Treatment includes bioswales (basic and compost-amended), and vegetated filter strips (basic, narrow area, and compost amended), and a small detention pond at the south end of the project.

During construction, the contractor will be required to adhere to a TESC plan and use appropriate BMPs as described in the Highway Runoff Manual. Temporary BMPs would include, but not be limited to, geotextile silt fence, erosion control blanket, straw wattles, mulching, and stabilized construction entrances.

After construction, all disturbed areas will be landscaped/planted or reseeded with native vegetation.

4. Plants

a. Types of vegetation found on the site:

Indigenous species include Douglas fir, western red cedar, big-leaf maple, red alder, Pacific madrone, wild rose, salmonberry, willow, swordfern, yarrow, and vine maple. Introduced species include blackberry, Scotch broom, Queen Anne's lace, sweet pea, thistle, mullein, English ivy, and dandelion.

b. What kind and amount of vegetation will be removed or altered?

Construction will require clearing and grubbing approximately 2.6 acres of vegetation mostly comprised of maintained grasses and forbs. Of this total, approximately 0.9 acres is shrub vegetation.

c. List threatened and endangered species known to be on or near the site.

No threatened, endangered, or priority plant species or critical habitat are located on-site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Using native plant species, approximately 2.0 acres of landscaping/planting of disturbed areas will occur throughout the project limits.

- e. List all noxious weeds and invasive species known to be on or near the site.

Reed Canarygrass, Scotch broom, and Himalayan blackberry.

5. Animals

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site.

Species observed near the project area include bald eagles, crows, various small birds, shorebirds, and small mammals.

- b. List any threatened and endangered species known to be on or near the site.

Listed species that may occur in the general project vicinity include Bull trout, marbled murrelet, Canada Lynx, Streaked Horned Lark, and Western Yellow-billed Cuckoo.

- c. Is the site part of a migration route? If so, explain.

Unknown.

- d. Proposed measures to preserve or enhance wildlife, if any:

During construction, the project will have limited operating periods during the marbled murrelet-nesting season (April 1 to September 23) on SR 20 from MP 47.30 to 47.36.

Within suitable murrelet habitat, no daytime work will be allowed in the same area where night work will occur. Night construction work zones will be restricted to those areas a distance of 100 meters or greater from day construction work zones. Night construction activity, other than traffic control activities, will occur from one hour after sunset to one hour before sunrise from April 1 to September 23. This restriction would not apply to night time activities conducted between September 23 and April 1. Any blasting will occur prior to April 1.

- e. List any invasive animal species known to be on or near the site.

There are no known invasive animal species known to be on or near the project.

6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Illumination will require electricity.

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

WSDOT has implemented a “No Idle Policy” to avoid operating engines unnecessarily and to reduce pollutants.

7. Environmental health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No. However, the risk of an environmental incident is always present during construction. The contractor will be required to use standard construction methods and traffic control measures to minimize the risk of an incident.

- 1) Describe any known or possible contamination at the site from present or past uses.

There are no known or potentially contaminated sites within the proposed right of way.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

Hazardous materials analysis found no documented contaminated sites within the proposed project limits. Field investigation found no evidence of contamination, discoloration, or odor in the soil samples.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

During construction, refueling with petroleum products may occur within the project limits.

- 4) Describe special emergency services that might be required.

No special emergency services will be required on this project. However, in the unlikely event of an environmental incident, the contractor would be responsible to immediately implement the SPCC plan, notify the project engineer, and evaluate the incident.

- 5) Proposed measures to reduce or control environmental health hazards, if any:

Standard construction practices and safety measures will be required of the contractor when handling or storing toxic or hazardous materials.

If found, any hazardous materials will be handled in accordance with Environmental Protection Agency, Department of Ecology, and local health regulations. The contractor will also be required to submit a SPCC plan for approval and implement it during construction.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None.

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

During construction, which will occur during daylight and nighttime hours, noise levels may temporarily increase due to equipment use and construction activities. Upon completion, noise will return to pre-project levels.

- 3) Proposed measures to reduce or control noise impacts, if any:

The contractor will be required to adhere to all applicable federal, state, and local noise regulations.

Nighttime noise reduction measures includes, but may not be limited to, ambient sensitive backup warning devices or back-up observers for all equipment except dump trucks (WAC Chapter 296-115-610), prohibiting truck tailgate banging, bed liners for all trucks performing export haul, WSDOT approved noise mitigation shields, noise blankets, skirts for all stationary equipment such as light plants, generators, compressors and jackhammers.

8. Land and shoreline use

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

Currently, the site is state right of way. Adjacent properties are primarily commercial development with scattered rural residential, recreational, and open space land to the west, low density residential to the south, commercial and industrial development to the east, and Fidalgo Bay to the north. WSDOT will acquire portions of nine separate parcels for conversion to State right of way.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

No.

- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

Yes. During construction, traffic control will temporally affect businesses and freight operations.

- c. Describe any structures on the site.

There are no structures within the existing or proposed right of way.

- d. Will any structures be demolished? If so, what?

No.

- e. What is the current zoning classification of the site?

Currently, the site is state right of way of way and not subject to zoning. Properties adjacent to the project are zoned light manufacturing.

- f. What is the current comprehensive plan designation of the site?

SR 20 is designated a transportation corridor. Properties adjacent to the project are zoned light manufacturing.

- g. If applicable, what is the current shoreline master program designation of the site?

Conservancy.

- h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Yes. Anacortes and Skagit County classify wetlands, streams, buffers, and Fidalgo Bay as critical areas.

- i. Approximately how many people would reside or work in the completed project?

None.

- j. Approximately how many people would the completed project displace?

None.

- k. Proposed measures to avoid or reduce displacement impacts, if any:

None required.

- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

This project is compatible with existing and projected land uses in that it maintains essential transportation infrastructure while improving safety and traffic flow in the city of Anacortes and Skagit County.

- m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

This project is compatible with agricultural related uses by designing the roundabouts to accommodate large equipment and freight vehicles.

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not applicable.

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable.

- c. Proposed measures to reduce or control housing impacts, if any:

None required.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Not applicable. There are no proposed structures related to this project.

- b. What views in the immediate vicinity would be altered or obstructed?

Views from vehicles, as seen by the motorist, will be altered by the construction of the roundabouts, landscaping and roadside restoration.

- c. Proposed measures to reduce or control aesthetic impacts, if any:

All disturbed areas will be restored with native vegetation selected to blend with the surrounding highway corridor.

11. Light and glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

This project will require temporary and permanent lighting to support construction and post project safety during nighttime hours.

- b. Could light or glare from the finished project be a safety hazard or interfere with views?

No. Permanent lighting will not cause glare or interfere with views.

- c. What existing off-site sources of light or glare may affect your proposal?

No existing light sources were known or identified that would affect this project.

- d. Proposed measures to reduce or control light and glare impacts, if any:

This project will design lighting using veiling luminance standards that reduce glare while improving the visual perception of nighttime roadway conditions.

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?

There are no designated recreational uses located within the project limits. However, recreational activities that may occur in the general area include camping, golfing, bicycling, jogging, dog walking.

- b. Would the proposed project displace any existing recreational uses? If so, describe.

No.

- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

During construction, temporary traffic control and construction signage will be required to alert the public traveling through the project areas.

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

There are no buildings, structures, or sites within or adjacent to the proposed right of way, listed or eligible for listing in any preservation registers.

- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

A cultural resource survey performed and produced by the Archaeological and Historical Services of Eastern Washington University, found no resources noted above within the proposed project limits.

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

WSDOT, on behalf of the Federal Highway Administration, has consulted with the Department of Archaeology and Historic Preservation office, City of Anacortes, the Anacortes Museum, Skagit County Planning, the Skagit County Historical Society, the Swinomish Indian Tribal Community, the Samish Indian Nation, the Sauk-Suiattle Indian Tribe, the Lummi Nation, the Stillaguamish Indian Tribe, and the Tulalip Tribe.

Eastern Washington University cultural resources staff conducted a cultural resource survey of the Area of Potential Effect (APE), which included subsurface testing of areas within the APE that were likely to have ground disturbance.

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

None required. In the unlikely event cultural resources are identified during project construction, work in the immediate vicinity of the find would stop; a professional archaeologist would be contacted to assess the resource, and if necessary, contact the Department of Archaeology and Historic Preservation and concerned tribes.

An Unanticipated Discovery Plan (UDP) outlining the procedures to follow in accordance with state and federal laws will be prepared and kept on-site at all times.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

SR 20 services traffic traveling east and west through Skagit County from Interstate 5 to the city of Anacortes, and south to Whidbey Island.

Within the project limits, streets connecting with SR 20 include S. Fidalgo Bay Rd., March's Point Rd., Old Brook Lane, D Avenue, 11th Avenue, C Avenue, Miller Rd., and Gibraltar Rd.

No new accesses are planned for the existing street system.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

Yes. There are two transit stops within the project limits. They are both south of the Sharpes Corner interchange near The Corner Restaurant.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

No new parking spaces will be constructed and sixteen will be eliminated.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

Yes. Construction of the roundabouts and the southbound truck-climbing lane will improve state right of way.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

None. Traffic volumes will not change.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.

Yes. During construction, traffic control will temporarily affect business, and freight vehicle operations.

- h. Proposed measures to reduce or control transportation impacts, if any:

Temporary traffic control will be required for safety during construction.

15. Public services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

- b. Proposed measures to reduce or control direct impacts on public services, if any.

Emergency services, schools, and transit services will be notified of traffic control prior to the start of construction, and emergency vehicles will be given the highest priority during traffic-controlled events.

16. Utilities

- a. List the utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, or others.

This project has gas, water, communication lines, and electrical lines within the existing and proposed right of way.

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.

All utilities noted above will require some form of relocation and/or adjustment.

C. Signature

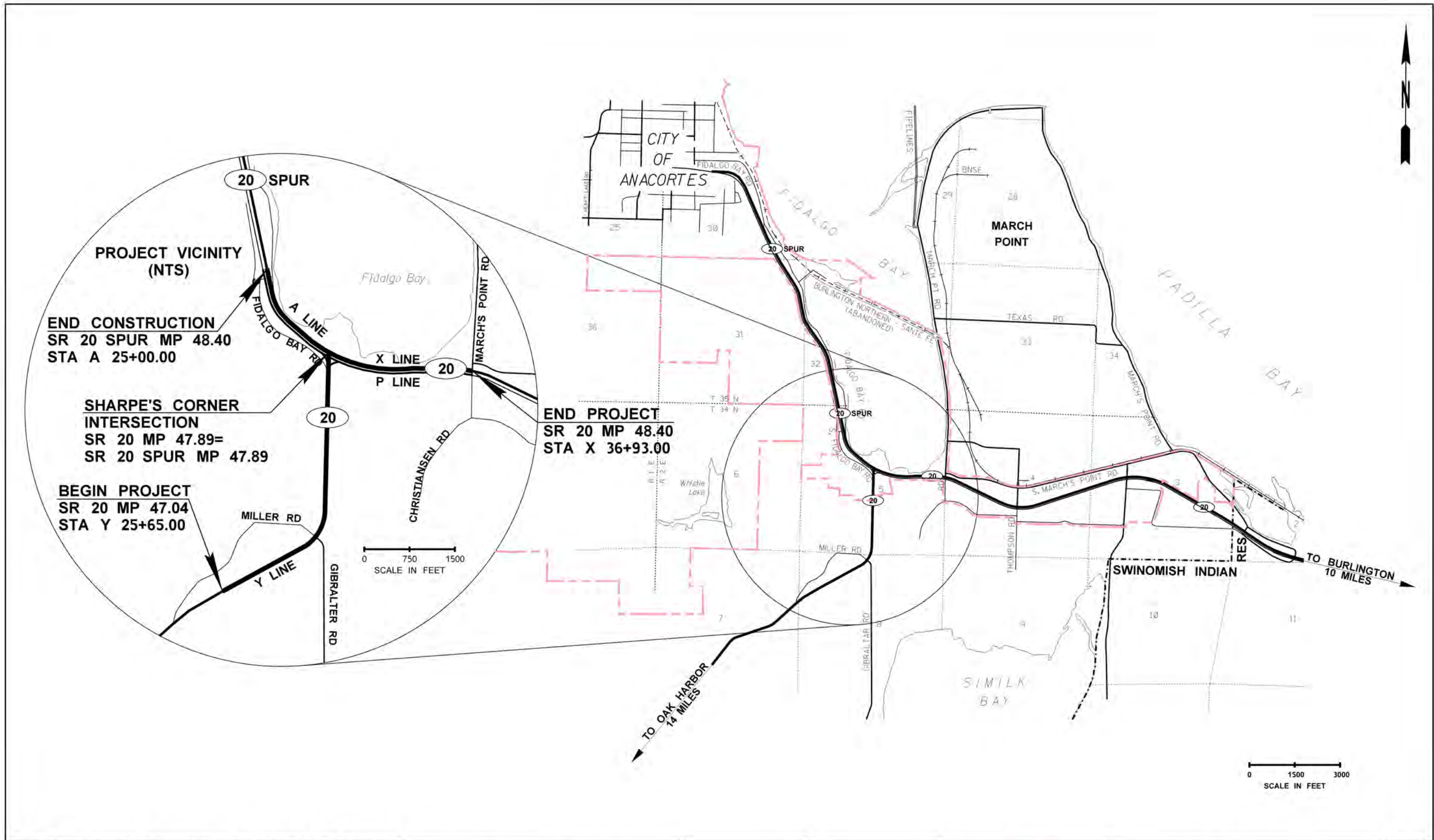
The above answers are true and complete to the best of my knowledge.

Signature:



Northwest Region – Mt Baker Area
Environmental Manager

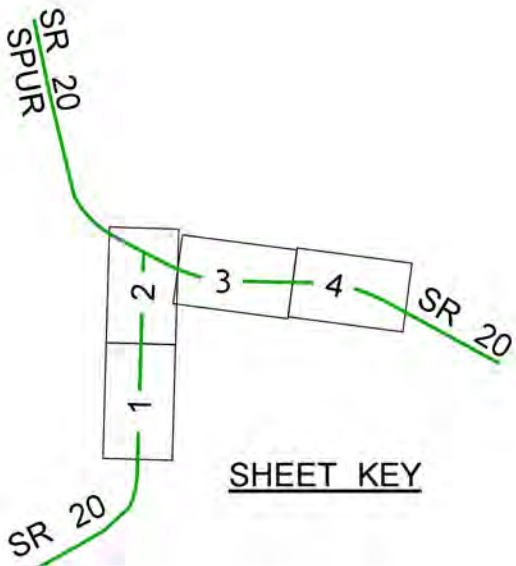
Date Submitted: June 13, 2017



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DATE		3/7/2017						10		WASH								SHEET 5 OF 5 SHEETS	
PLOTTED BY		GooAlbB																	
DESIGNED BY								JOB NUMBER				Washington State Department of Transportation		ENVIRONMENTAL IMPACTS					
ENTERED BY																			
CHECKED BY																			
PROJ. ENGR.								CONTRACT NO.		LOCATION NO.									
REGIONAL ADM.				REVISION		DATE		BY				DATE		DATE					
												P.E. STAMP BOX		P.E. STAMP BOX					

LEGEND

	EXISTING PAVEMENT
	EXIST. EDGE OF TRAVELLED WAY
	EXISTING DITCH
	EXISTING STORM SEWER LINE
	EXISTING ASPHALT DITCH
	WETLAND BOUNDARY
	MEAN HIGHER HIGH WATER MARK / ORDINARY HIGH WATER
	EXISTING CULVERT
	WETLAND BUFFER
	WSDOT LIMITED ACCESS
	EXISTING HIGHWAY RIGHT OF WAY
	NEW HIGHWAY RIGHT OF WAY
	PROPOSED ROUNDABOUT DESIGN



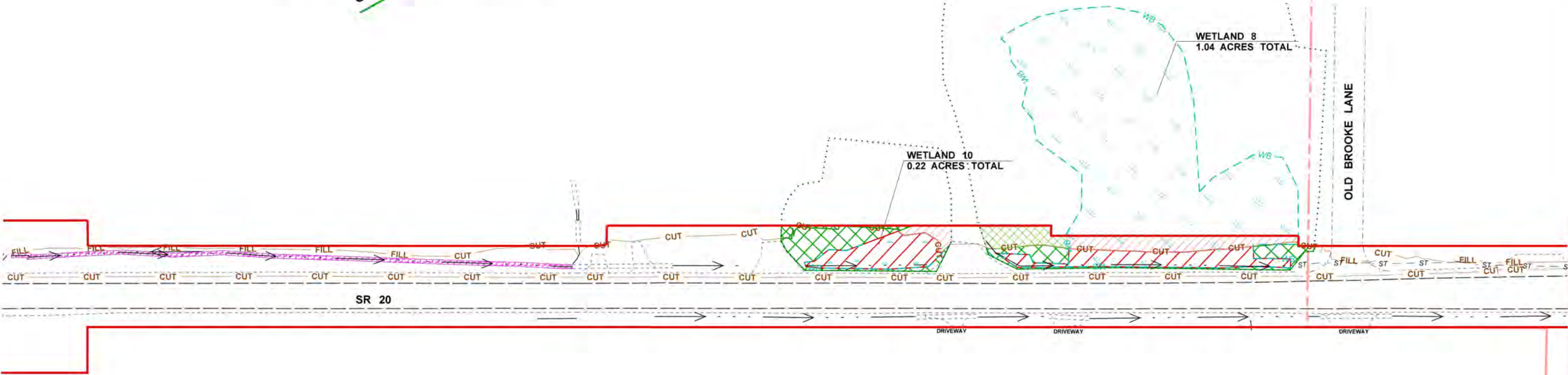
SHEET KEY

T.34N., R.2E., SEC.5, W.M.
48.4600° N 122.5821° W



SKAGIT COUNTY

CITY OF
ANACORTES



WETLAND QUANTITIES

ACRES

WETLAND #	8	10	TOTALS	IMPACT LEGEND
DOE CATEGORY	III	III		
WETLAND AREA	1.04	0.22	1.26	
PERM. WETLAND IMPACT	0.09	0.07	0.16	
TEMP. WETLAND IMPACT	0.07	0.01	0.08	
PERM. WETLAND BUFFER IMPACT	0.05	0.06	0.11	
TEMP. WETLAND BUFFER IMPACT	0.04	< 0.01	0.04	

JURISDICTIONAL DITCH QUANTITIES

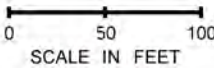
CUBIC YARD (SQUARE FEET)

DITCH #	1	IMPACT LEGEND
DITCH VOLUME	6.85 (1111)	
PERM. DITCH IMPACT	6.85 (1111)	

GENERAL NOTES:

1) TEMPORARY IMPACTS ARE CALCULATED TO NEW RIGHT OF WAY LINE.

WETLAND 8 & 10



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TIME 11:16:45 AM

DATE 3/22/2017

PLOTTED BY GooAibB

DESIGNED BY

ENTERED BY

CHECKED BY

PROJ. ENGR.

REGIONAL ADM.

REVISION

DATE

BY

REGION
NO.
10

STATE
WASH

JOB NUMBER

CONTRACT NO.

FED.AID PROJ.NO.

LOCATION NO.

P.E. STAMP BOX

DATE

P.E. STAMP BOX

DATE



Washington State
Department of Transportation

SR 20 & SR 20 SPUR
SHARPE'S CORNER
INTERSECTION IMPROVEMENT

ENVIRONMENTAL IMPACTS

Plot 11

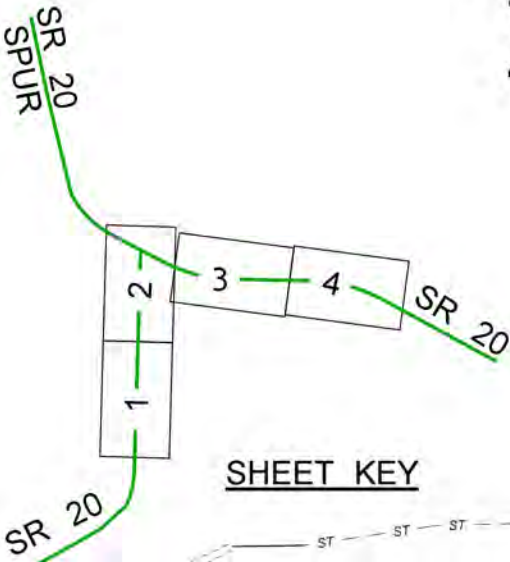
PLAN REF NO

SHEET
1
OF
5
SHEETS

LEGEND

- EXISTING PAVEMENT
- EXIST. EDGE OF TRAVELLED WAY
- EXISTING DITCH
- EXISTING STORM SEWER LINE
- EXISTING ASPHALT DITCH
- WETLAND BOUNDARY
- MEAN HIGHER HIGH WATER MARK / ORDINARY HIGH WATER
- EXISTING CULVERT
- WETLAND BUFFER
- WSDOT LIMITED ACCESS
- EXISTING HIGHWAY RIGHT OF WAY
- NEW HIGHWAY RIGHT OF WAY
- PROPOSED ROUNDABOUT DESIGN

T.34N., R.2E., SEC.5, W.M.
48.4635° N 122.5816° W



SHEET KEY

WETLAND 4
0.06 ACRES TOTAL

WETLAND 1
0.04 ACRES TOTAL

WETLAND 2
0.03 ACRES TOTAL

FIDALGO BAY

MHHW
OHW

FIDALGO BAY BUFFER

JURISDICTIONAL DITCH QUANTITIES
CUBIC YARD (SQUARE FEET)

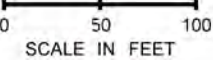
DITCH #	2	IMPACT LEGEND
DITCH VOLUME	2.32 (743)	
PERM. DITCH IMPACT	1.92 (624)	

IMPACT QUANTITIES
ACRES

WATERBODY	FID. BAY	TOTALS	IMPACT LEGEND
PERM. BUFFER IMPACT	0.18	0.18	
TEMP. BUFFER IMPACT	0.04	0.04	

GENERAL NOTES:
2) TEMPORARY IMPACTS ARE CALCULATED 5 FEET FROM CUT/FILL LINES.

WETLANDS 1, 2, 4



FILE NAME	T:\412354\XL4998_Sharpe\CAD\From_Design\Albert\XL4998_PS_WL_Impacts.DGN
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DATE	3/22/2017
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PROJ. ENGR.	
REGIONAL ADM.	

REVISION

DATE

BY

REGION NO.
10

STATE
WASH

JOB NUMBER

CONTRACT NO.

FED.AID PROJ.NO.

LOCATION NO.

P.E. STAMP BOX

DATE

P.E. STAMP BOX

DATE



Washington State
Department of Transportation

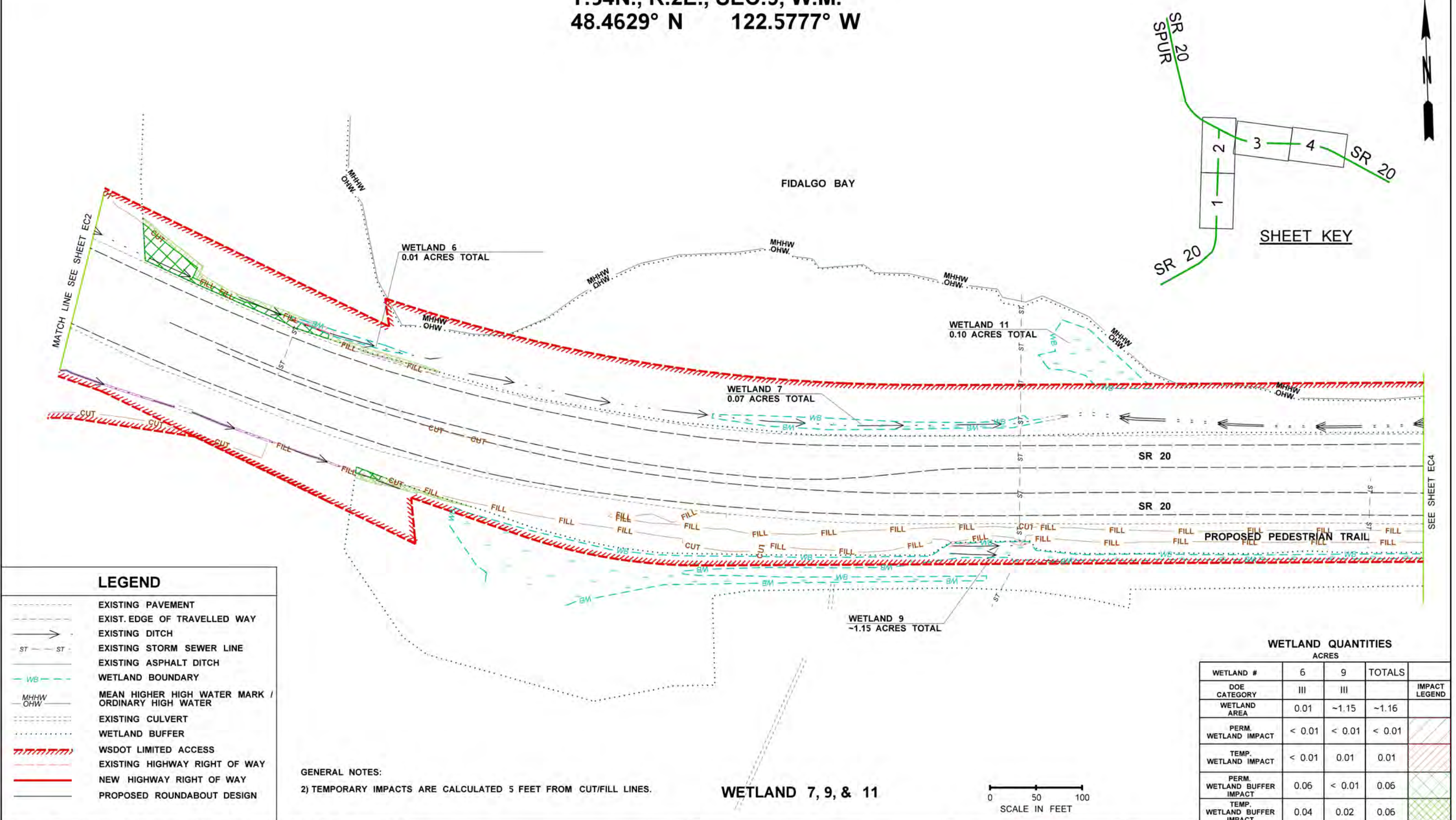
SR 20 & SR 20 SPUR
SHARPE'S CORNER
INTERSECTION IMPROVEMENT
ENVIRONMENTAL IMPACTS

Plot 12

PLAN REF NO

SHEET
2
OF
5
SHEETS

T.34N., R.2E., SEC.5, W.M.
48.4629° N 122.5777° W

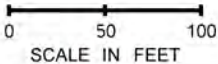


LEGEND

- EXISTING PAVEMENT
- EXIST. EDGE OF TRAVELLED WAY
- EXISTING DITCH
- ST ST EXISTING STORM SEWER LINE
- EXISTING ASPHALT DITCH
- WB WETLAND BOUNDARY
- MHHW OHW MEAN HIGHER HIGH WATER MARK / ORDINARY HIGH WATER
- EXISTING CULVERT
- WETLAND BUFFER
- WSDOT LIMITED ACCESS
- EXISTING HIGHWAY RIGHT OF WAY
- NEW HIGHWAY RIGHT OF WAY
- PROPOSED ROUNDABOUT DESIGN

GENERAL NOTES:
2) TEMPORARY IMPACTS ARE CALCULATED 5 FEET FROM CUT/FILL LINES.

WETLAND 7, 9, & 11

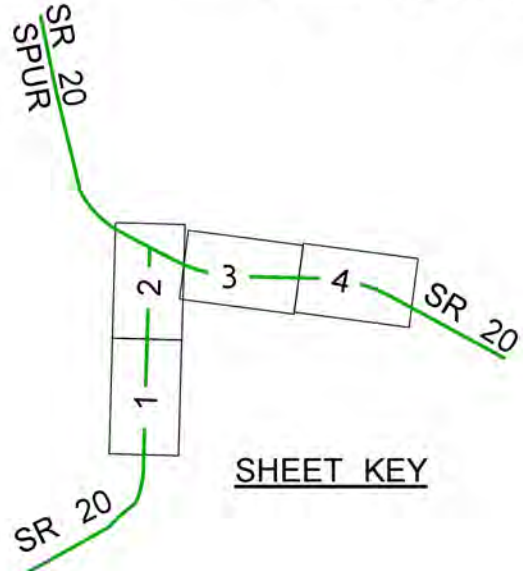


WETLAND QUANTITIES
ACRES

WETLAND #	6	9	TOTALS	
DOE CATEGORY	III	III		IMPACT LEGEND
WETLAND AREA	0.01	~1.15	~1.16	
PERM. WETLAND IMPACT	< 0.01	< 0.01	< 0.01	
TEMP. WETLAND IMPACT	< 0.01	0.01	0.01	
PERM. WETLAND BUFFER IMPACT	0.06	< 0.01	0.06	
TEMP. WETLAND BUFFER IMPACT	0.04	0.02	0.06	

FILE NAME T:\412354\XL4998_Sharpe\ICAD\From_Design\Albert\XL4998_PS_WL_Impacts.DGN		REGION NO. STATE		FED.AID PROJ.NO.		Washington State Department of Transportation		SR 20 & SR 20 SPUR SHARPE'S CORNER INTERSECTION IMPROVEMENT ENVIRONMENTAL IMPACTS		Plot 13	
TIME 12:04:22 PM		10 WASH			PLAN REF NO						
DATE 3/7/2017											
PLOTTED BY GooAlbB											
DESIGNED BY											
ENTERED BY											
CHECKED BY											
PROJ. ENGR.											
REGIONAL ADM.	REVISION	DATE	BY	CONTRACT NO.	LOCATION NO.	P.E. STAMP BOX	DATE	P.E. STAMP BOX	DATE		SHEET 3 OF 5 SHEETS

T.34N., R.2E., SEC.5, W.M.
48.4628° N 122.5726° W



SHEET KEY

GENERAL NOTES:
2) TEMPORARY IMPACTS ARE CALCULATED 5 FEET FROM CUT/FILL LINES.

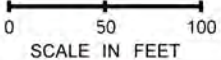
LEGEND

- EXISTING PAVEMENT
- EXIST. EDGE OF TRAVELLED WAY
- EXISTING DITCH
- EXISTING STORM SEWER LINE
- EXISTING ASPHALT DITCH
- WETLAND BOUNDARY
- MEAN HIGHER HIGH WATER MARK / ORDINARY HIGH WATER
- EXISTING CULVERT
- WETLAND BUFFER
- WSDOT LIMITED ACCESS
- EXISTING HIGHWAY RIGHT OF WAY
- NEW HIGHWAY RIGHT OF WAY
- PROPOSED ROUNDABOUT DESIGN

WETLAND 9
~1.15 ACRES TOTAL

WETLAND 3
5.15 ACRES TOTAL

WETLAND 3 & 9



FILE NAME		T:\412354\XL4998_Sharpe\ICAD\From_Design\Albert\XL4998_PS_WL_Impacts.DGN		REGION		STATE		FED.AID PROJ.NO.		Washington State Department of Transportation		SR 20 & SR 20 SPUR SHARPE'S CORNER INTERSECTION IMPROVEMENT		Plot 14	
TIME	12:05:07 PM			10	WASH									PLAN REF NO	
DATE	3/7/2017									SHEET 4 OF 5 SHEETS		ENVIRONMENTAL IMPACTS			
PLOTTED BY	GooAlbB														
DESIGNED BY															
ENTERED BY															
CHECKED BY															
PROJ. ENGR.															
REGIONAL ADM.		REVISION	DATE	BY											

April 27, 2017

TO: Kevin Stuber, Environmental Documentation and Permit Specialist
NB 82-210

FROM: Patrick Svoboda, NWR HazMat Lead
206-440-4535

SUBJECT: SR 20 Sharpes Corner Intersection Hazardous Materials Analysis

Introduction

The Washington State Department of Transportation proposes to construct a multi-lane intersection improvement at Sharpes Corner along State Route (SR) 20. In addition, the project will reconstruct the SR 20/Miller/Gilbralter road intersection, improve the Fidalgo Bay Road intersection, and improve bike and pedestrian facilities (Figure 1).

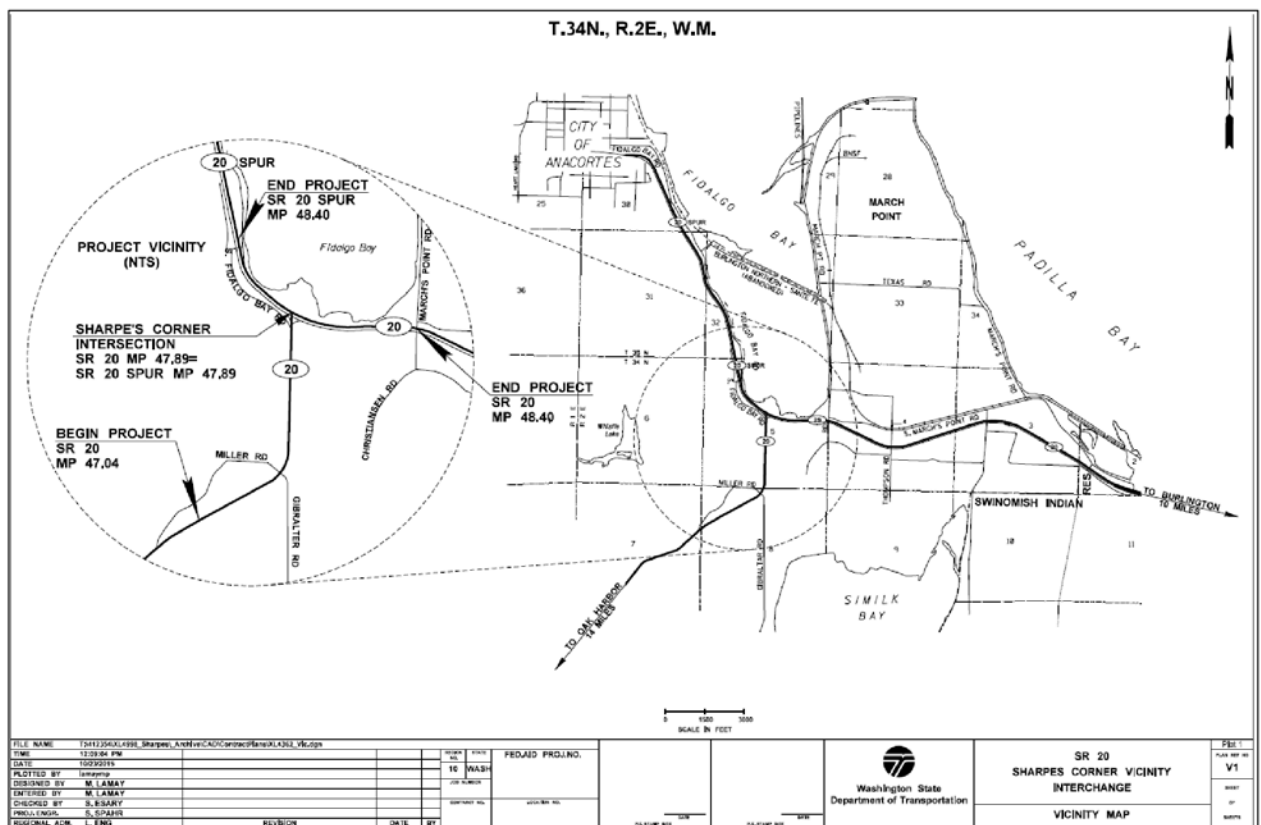


Figure 1: Vicinity Map of the project area

The anticipated excavation depths for the project are as follows.

SR20 Spur – The majority of the area to excavate will be for the separation of the bypass lane and the westbound exit lane. It is anticipated there will be approximately 3 feet (') of

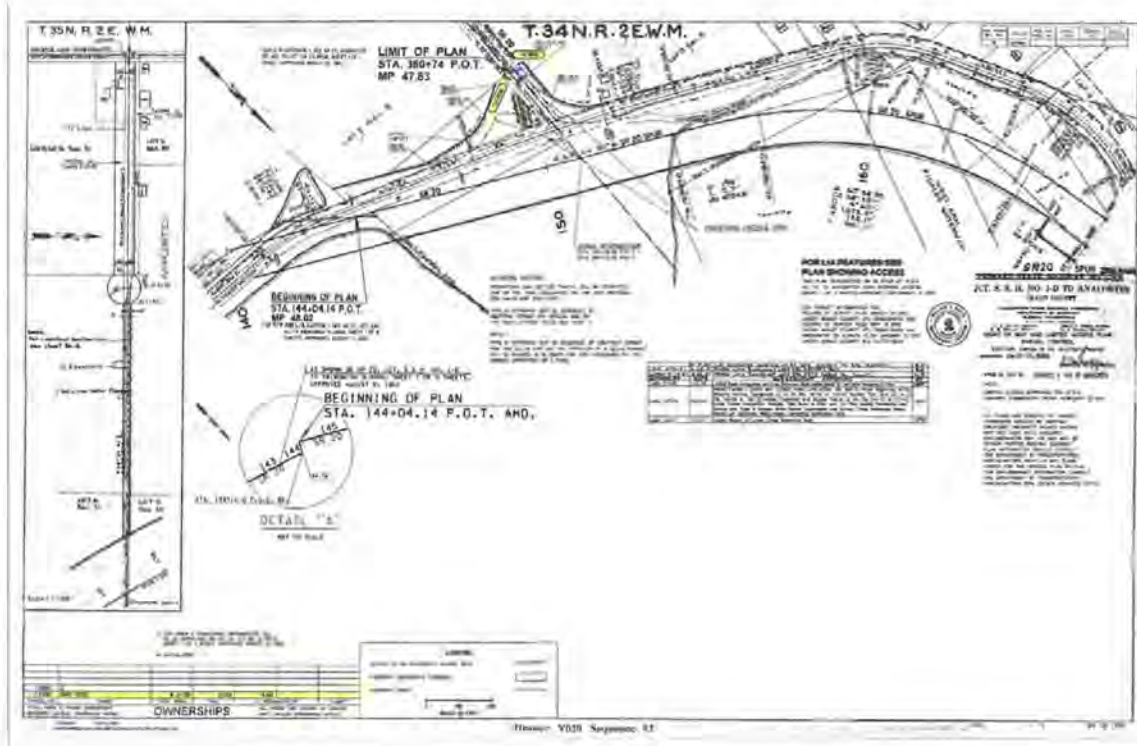
- Excavation below ground surface (bgs) for the separation area with the deepest excation to be approximately 4' bgs.
- Miller-Gibraltar - The largest excavation is 6' deep on the southeast corner of the new roundabout to build out the ditch adjacent to the roundabout. The northeast and southwest excavations are approximately 4' in depth.
- Bicycle and Pedestrian Path – The deepest excavation will occur on the east end of the path at approximately 4' in depth.
- West Bypass Lane– We anticipate the deepest excavation to be approximately 5' into the north slope near the middle of the bypass. Excavations of about 3' for the area between the roundabout and the west bypass lane are expected.
- Sharpes Corner Roundabout – The south-east turn pocket will require extensive excavations with the deepest depth of about 8' bgs. The roundabout itself will either be built atop the existing subgrade or will require at most 3' of excavation below the existing pavement.
- Connection between Sharpes and the Miller and Gibraltar Roundabouts – There will be excavations near Miller Gibraltar roundabout of 8' bgs and 6' excavations into the western sideslope. The depth of these excavations decrease closer to the Sharpes Corner roundabout. The excavation in the Sharpes Corner area will be about 8' until about C Avenue at the Fernhill Cemetary.

There will be right of way purchased with this project. The table and figures below shows planned real estate activity for each of the parcel (partial acquisition, full acquisition, and/or easement. Three of the parcels will include limited access revisions.

Parcel Number	County Parcel Number	Name	Total Area (square feet)	Right of Way Needs (square feet)	Easment (square feet)
1-23658	P19959	Rick Rennebohm	36,156	1232	
1-23660	P19986	Yatta Training Co LTD	5640	5640	

1-23657	P20014	Signal Hill Family	678,229	5402	
1-23656	P20013	Fidalgo/Signal Prop LLC	37,807	1124	
1-23655	P19979	Barto Family Trust	69,260	2127	
1-23654	P120559	Silver Lake Holdings	10,890	736	
1-23056	P120025	Morgan ET AL	10,890		952
1-23055	P123056	Howard	217,800		459
1-23659	P19959	Chao Moen	41,798	23,230	

Table 1: Right of Way Acquisitions and Easements





Figures 2-4: Right of Way Activity (in yellow)

Historical

Sharpe's Corner was previously known as Dean's Corner, after Charles Dean who built a gas station at the southwest corner of the intersection in 1924. Dean later expanded the building to include a market and service garage. This was followed by construction of three cabins nearby. At some point Dean took on a partner named Stevenson. Both names appear on a photograph dated 1924-1930, on file at the Anacortes Museum. The Stevenson and Dean Service Station closed sometime between 1975 and 1986. It was later demolished to make way for a motel development. There is some type of tank (possibly a heating oil) with a volume of 1,200 gallons that may exist on the west side of the corner as part of the motel development.

In the late 1940s, Wallace Sharpe, a Skagit County commissioner, opened a restaurant on the southeast corner of the SR 20-SR 20 Spur intersection. He would later expand this enterprise to include a gas station and automotive service garage, thus competing with Dean's business across the street. In an interview with Wallace Sharpe's grandson, also named Wallace, the locations of both businesses are described:

Sharpe's Corner was called Dean's Corner before it was Sharpe's Corner. If you stand in the intersection of S.R. 20 at Sharpe's Corner and look up the hill [southward], on the left hand side of the road, my granddad had a gas station/restaurant named Sharpe's Corner. Directly above that was a lumber yard, owned by Willard Evans. On the right hand side

To_Kevin Stuber
Date_April 27, 2017
Page 5

[of SR 20] there was a gas station and repair shop and that was owned by Charles Dean [Sharpe, 2001].



Figure 5: Charles Dean gas station at Sharpe's Corner; ca. 1924-1930 (photograph courtesy of the Anacortes Museum, Wallie Funk Collection). The view is to the southwest



Figure 6: Metsker Map of Sharpes Corner.

Based upon review of historical maps, the additional properties being purchased and their adjacent property uses do not have a high risk of contamination. The uses are primarily residential along with golf courses, agricultural, and a cemetery. Residential properties have propane tanks, possible asbestos in the structures, and used lead in the painting of their structures. There is a low probability in the old Puget Sound Light parcel of contamination associated with storing of electrical wires, creosote poles, small containers of lube oil and fuels, and other associated products.

Ecology Facility Site Review

A review of the Washington State Department of Ecology (Ecology) Facility Site Atlas website, (<http://apps.ecy.wa.gov/website/facsite/viewer.htm>) accessed on March 29, 2017, identified 15 sites located within a 0.5 mile radius of the project footprint . that have or may have soil or groundwater contamination that could potentially impact the project during construction A National Priority List Site (Shell Opus Puget Sound Refinery) exists within one mile. The sites included a hazardous waste generator, underground storage tanks (UST), leaking underground storage tanks (LUST), emergency hazardous material tier 2 chemical reports, local source control, construction stormwater general permit, independent cleanups, a landfill, sand and gravel pit, a non-enforcement final, a 401 coastal zone management project site, a 401 coastal zone mitigation site, and an enforcement action.

Each site is screened to identify sites of concern where it was likely that contamination may be encountered during construction either by excavation and/or dewatering (Figures 4, 5 and 6). A site can pose a liability to the project if the site is located within close proximity (adjacent to the proposed project area), or hydraulically upgradient, or has a confirmed release of hazardous materials or petroleum products to the surface or groundwater within 1 mile or less from the proposed project area. Sites with documented contamination (e.g., a LUST or cleanup site) warrants further investigation. These sites include:

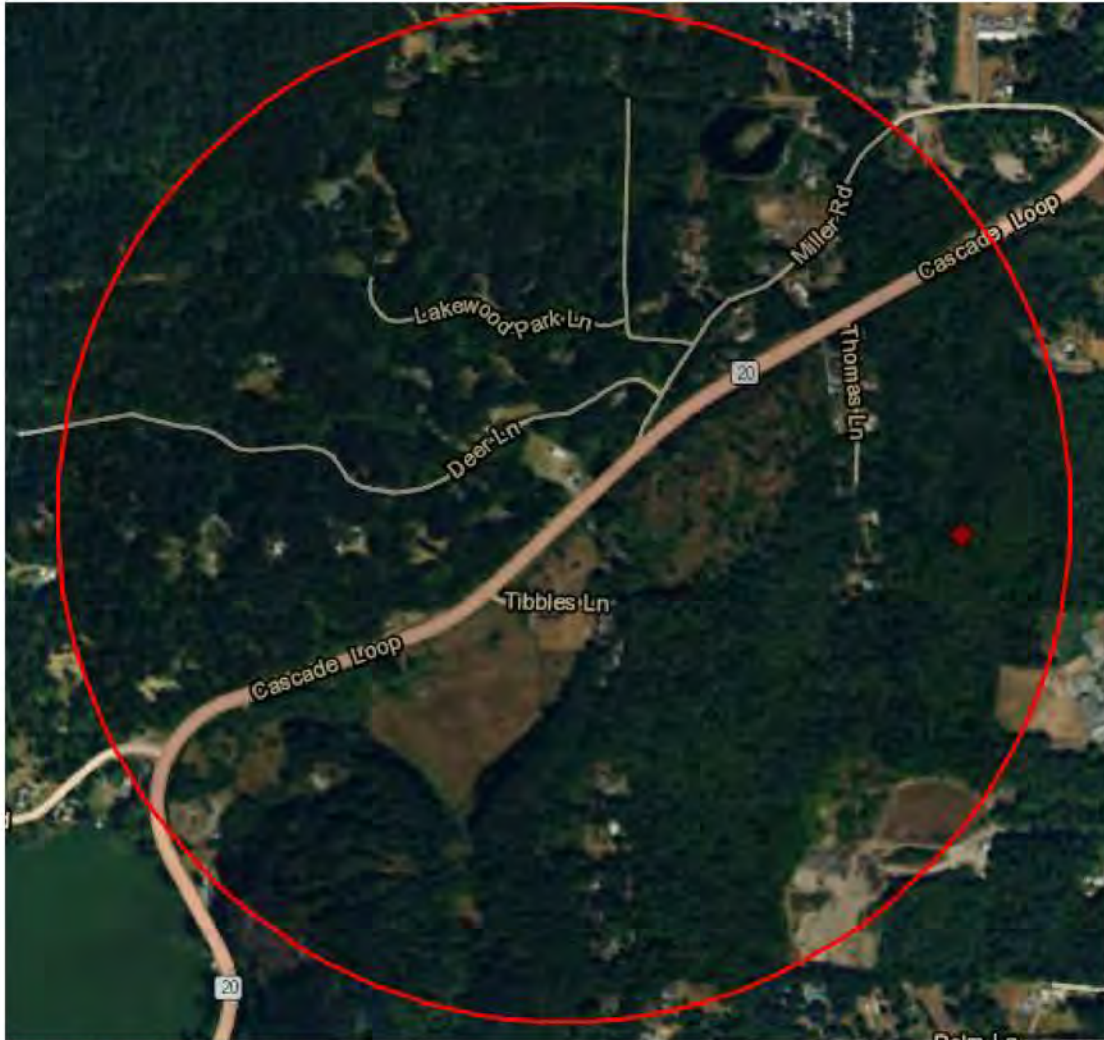
- Sharpes corner, Facility ID:45576247,
- Chevron Facility 60091038 Facility ID: 2687,
- Similk Incorporated Golf Course, Facility ID: 43397816 and,
- Shell Opus Puget Sound Refinery Facility ID 7.



Facility Site records:

Id	
63894366	COUNTRY CORNER GROCERY MART 7601 SR 20 STE A ANACORTES WA 98221
6618338	JR Simplot S OF MCMANNAMON RD OTHELLO WA 99344
6473778	REFINERY TEXACO 1247 CHRISTIANSON RD ANACORTES WA 98221
4223	SIMILK BEACH GOLF COURSE 12518 CHRISTIANSON RD ANACORTES WA 98221
10294	SOUTH FIDALGO BAY ROAD EXT S FIDALGO BAY ROAD TO OLD BROOK LANE ANACORTES WA 98221

Figure 5: Ecology Facility Atlas Review and Associated List of Facilities, Miller-Gibraltar Vicinity.



Facility Site records:

Id

6618338 JR Simplot S OF MCMANNAMON RD OTHELLO WA 99344

Figure 6: Ecology Facility Atlas Review and Associated List of Facilities, Miller Road Vicinity.

Field Investigation

A hazardous materials specialist accompanied the geotechnical drill crew in January 2017 during borings by the existing Chevron gas station and Sharpes Corner to assess if contamination still exists and/or is migrating towards the project area. The borings in these areas used the hollow stem auger method instead of the traditional wet rotary method and followed the proposed boring locations shown in Figure 7. The wet method

To_Kevin Stuber
Date_April 27, 2017
Page 9

can compromise samples with the additional liquids being introduced. Field screening material, including a photoionization detector (PID) along with sampling material was on hand if needed.

The two boring locations adjacent to and just downgradient from the existing Chevron did not warrant sampling as no indication of contamination was observed. The material was primarily sand, gravels, and some quartz was encountered. The boring holes at the corner of SR 20 and Sharpes Corner were not able to be drilled due to the conflict of utilities in the limited space within existing WSDOT right of way. Additionally, the right of entry was not granted by the existing shop property owner and this did not provide the opportunity to verify if contamination exists in the soil or groundwater at Sharpes Corner. The water levels throughout the borings were anywhere from 4-16' below ground surface (bgs).



Figure 7: Locations of Proposed Geotechnical boring locations



Photo 1: Geotechnical boring location (wooden stake) downgradient (south and west) of project area and in a potential migratory zone from existing source.

To_Kevin Stuber
Date_April 27, 2017
Page 11



Photo 2: Core from geotechnical boring location shown in Picture 1 above, showing native soil and no indication of contamination was noted.

To_Kevin Stuber
Date_April 27, 2017
Page 12



Picture 3: View looking south of SW corner of Sharpes Corner



Photo 4: Utility conflicts and limited space that did not allow for boring opportunities at Sharpes Corner.

Next Steps

To_Kevin Stuber
Date_April 27, 2017
Page 14

Although documentation exists that the two USTs have been removed as well as completed remedial activities, there is a low to moderate potential to encounter petroleum hydrocarbons and heating oil contamination in the soil. It is recommended that visual and olfactory screening of excavated material occurs during construction of this project. Stockpiling and field sampling of excavated material should be performed when there is an **indication** (i.e., sight or odor) of contamination. This material should be separated out and contained from other media so field sampling by a hazardous material specialist can be completed. If the contamination is encountered, it will need to be managed as a change condition and paid via force account.

Construction during the summer months may reduce the probability of encountering contamination. The ground water levels will be lower at this time.

In accordance with Chapter 173-340 Washington Administrative Code (WAC), a discovered release must be reported within 90 days of discovery.

If structures are going to be removed, please contact a hazardous material specialist to conduct a good faith survey prior to the structural removal.

Please contact me at 206-440-4535 if the project components change that may alter the conclusions of this analysis.

PS\kr

**CERTIFICATION OF CONSISTENCY WITH
THE WASHINGTON STATE COASTAL ZONE MANAGEMENT PROGRAM
FOR FEDERALLY LICENSED OR PERMITTED ACTIVITIES**

Federal Project Number: N/A – No Federal Funding

Applicant: Washington State Department of Transportation

Project Description: WSDOT proposes to improve safety and relieve congestion at the SR 20/SR 20 Spur Interchange (referred to as Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd. /Gibraltar Road intersection for a southbound truck-climbing lane, converting the SR 20/Miller Rd. /Gibraltar intersection into a multi-lane roundabout, and providing a pedestrian path between Sharpes Corner and March Point Road.

(attach site plans, location {county/city}, and proximity to waterbody {name})

This action under CZMA §307(c)(3) is for a project that will take place within Washington's coastal zone or which will affect a land use, water use, or natural resource of the coastal zone. *(The coastal zone includes all parts of Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum and Whatcom counties.)*

The project complies with the following enforceable policies of the Coastal Zone Management Program:

1. Shoreline Management Act (SMA):

Is outside of SMA jurisdiction	()
Applied for shoreline permit	(X) # <u>Pending</u> being reviewed by <u>Anacortes</u>
Has a valid shoreline permit	() # _____ issued by _____ on _____
Has received an SMA Exemption	() # _____ issued by _____ on _____

2. State Water Quality Requirements:

Does not require water quality permits	()
Applied for water quality certification	()
Has received water quality certification	() # _____ issued on _____
Applied for stormwater permit	(X) # <u>Pending</u> issued on <u>Pending</u>
Has received stormwater permit	() # _____ issued on _____

3. State Air Quality Requirements:

Does not require air quality permits	(X)
Applied for Air Quality permit	() # _____ being reviewed by _____
Has an Air Quality permit	() # _____ issued by _____ on _____

4. State Environmental Policy Act:

Project is exempt from SEPA	SEPA Lead Agency is: <u>WSDOT</u>
SEPA checklist submitted	()
SEPA decision issued/adopted	(X) date <u>6/13/17</u>
NEPA decision adopted by	(X) DNS () MDNS () EIS () Other date <u>6/13/17</u>
lead agency to satisfy SEPA	() SEPA # _____ date _____

Public Notice for this proposed project was provided through:

(X) notices mailed to interested parties using USPS mailing list on 6/14/17.

(X) publication in Skagit Valley Herald.

Therefore, I certify that this project complies with the enforceable policies of Washington's approved Coastal Zone Management Program and will be conducted in a manner consistent with that program.

Signature: Kevin D. Stuber **Date:** 7/18/17



August 1, 2017

Mr. Don Measamer
Planning Director - City of Anacortes
904 6th St.
Anacortes, WA 98221

SR 20 Sharpes Corner Vicinity Improvements
Shoreline Substantial Development Permit
Neighborhood Meeting / Public Outreach

Dear Mr. Measamer:

The Washington State Department of Transportation (WSDOT) has been actively developing the SR 20 Sharpes Corner Vicinity Improvement project since the fall of 2015. The project is scheduled to go on advertisement on October 16, 2017 and will be constructed during the Spring and Summer of 2018. The project requires a Shoreline Substantial Development Permit from the City.

Over the last couple years WSDOT has had an extensive amount of public outreach. A list of the public events held to date is shown below:

- Open House – Anacortes Middle School – January 28, 2016
- Open House – Anacortes Middle School – March 17, 2016
- Open House – Anacortes Middle School – June 23, 2016
- Open House – Oak Harbor High School – September 22, 2016
- City Council Meeting – Anacortes – October 17, 2016
- Open House – Coupeville High School – March 14, 2017
- Open House – Sedro Wooley – March 21, 2017

In addition we have met with many of the individual adjacent landowners and residents to the project. The outreach events were wildly successful in communicating with and receiving input from a broad section of the community. In all, well over 500 citizens attended the outreach events. A narrative summary of the public comments received and actions taken is enclosed for your information. Public comments were also received and addressed during the SEPA process.

We believe our previous efforts have provided us with a thorough and complete understanding of the public's opinions and interests. In consideration of the extensive amount of outreach performed, WSDOT is requesting to forego an additional neighborhood meeting as part of the Shoreline Development Permit process. Please let me know at your earliest convenience if this request will be approved.

If you have any questions or require additional information, please contact me at (360) 788-7403.

Sincerely,

A handwritten signature in black ink, appearing to read 'Gabe Ng', with a stylized, cursive script.

Gabe Ng, P.E.
Project Engineer

Attachments:
Public Comment Narrative

cc:
Chris Damitio, Engineering Manager – Mt. Baker Area
Jay Drye, Assistant Regional Administrator – Mt. Baker Area
Project File

SR 20 Sharpes Corner Vicinity Improvements
Summary of Public Comments & Actions
7/31/2017

Alternative Selection

Comment

Most of the attendees at the open houses took the time to communicate their preferred alternative. Public comments indicated a slight preference for a roundabout solution over the other alternatives. An improved traffic signal was the second most preferred solution.

Citizens who participated in past Sharpes Corner open houses, prior to 2015, had seen much more elaborate and expensive improvement solutions. Many people were confused why these alternatives were not carried forward.

Actions

WSDOT considered the public feedback regarding the alternatives. In addition, WSDOT analyzed the safety and mobility benefits of the different alternatives. After considering everything, WSDOT selected the roundabout solution for both Miller/Gibraltar and SR 20 Sharpes corner.

WSDOT staff explained that the project was allocated \$13.4 million dollars by the legislature through the Connecting Washington program. In addition, staff explained that the solutions presented at the open house will meet the project needs to reduce collisions, relieve congestion, improve freight mobility and enhance non-motorized connectivity.

Construction Strategy

Comments

During multiple outreach events WSDOT solicited feedback on the timing of construction day/night and the intensity. Higher traffic impacts correlate to shorter construction windows and trying to minimize traffic impacts would likely extend the project into two seasons. Citizens overwhelmingly supported the high traffic impact short construction duration approach.

Actions

After receipt of this input WSDOT developed a CN staging strategy that expedites construction of the project while trying to minimize impacts to the public. The current schedule shows work starting on April 9, 2018 and both roundabouts being open to the public by June 29, 2018.

SR 20 Sharpes Corner Vicinity Improvements
Summary of Public Comments & Actions
7/31/2017

Pedestrian/Bicyclist

Comments

People were generally positive towards the proposed shared use path between March's Pt Rd and Sharpes Corner.

People requested a proper East/West pedestrian crossing of SR 20. Some individuals requested a pedestrian bridge or tunnel.

Bicyclists noted placing barrier at Fidalgo Bay Rd would prohibit that crossing location. While this was an inconvenience for them, there was acknowledgement that this modification would be a safety enhancement.

People expressed that many out of area bicyclists use the intersection, Tommy Thompson Trail, etc. and that better signing was needed.

WSDOT received a handful of comments related to the camera at March's Point Rd not picking up bicycles.

Actions

The project team developed the pedestrian facility design and came up with a bicycle signing plan. The design office then reached out to members of the project stakeholder team who were active bicyclists in the community. The signing plan along with the pedestrian crossing design at SR 20 were reviewed at length. The final design was one that satisfied all parties and met the project goals for enhancing non-motorized connectivity.

Comments regarding the camera at March's Point Rd were transmitted to our traffic office for further investigation. A follow-up in early 2017 indicated this issue had been resolved.

Access

Comments

Many members of the Fidalgo Bay neighborhood participated in the open houses. They were concerned how closing left turns and through movement at Fidalgo Bay Rd would negatively impact their access.

Businesses along SR 20 expressed both appreciation and apprehension towards the raised curb that is proposed between the NB and SB traffic. The raised curb would eliminate left turns

SR 20 Sharpes Corner Vicinity Improvements
Summary of Public Comments & Actions
7/31/2017

which would decrease collisions and improve mobility. However, individuals were concerned that modifying access to their property would negatively impact their businesses.

Actions

WSDOT staff explained to the public the safety benefits of closing the turning movements at Fidalgo Bay Rd and SR 20 Spur. Most of the people recognized this benefit. In addition, staff explained the benefits of the roundabouts providing easy U-turn movements. Once individuals looked closely at how the roundabouts were integrated into their access needs, their concerns were mitigated.

WSDOT staff spoke at length during the open houses with the public about the importance of dividing the Northbound and Southbound lanes of SR 20 with raised channelization. The safety analysis demonstrates the benefit of incorporating this change. WSDOT staff also communicated how access being limited to right-in/right-out was greatly mitigated by the inclusion of the roundabouts. Today the traffic volumes are such that making a left turn from a driveway results in significant delay. In the future condition making a right turn then using the roundabout to make a U-turn may result in little to no delay for users.

Right-of-Way

Comments

A number of attendees who lived or operated businesses adjacent to the project were curious if the project would have impacts on their property.

Actions

WSDOT staff relayed where the new ROW lines were located and which parcels were anticipated to have property acquisition needs. Staff also clarified the ROW acquisition process and the timeline on which impacted property owners would be contacted by WSDOT Real Estate Services staff.

Delay

Comments

A number of the public expressed concerns that installing roundabouts would eliminate the gaps in traffic that they get today, which would make it more difficult to enter traffic from a driveway or side-street.

SR 20 Sharpes Corner Vicinity Improvements
Summary of Public Comments & Actions
7/31/2017

Individuals expressed concern that the eastbound traffic from Anacortes heading to Burlington would not be able to enter the roundabout at Sharpes Corner due to a large number of vehicles making left turns towards Oak Harbor.

Actions

Because of the number of individuals who expressed these concerns, WSDOT revisited the traffic simulation and integrated the upstream signal at March's Point Rd. WSDOT brought the updated model to the subsequent open houses. When individuals raised these concerns again, staff would present to them the model as a visualization and explain how sufficient gaps will continue to form. Once individuals saw the model and thought more closely about the nearby signal they were typically satisfied.

From: MacDonald, Michael K.
Sent: Monday, July 18, 2016 1:53 PM
To: Bakeman, Mark; Murray, Kristin
Cc: Jones, DeeAn (USFWS)
Subject: RE: SR 20/Sharpes Corner Vicinity-Improvements (Skagit County)

I agree, esp for this project. Was just pointing out the technicality that I missed. Consultation is complete for this PBO.

Michael MacDonald
NMFS liaison
Shoreline office 206-440-4909

From: Bakeman, Mark
Sent: Friday, July 15, 2016 9:07 AM
To: MacDonald, Michael K.; Murray, Kristin
Cc: Jones, DeeAn (USFWS)
Subject: RE: SR 20/Sharpes Corner Vicinity-Improvements (Skagit County)

Michael, this particular item was one of the subjects in the programmatic reinitiation, and this project is a good example. The project will provide secondary treatment for all new PGIS, which is the maximum we can do. If they had to do Hi-Run on the project and Hi-Run points us to a dilution analysis, they would likely have to hire a consultant to do the dilution modeling because it would invoke CoreMix, which is used for non-riverine systems. Our current group of stormwater engineers does not have experience with CoreMix.

We asked for new language in the programmatic that said the Hi-Run analysis could be requested at the discretion of NMFS. In this case I would argue that Hi-Run will not provide any real information that will inform project design or the effect determinations. Since we are so close to getting that reinitiation completed, can you postpone your decision until it is done?

Mark

From: MacDonald, Michael K.
Sent: Thursday, July 14, 2016 3:09 PM
To: Murray, Kristin; Bakeman, Mark
Cc: Jones, DeeAn (USFWS)
Subject: RE: SR 20/Sharpes Corner Vicinity-Improvements (Skagit County)

Kristin and Mark,
SW modeling is required even if all new PGIS is treated, particularly since it's not infiltrated. Technically the PNF isn't complete without that information. I didn't catch it before sending the approval.

WSDOT presented the project to USFWS and NMFS at a pre-BA meeting.
Feedback from the
Services indicated the project could be submitted programmatically if the project
treats
stormwater from all new and replaced PGIS, uses the limited operating period in
murrelet

habitat outside of Anacortes, and provides specific details on night work. A tiered BO would be needed for night work. Because the project is treating all new and replaced PGIS, no Hi-Run modeling is required.

The WSDOT will analyze the effects of stormwater pollutants using the most recent versions of the Highway Runoff Dilution and Loading Model User's Guide (for western Washington) or the Stormwater Water Quality Analysis Process for Eastern Washington (whichever is applicable to the individual project) and submit the results to NMFS as part of the PNF (WSDOT 2011b; WSDOT 2009b).

Michael MacDonald
NMFS liaison
Shoreline office 206-440-4909

From: Murray, Kristin
Sent: Wednesday, July 13, 2016 3:52 PM
To: MacDonald, Michael K.; Lamay, Mikkil; Koreski, Jason
Cc: Washington FHWA; McAndrew, Rebecca (Corps); Carlson, George; Stuber, Kevin; Durham, Leslie (USFWS); Magrane, April; Bakeman, Mark; Burdick, Sarah
Subject: SR 20/Sharpes Corner Vicinity-Improvements (Skagit County)

Hi Michael

Attached is the NOAA project notification form (PNF) for the SR 20/Sharpes Corner Vicinity-Improvements project. Please let me know if you have any questions. Thanks, Kristin

Kristin Murray, Wetland and Fisheries Biologist, M.S., PWS
WSDOT NW Region Environmental
460 Stuart Rd, NB82-55
Bellingham, WA 98226
360-788-7453 (office), 360-661-2883 (cell)

WSDOT NOAA Short Project Notification Form

Note: The proper version of this form must be submitted to either the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (or both). See <http://wwwi.wsdot.wa.gov/Environment/FishWildlife/> for submittal procedures.

Project Name:

Sr20/Sharpes Corner Vicinity - Improvements

Submittal Date:

July 13, 2016

Work Order:

XL4998

WIN:

A02029K

Project Location:

State Route 20, Mile Post 47.04 to 48.40

Geographical Coordinates: 48.45278400 / -122.58615600 to 48.46260000 / -122.57076200

Indicate Township / Range / Section

This project is located on State Route (SR) 20 between MP 47.04 to MP 48.40 and SR 20 Spur MP 47.89 to MP 48.40, within Skagit County and the City of Anacortes. Specifically, the project is located within portions of Township 34 North, Range 2 East, Sections 5 & 8.

County:

Skagit

Region:

Northwest

Project Biologist:

Kristin Murray, murrakm@wsdot.wa.gov, 360-788-7453

The project area was visited several times to delineate wetlands and streams and review habitat for terrestrial species.

Reviewing Biologist:

April P. Magrane, magrana@wsdot.wa.gov, 206-440-4522

Review completed.

Signed June 24, 2016 @ 8:20 PM

Form Completed Date:

WRIA:

3: Lower Skagit - Samish

6th Field Hydrologic Unit Code (HUC) Name
Fidalgo Island-Frontal Padilla Bay

6th Field HUC number
171100020502

Site Visit Date:
March 31, 2016

Date of Early Coordination:
April 14, 2016

Explain and summarize Early Coordination activities with the Services:
WSDOT presented the project to USFWS and NMFS at a pre-BA meeting. Feedback from the Services indicated the project could be submitted programmatically if the project treats stormwater from all new and replaced PGIS, uses the limited operating period in murrelet habitat outside of Anacortes, and provides specific details on night work. A tiered BO would be needed for night work. Because the project is treating all new and replaced PGIS, no Hi-Run modeling is required.

Does the project meet the conditions of the programmatic biological assessment?
☒ **Yes** ☐ **No**

Please explain:
Nighttime work will occur due to high traffic volumes. Seasonal high traffic volumes, ferry traffic, and local heavy traffic due to a nearby refinery require night work.

Is this a reference biological assessment?
☐ **Yes** ☒ **No**

Is this an Essential Fish Habitat (EFH) only submittal for NMFS?
☒ **Yes** ☐ **No**

Is this an after the fact consultation for NMFS?
☒ **Yes** ☐ **No**

Will this project be submitted Fast Track for the NMFS?
☒ **Yes** ☐ **No**

Will this project be submitted Fast Track for the USFWS?
☒ **Yes** ☐ **No**

NMFS summary of species and critical habitats in the project action area:
Puget Sound Chinook, Puget Sound Chinook Critical Habitat, Puget Sound Steelhead, Yelloweye Rockfish, Canary Rockfish, Bocaccio Rockfish, Rockfish Critical Habitat, and Southern Resident Killer Whale Critical Habitat

Check all project activities that apply (for both NMFS and USFWS projects)

Create new pollution generating impervious surface

Upland vegetation removal & management

Riparian and Wetland Vegetation Removal and Management

Heavy equipment operation

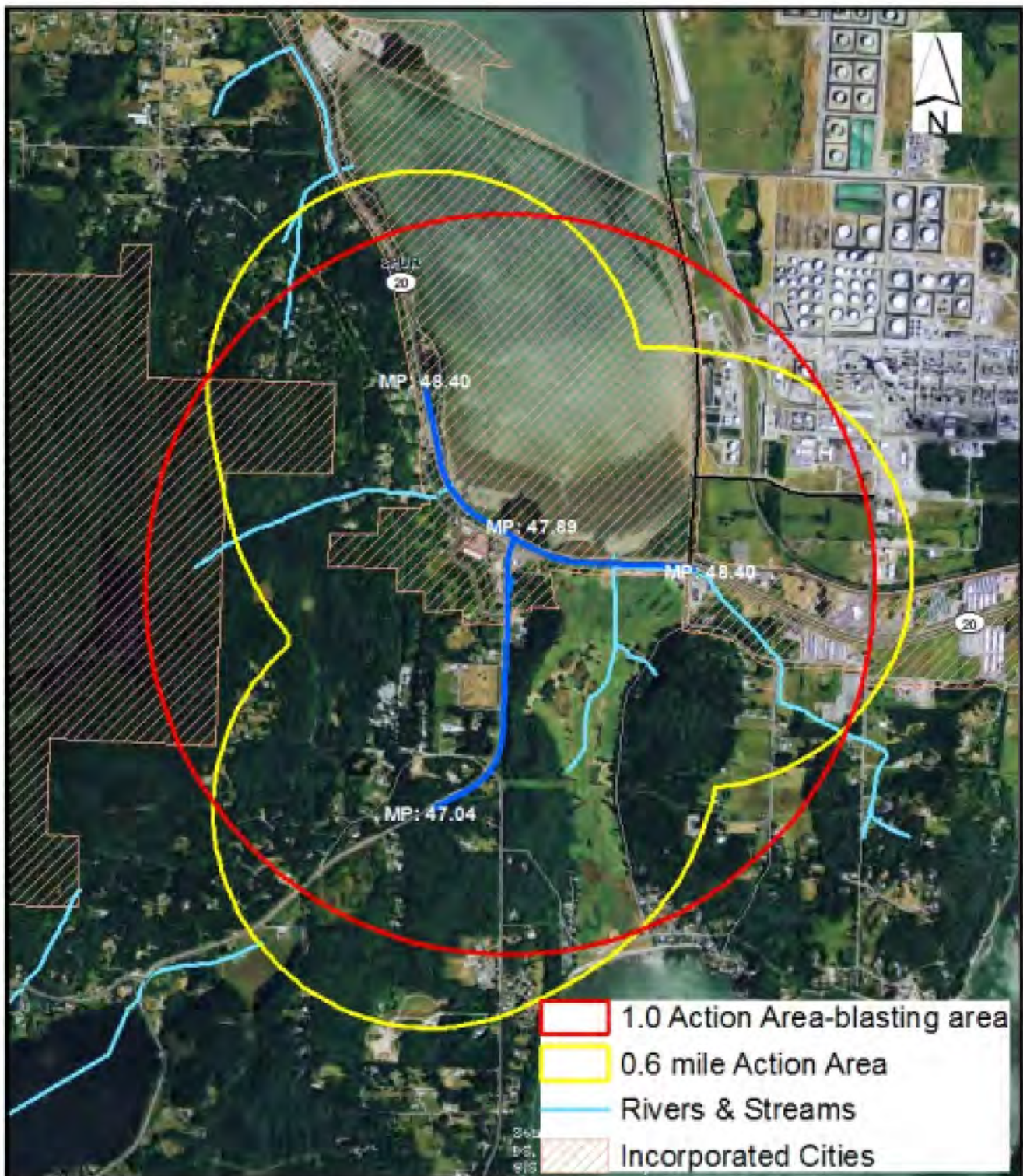
Cut and fill operations

Use of Artificial Lighting

Project action area:

The action area is estimated to include a 3,200 foot (0.60 mile) radius around the project site to account for the anticipated increase in noise levels due to construction. A 1 mile radius around a blasting area will be used. Although no in-water work is proposed, stormwater effects on listed aquatic species in Fidalgo Bay will be considered.

Attach map and photographs:



SR20 - SHARPES CORNER CURRENT PROJECT FEATURES



Project Description:

The project intends to improve the safety and capacity of the SR 20/SR 20 Spur Interchange (AKA Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional roadway improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd/Gibraltar Road intersection. The new lane configuration here will include two lanes in the southbound direction (toward Oak Harbor) and a single lane in the northbound direction. A multi-lane roundabout will be constructed at the intersection of SR 20/Miller Rd/Gibraltar Road.

Other notable work includes the relocation of utilities, both under and above ground, new illumination systems at the roundabouts, a multi-use path connecting SR 20/Sharpes Corner and the SR 20/March's Point road, potential rock blasting on the east side of SR 20 just south of Sharpes Corner, and landscaping/planting of disturbed areas throughout the project. All stormwater from new and replaced, a total of 1.24 acres, will be treated on-site with bioswales (basic and compost-amended) and vegetated filter strips (basic, narrow area, and compost amended). Wetland and buffer impacts of 0.16 acre and 0.19 acre, respectively, will be mitigated at the nearby WSDOT owned Fidalgo Bay mitigation site.

Project Equipment List

Heavy equipment will include traffic control equipment, lighting, rock drills, chain saws, compressors, dump trucks, excavators, graders, backhoes, roller/compactor, asphalt pavers, pavement grinders.

Indicate equipment that will be working below the ordinary high water mark (OHWM)

No equipment will be working in streams.

Is this an emergency project?

☒ **Yes** ☐ **No**

Does the project have sensitive habitats (within 200 feet of wetlands or surface waters) where staging, refueling, or other activities should be restricted?

☐ **Yes** ☒ **No**

Indicate mileposts within project area where restrictions apply.

Wetlands are located throughout the project corridor. No storage or materials or equipment will occur in sensitive areas not permitted for impact. HVF and BMPs will be used to protect wetlands and streams in the project corridor.

Will the project have construction equipment operating within the wetted channel of any waterbody?

☒ **Yes** ☐ **No**

Will detours be used?

☒ **Yes** ☐ **No**

Will the project include work at night?

☐ **Yes** ☒ **No**

Will artificial lights be used over or adjacent to an aquatic area?

☒ **Yes** ☐ **No**

Will blasting occur?

☐ **Yes** ☒ **No**

Number of blasts:

2

Will there be measures to protect listed species during blasting?

☐ **Yes** ☒ **No**

Please explain:

Blasting will occur outside the marbled murrelet nesting season (April 1 to September 23) to avoid impacts. No other listed terrestrial species or habitats are located within the action area.

Indicate dates when blasting will occur

Blasting is expected to occur in one day with one week of rock drilling prior to blasting. This will occur before April 1.

Will impact pile driving occur?

☒ **Yes** ☐ **No**

Will piles be removed on the project?

☒ Yes ☐ No

Is the project for slide abatement and repair?

☒ Yes ☐ No

Will cutting or filling occur?

☐ Yes ☒ No

Indicate cut area (excavated area) above the ordinary high water mark (OHWM).

Area: 1.77 acres (77,101 square feet)

Indicate fill area above the ordinary high water mark (OHWM)

Area: 2.31 acres (100,624 square feet)

Will cutting or filling occur within 300 ft of a water body that has listed aquatic species or their habitat?

☐ Yes ☒ No

Will any soils be exposed?

☐ Yes ☒ No

What is the erosion potential?

Low

Will bare soils be revegetated or hydroseeded after construction?

☐ Yes ☒ No

Describe the proposed methods.

Areas will be mulched and/or hydroseeded to stabilize exposed soils.

Project Timing

Construction Start Date

April 2, 2018

Construction End Date

November 22, 2019

Total Working Days

150

Will the project need a Hydraulic Project Approval (HPA) or have an aquatic zone of impact requiring in-water work?

☒ Yes ☐ No

Will the project have daily limited operating periods? If yes, please explain. If no leave blank

The project will have limited operating periods during the marbled murrelet nesting season (April 1 to September 23) on SR 20 from MP 47.66 to 47.30. In addition, blasting will be done outside the nesting season.

Will the project have any other seasonal operating restrictions not covered above? If yes, please explain. If no leave blank

Within suitable murrelet habitat, no daytime work will be allowed in the same area where night work occurred. Night construction work zones will be restricted to those areas a distance of 100 meters or greater from day construction work zones. Night construction activity, other than traffic control activities, will occur from one hour after sunset to one hour before sunrise from April 1 to September 23. This restriction would not apply to night time activities conducted between September 23 and April 1.

Project Aquatic Habitat Impacts

Elevated pollutant delivery (non-sediment)?

☒ Yes ☐ No

Will there be elevated sediment/turbidity?

☒ Yes ☐ No

Will riparian habitat functions be altered?

☐ Yes ☒ No

Explain

Minor permanent impacts will occur to the buffer of a non-fish bearing stream (0.01 acre) and along the Fidalgo Bay buffer (0.27 acre). Temporary buffer impacts of 0.08 acres will also occur for construction access. Impacts are largely road prism and are dominated by maintained grasses and invasive plants such as Scot's broom and Himalayan blackberry. Temporary impacts will be replanted with native vegetation. Mitigation for wetland and buffer impacts will occur at the Fidalgo Bay Mitigation Site along the bay.

Will there be elevated surface water temperature?

☒ Yes ☐ No

Will there be substrate disturbance?

☒ Yes ☐ No

Will there be loss of benthic invertebrate habitat and potential food web effects?

☒ Yes ☐ No

Will there be elevated in-water noise from pile driving?

☒ Yes ☐ No

Fish harm or harassment from in-water work or handling?

☒ Yes ☐ No

Will there be effects on fish migration?

☒ Yes ☐ No

Will there be impacts to wetlands that have fish habitat?

☒ Yes ☐ No

Will there be permanent or temporary fish habitat displacement?

☒ Yes ☐ No

Will there be altered water quality delivery, such as a change to a stormwater conveyance structure?

☒ Yes ☐ No

Will there be streambank/shoreline habitat loss/modification or reduced habitat connectivity?

☐ Yes ☒ No

Explain.

Impacts to 0.27 acre within the buffer of Fidalgo Bay and 0.01 acre of the unnamed stream will occur. Impacts occur to mostly road prism and maintained grassy or shrub vegetation within the right of way. Temporary impact areas will be restored with native vegetation. Permanent impacts will be mitigated at the Fidalgo Bay Mitigation Site.

Will natural stream processes and/or floodplains be altered?

☒ Yes ☐ No

Will the project have beneficial effects?

☒ Yes ☐ No

Environmental Setting

Baseline Conditions. Document general baseline conditions in the action area as they relate to the proposed action and effects. Discuss surrounding land use if appropriate.

The project area is located in the central portion of Fidalgo Island next to Fidalgo Bay largely within the City of Anacortes. Land use in the project area is primarily commercial development with scattered residential, recreational, and open space land use to the west. Commercial development includes a large golf course south of SR 20. Industrial development includes the Tesoro oil refinery located 0.25 miles north of the SR 20 intersection and Marches Point Road. Fidalgo Bay is a 650-acre aquatic reserve managed by the Washington Department of Natural Resources.

Describe the vegetation in the project action area:

Vegetation in the action area has been altered by land use. Areas of commercial and residential development are either un-vegetated or dominated by herbaceous/grassy, and ornamental vegetation. Vegetation that is present is dominated by scattered patches of mixed deciduous and coniferous forest. A golf course and the Tesoro refinery are dominated by maintained grassy vegetation.

Habitat in the project action area

5% Riparian, 15% Meadow, 5% Coniferous Forest, 25% Deciduous Forest, 15% Mixed Forest, 2% Wetlands, 1% Rock-talus, 17% Developed, and 15% Other

Do streams, rivers, or other waterbodies occur in the project action area?

☐ Yes ☒ No

Stream name 1 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

Fidalgo Bay parallels SR 20 and SR 20 Spur to the north of the project. Within the action area, Fidalgo Bay is shallow mud-flat. Since SR 20 parallels Fidalgo Bay, riparian vegetation is sparse in areas that have been rip-rapped to protect the road from tidal erosion. These areas are dominated by maintained grassy vegetation or invasive shrub vegetation (Scot's broom, Himalayan blackberry, with some pea-fruit rose). One knob of land juts out in the Bay that is dominated by mixed forest of western red cedar, Pacific madrone, and red alder trees with an understory of oso-berry, oceanspray, pea-fruit rose, and western swordfern. The Fidalgo Bay mitigation site at the east end of the project is vegetated with planted native trees and shrub vegetation. No in-water impacts are proposed for this project. Minor buffer impacts to grassy or maintained shrubby vegetation will occur.

Stream name 2 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

On the east side of SR 20 at milepost (MP) 48.17 an unnamed stream flows out of the golf course through a pump house/tide gate into Fidalgo Bay. This stream feature is primarily ditched and is associated with Wetland 9. Overall, the stream lacks habitat and is dominated by small gravels and fines. Some stream shade comes from common cattail, reed canarygrass, and Himalayan blackberry. The stream is considered non-fish bearing (WDFW, Thompson D.). Minor impacts will occur along the stream buffer. No in-water work will occur.

Stream name 3 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

On the west side of the project along the SR 20 Spur near MP 48.12 a stream locally known as Aqua Creek flows under SR 20 Spur into Fidalgo Bay. Three-spine stickleback were observed during a site visit; therefore, the stream would be considered fish bearing. No in-water work or buffer impacts will occur.

Project Impacts to Streambank, Streambed, and Shoreline

Will there be riprap placement in the project area along streambanks or shorelines ?

☒ Yes ☐ No

Will work on streambanks or shorelines improve fish habitat?

☒ Yes ☐ No

Indicate why there will be no fish habitat improvements.

Native vegetation will be replanted along Fidalgo Bay and treatment of new and replaced impervious surface will provide some improvements along the shoreline.

Will the stream bed, lake bed or marine bed be disturbed?

☒ Yes ☐ No

Project Impacts to Marine Mammals

The NMFS programmatic only covers informal effects to marine mammals

Will the project affect marine mammal migration?

☒ Yes ☐ No

Will there be effects to marine mammal prey species or food webs?

☒ Yes ☐ No

Will the project alter shorelines or other natural processes?

☒ Yes ☐ No

Other possible effects to marine mammals (explain)

Stormwater effects may occur with additional impervious surfaces. The project proposes to treat all new and replaced impervious surfaces to ensure insignificant stormwater effects on species using Fidalgo Bay. The nearest seal and sea lion haulouts are more than 2 miles from the project and habitat is mudflat within the action area, so no noise effects are expected to marine mammals.

Pollution Generating Impervious Surface

Will the project create new PGIS?

☐ Yes ☒ No

Existing PGIS

Area: 19.32 acres (841,579 square feet)

Post-project PGIS

Area: 20.56 acres (895,594 square feet)

Net gain of PGIS

Area: 1.24 acres (54,014 square feet)

Replaced PGIS

Area: 16,683 square feet (.383 acres)

Area of existing PGIS that is currently treated (pre-project treatment)

Area: .644 acres (28,053 square feet)

Area of post-project PGIS that will be treated.

Area: 2.23 acres (97,139 square feet)

Will stormwater from the new impervious surface area be treated?

☐ Yes ☒ No

Will there be 100% infiltration of new and existing PGIS?

☒ Yes ☐ No

Indicate if infiltration is not feasible and why.

Geotechnical investigations indicate soils are not conducive to infiltration in the project area.

Fish Handling

Will the project have fish handling?

☒ Yes ☐ No

Will an HPA be needed?

☒ Yes ☐ No

Project Terrestrial Impacts

Total permanent vegetation impact area (all vegetation types including riparian)

Area: 2.24 acres (97,574 square feet)

Total temporary vegetation impact area (all vegetation types)

Area: 1.84 acres (80,150 square feet)

Total vegetation impact area (all vegetation types)

Area: 4.08 acres (177,725 square feet)

Will the project have riparian vegetation impacts?

☐ Yes ☒ No

Temporary riparian impact area

Area: 3,485 square feet (.08 acres)

Permanent riparian impact area

Area: 12,197 square feet (.28 acres)

Total riparian impact area.

Area: 15,682 square feet (.36 acres)

If you are removing mature trees in the riparian zone, describe the species and approximate tree size and number removed

Cut and fill will only impact roadside vegetation dominated by grasses with some Himalayan blackberry, Scot's broom, and pea-fruit rose. Native re-planting will occur. Permanent buffer impacts will be mitigated at the Fidalgo Bay Mitigation Site.

Area of on-site riparian restoration

Area: 3,485 square feet (.08 acres)

NMFS and USFWS Pre-Approved Enhancement Projects (Fast Track)

These are projects that benefit listed species and habitat.

All Fast Track projects must be submitted for final review to WSDOT Headquarters. Check the box if your project meets the stated conditions and fill in the required information. There are 6 project types.

Essential Fish Habitat

The analysis of Essential Fish Habitat is usually conducted for all projects submitted to the National Marine Fisheries Service in conjunction with the Endangered Species Act analysis. However, an EFH analysis can be done as a stand-alone submittal.

Pacific salmon EFH is based on habitat for Chinook, coho, and pink salmon.

Is there Groundfish Essential Fish Habitat present in the project action area?

☐ Yes ☒ No

Will the project adversely affect groundfish EFH?

☒ Yes ☐ No

Is there Pacific Salmon Essential Fish Habitat present in the project action area?

☐ Yes ☒ No

Will the project adversely affect Pacific Salmon EFH?

☒ Yes ☐ No

Project Minimization Measures

Stormwater Quality and Quantity Minimization Measures

MM-1. All projects (except exempt activities as listed in section 3-2.2 of the Highway Runoff Manual (HRM, WSDOT 2014), are subject to minimum stormwater management requirements as outlined in Section 3-3 of the HRM. Non-exempt projects must address erosion control if = 7,000 ft² of soil will be disturbed or if there is = 2000 ft² of new, replaced, or new + replaced impervious surface. Erosion control requirements include: 1) a temporary erosion and sediment control (TESC) plan (see TESC Manual), and a project specific spill prevention, control and countermeasures (SPCC) Plan as required in Standard Specification 1.07-15(1).

☐ Yes ☒ No

MM-2. Projects within 200 feet of surface water will install and maintain Best Management Practices (BMPs) as stated in the Temporary Erosion and Sediment Control Manual to ensure that no foreign material, such as pavement slurry from asphalt grinding equipment, is sidecast, and to control and prevent sediments from entering aquatic systems.

☐ Yes ☒ No

MM-3. Projects will at a minimum comply with Washington Department of Ecology's State Water Quality Standards or permit modifications. Permit modifications are limited to temporary extension of the turbidity plume.

☐ Yes ☒ No

MM-4. Projects that drain to waters that may be used by listed fish species and create more than 500 ft² of new pollution generating impervious surface in any TDA will use the most current WSDOT stormwater effects analysis guidance to evaluate the potential effects of each proposed project. The PBA Determination Form and/or supplemented documents must include the following information at a minimum: 1) Sufficient information to assess pre-project and post-project stormwater pollutant loadings and end of pipe concentrations. 2) Identify the receiving waterbodies for the stormwater runoff associated with the new pollution generating impervious surface. 3) Identify any proposed new (or modified) stormwater outfalls/structures.

☐ Yes ☒ No

MM-4 cont'd. 4) A qualitative or quantitative description of pre-and post-project mixing zones or dilution analysis, consistent with WSDOT stormwater effects analysis guidance. If exposure to listed fish species in the dilution zone cannot be discounted, a quantitative description is recommended. 5) Describe potential effects to hydrology (i.e., peak flows, base flows, flow durations, etc.) and in-stream conditions (i.e., bed and bank scour or erosion, channel stability, etc.) due to the proposed project.

☐ Yes ☒ No

MM-5. The project will not cause or contribute to bed or bank scour or erosion (channel instability), and will not measurably affect base, peak, or flow durations in any Threshold Discharge Area (TDA) or receiving waterbody.

☐ Yes ☒ No

MM-6. Stormwater will be infiltrated and/or dispersed when possible.

☐ Yes ☒ No

Aquatic Area Buffers Minimization Measures

MM-7. No contractor staging areas will be allowed within 200 feet of potentially suitable wetland, stream, estuarine, river or marine drainage as identified by the project biologist, unless site specific review completed by the project biologist indicates that no impacts to the sensitive resource areas will occur due to topography or other factors.

☐ Yes ☒ No

MM-8. Temporary material storage piles consisting of erosive materials will be placed outside the 100-year floodplain during the rainy season (October 1 through June 1) except for emergency projects, or unless site specific review completed by the project biologist indicates that topography or other factors preclude runoff from entering waterbodies containing listed fish species or their prey. Such temporary storage piles will be stabilized with plastic sheeting, straw bales, or other BMPs, to prevent sediment delivery to these waterbodies. Material to be used within 12 hours of deposition will not be considered a temporary material storage pile.

☐ Yes ☒ No

MM-9. All excavated materials will be removed to an upland location where they cannot enter the water body.

☐ Yes ☒ No

Vegetation Removal Minimization Measures

MM-11. Minimize removal of riparian vegetation and replant riparian vegetation. Replanting may not be possible in permanent impact areas, the roadway clear zone, or adjacent to or under bridges. However, potential replanting of riparian vegetation near the site should be evaluated. The PBA Determination Form will provide the justification for the removal of riparian vegetation and will include the proposed replanting plans, if applicable.

☐ Yes ☒ No

MM-12. Vegetation will only be grubbed from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.

☐ Yes ☒ No

MM-13. Disturbance to riparian vegetation from the operation of heavy equipment will be minimized as practicable by straddling it with heavy equipment or by pruning it without damaging the roots. Existing riparian vegetation outside of the work area will not be removed or disturbed.

☐ Yes ☒ No

Revegetation and Slope Stability Minimization Measures

MM-18. All unstable slopes resulting from construction activities with a high likelihood of delivery of material to listed species-bearing waters will be stabilized within 2 days from October 1 to April 30, and within 7 days from May 1 to September 30.

☐ Yes ☒ No

MM-19. Temporarily disturbed areas will be restored to pre-work conditions to the extent possible, including protecting existing root systems and allowing re-sprouting of herbaceous and woody plants. Native trees and shrubs will be used that are endemic to the project vicinity or region of the State where the activity is occurring.

☐ Yes ☒ No

MM-20. All exposed areas will be mulched and seeded with an approved native or noninvasive herbaceous seed mix following construction and/or planted with native woody vegetation and trees (if appropriate) during the first available planting season.

☐ Yes ☒ No

General Construction Minimization Measures

MM-21. Construction impacts will be confined to the minimum area necessary to complete the project.

☐ Yes ☒ No

MM-22. Boundaries of clearing limits will be clearly flagged to prevent disturbance outside of the limits.

☐ Yes ☒ No

Pollutant Protection Minimization Measures

MM-23. BMPs, as stated in the Highway Runoff Manual, will be used to ensure that no foreign material such as oil or fuel from construction equipment will enter any wetlands, flowing or standing water.

☐ Yes ☒ No

MM-24. All equipment will be fueled and maintained more than 200 feet from the nearest wetland, ditches, flowing or standing water, unless site specific review completed by the project biologist indicates that no impacts to the resource areas will result due to topography or other factors. Exceptions to this requirement are allowed for large cranes, pile drivers, and drill rigs if they cannot be easily moved.

☐ Yes ☒ No

MM-25. Equipment will be checked daily for leaks and will be well maintained to prevent lubricants and any other deleterious materials from entering waters of the State. Prior to entering the water or below the OHWM, all equipment will be free of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials. Wash water will not be discharged to any water body without pre-treatment.

☐ Yes ☒ No

Concrete Work Minimization Measures

MM-27. For projects involving concrete, concrete truck chute cleanout areas will be established to properly contain wet concrete and wash water and prevent it from entering wetlands and other waterbodies.

☐ Yes ☒ No

MM-28. The contractor will protect all inlets and catchments from stormwater runoff from fresh concrete, tackifier, paving, or paint striping if inclement weather unexpectedly occurs.

☐ Yes ☒ No

MM-29. All concrete will be poured in the dry, or within confined waters not being dewatered to surface waters, and will be allowed to cure a minimum of 7 days before contact with surface water.

☐ Yes ☒ No

Restrictions in Rainy Weather Minimization Measures

MM-32. No paving, chip sealing, or stripe painting will be initiated in rainy weather.

☐ Yes ☒ No

Cutting and Filling Minimization Measures

MM-66. Fill material will only be placed in specified and permitted locations. Fill placement may be permanent or temporary and will be located in a way that minimizes impacts to sensitive areas.

☐ Yes ☒ No

MM-67. Temporary fills must be entirely removed and the site restored to pre-existing contours.

☐ Yes ☒ No

Herbicide Use Minimization Measures

MM-75. Herbicides will not be used within 200 ft of listed fish species spawning and rearing streams unless site specific review completed by the project biologist indicates that topography or other factors preclude herbicides from reaching spawning and rearing stream occupied by listed fish species.

☐ Yes ☒ No

Lighting Minimization Measures

MM-76. Temporary lights for night work will be directed away from waters with listed fish species to the greatest extent possible, with the intent to prevent light from shining on surface waters.

☐ Yes ☒ No

MM-77. When permanent lighting is needed on a bridge or road segment adjacent to surface waters with listed fish species, individual "cobra head" or similar lamps will be used when possible, rather than area lights that illuminate larger areas. Lights will be directed away from waters with listed fish species to the extent possible.

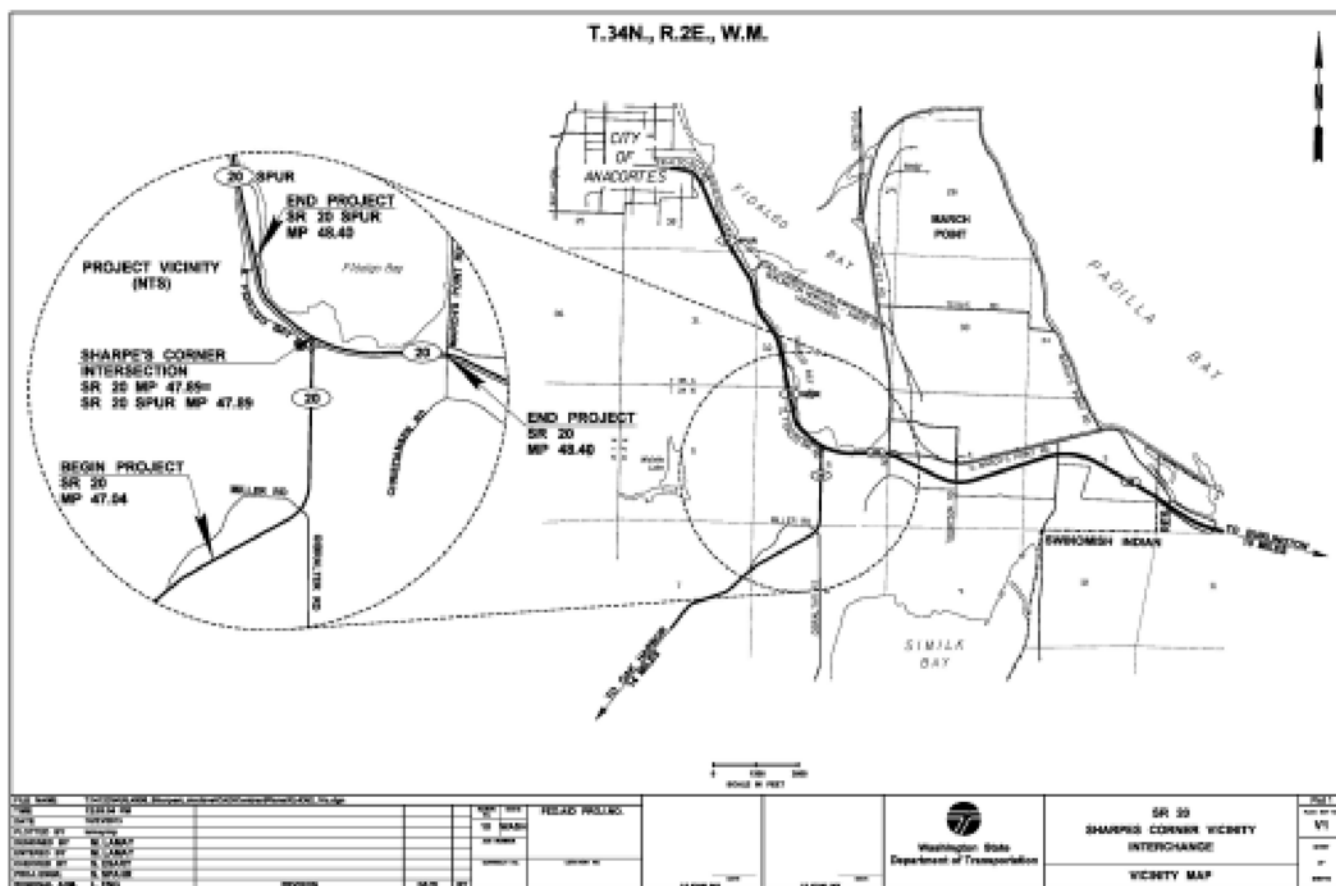
☐ Yes ☒ No

Minimization Measures Documentation

Will the project use all applicable minimization measures?

☐ Yes ☒ No

Vicinity Map & Photos



From: [Murray, Kristin](#)
To: [Koreski, Jason](#); [Lamay, Mikkel](#); [Stuber, Kevin](#); [Regan, Ross](#)
Subject: FW: SR 20 Spur Sharpes Corner Vicinity-Improvements (XL4998) Skagit County
Date: Thursday, September 01, 2016 2:28:13 PM

FYI-

From: Durham, Leslie [mailto:leslie_durham@fws.gov]
Sent: Thursday, September 1, 2016 10:37 AM
To: Magrane, April <MagranA@wsdot.wa.gov>
Cc: Murray, Kristin <MurraKM@wsdot.wa.gov>; Washington FHWA <washington.fhwa@dot.gov>; Miller, Mark (USFWS) <mark_miller@fws.gov>; Bakeman, Mark <BakemaM@wsdot.wa.gov>; Carlson, George <CarloG@wsdot.wa.gov>; Darold Rhodes <darold_rhodes@fws.gov>; Jones, DeeAn (USFWS) <deean_jones@fws.gov>; MacDonald, Michael K. <MacDonM@wsdot.wa.gov>
Subject: SR 20 Spur Sharpes Corner Vicinity-Improvements (XL4998) Skagit County

Ms. Magrane:

On July 19, 2016 the U.S. Fish and Wildlife Service (Service) received your request for consistency review for the above project under the Statewide Programmatic Consultation for Washington State Department of Transportation (WSDOT) Biological Opinion (Opinion, Ref # 01EWF00-2014-F-0286; 01EWF00-2014-FC-0287). The Opinion was issued by the Service on July 2, 2015 at the request of Federal Highway Administration (FHWA) and the U.S. Army Corps of Engineers (COE). The Service reference number for this project under the above referenced programmatic consultation is 01EWF00-2016-TA-1107. This consultation was conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The FHWA and WSDOT provided a complete Programmatic Notification Form (PNF) with a request for review dated June 13, 2016. The information included an effect determination of "may affect, not likely to adversely affect" for potential effects to bull trout (*Salvelinus confluentus*), bull trout critical habitat, and marbled murrelet (*Brachyramphus marmoratus*).

After consideration of this information we confirm that the WSDOT project as proposed is consistent with the programmatic Opinion with an effect determination of "may affect, not likely to adversely affect" for potential effects to bull trout and bull trout critical habitat.

Although our Opinion authorized WSDOT activities that result in effects to marbled murrelets during the nesting season (April 1 to September 23), this authorization is predicated on the work being done during daylight hours with a limited operating (LOP) that avoids work during dawn and dusk crepuscular hours. The current action includes overnight work that would be inconsistent with the required LOP. Therefore overnight work in suitable habitat for marbled murrelet during the nesting season is currently not an activity covered under the programmatic.

However, our Opinion also considered the full range of the effects associated with WSDOT activities and the current status of the murrelet and potential murrelet nesting habitat within municipal boundaries. Within portions of the action area that lie within municipalities, with the exception of Port Angeles, we expect that exposure of murrelets to stressors associated

with programmatic projects is extremely unlikely. Suitable habitat within the WSDOT programmatic action area is limited and highly fragmented, and available survey data do not indicate murrelet presence or occupancy within the action area inside municipalities. Our analysis resulted in a recommendation that municipal boundaries be used as a “project screen” for projects covered under the WSDOT programmatic. For WSDOT programmatic projects located within a mapped city boundary, that project can be considered a “may affect, not likely to adversely affect” project regarding murrelets, regardless of project timing or vegetation impacts unless it is within the city limits of Port Angeles (projects occurring within Port Angeles shall be evaluated individually). Because murrelet presence is extremely unlikely with municipal boundaries the above affect determination would remain true even if the project activities occurred during overnight hours.

Much of the current project action area falls within the municipal boundary of Anacortes. The majority of suitable murrelet habitat that occurs outside of the municipal boundary within the project action area is outside the 328-foot threshold distance for adverse effects from equipment operation. The small portion of suitable habitat that occurs within the 328 foot threshold distance is so fragmented it extremely unlikely that murrelets would be nesting there and exposed to project effects during the nesting season.

Blasting is an activity covered by the Opinion. Blasting will occur outside of the murrelet nesting season to avoid exposure of nesting murrelets to elevated levels of sound resulting from blasting. Blasting will occur along SR 20 over a period of up to 5 days. The majority of this time will be spent drilling into rock to set the blast charges. The detonation of the required charges is expected to require at most two detonations, all likely within one day, and most likely within a couple of hours. Blasting is expected to be instantaneous occurrence with elevated sound levels returning to ambient conditions in just a few seconds after each blast.

In-air elevated sound from blasting will be brief and will extend over Fidalgo Bay, a shallow tidal flat that includes a 650-acre aquatic reserve managed by the Washington Department of Natural Resources. Documented forage fish within the bay is more than 0.25 miles from the furthest extent of elevated sound from blasting. We expect marbled murrelets foraging in the bay within the action area to be limited to a very few. Given the short duration of blasting, murrelets are not expected to experience any significant changes of foraging behavior as a result of temporary elevated levels of sound as a result of blasting.

Consistency Finding

After consideration of this information we confirm that the WSDOT project as proposed is consistent with the programmatic Opinion with an effect determination of “may affect, not likely to adversely affect” for potential effects to bull trout, bull trout critical habitat, and marbled murrelet. The FHWA and WSDOT have concluded the project will have “no effect” on additional listed species known to occur in Skagit County. There is no requirement for the Service to concur with “no effect” determinations. Your determination that the project will have no effect on these species and habitats rests with the action agency.

As set forth by the programmatic consultation, we are responding in electronic format to confirm coverage under the programmatic. The project is not expected to result incidental take of listed species, as such there are no Reasonable or Prudent Measures or associated Terms and Conditions pertaining to this project.

If you have any further questions or if we can be of further assistance please contact me at 360-753-9532; leslie_durham@fws.gov; or Mark Miller (360-534-9347, mark_miller@fws.gov).

Thank you.

--

Leslie Durham

WSDOT Liaison
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
510 Desmond Drive SE, Ste. 254
Lacey, Washington 98503

360-753-9532
leslie_durham@fws.gov



Washington State
Department of Transportation

Northwest Region
15700 Dayton Avenue North
P.O. BOX 330310
Seattle, WA 98133-9710

(206) 440-4000
TTY: 1-800-833-6388
www.wsdot.wa.gov

July 7, 2016

Eric Rickerson
U.S. Fish and Wildlife Service
510 Desmond Drive SE, Suite 102
Lacey, Washington 98503

SR 20 Sharpes Corner Vicinity-Improvements (XL-4998), Skagit County, WA
Request for Programmatic Coverage

Dear Mr. Rickerson:

The Washington State Department of Transportation (WSDOT) proposes to improve the safety and capacity of the State Route (SR) 20/SR 20 Spur Interchange (AKA Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional roadway improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd/Gibraltar Road intersection. This project is located on State Route (SR) 20 between MP 47.04 to MP 48.40 and SR 20 Spur MP 47.89 to MP 48.40, within Skagit County and the City of Anacortes. Specifically, the project is located within portions of Township 34 North, Range 2 East, Sections 5 & 8. Construction activities are expected to begin April 1, 2018, and be completed November 22, 2019. The project will require a federal permit; therefore, it has a federal nexus under the Endangered Species Act (ESA) of 1973, as amended.

This project was presented at a pre-biological assessment (pre-BA) meeting U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) on April 14, 2016, in which it was determined the project could fit under the Programmatic BA for both USFWS and NMFS since the project treats all new and replaced PGIS and will use a limited operating period within suitable marbled murrelet habitat. The project does not entirely fit the conditions of the programmatic as nighttime work will occur; therefore, the project is being submitted as a reference BA.

The USFWS (IPaC species list #- 01EWF00-2016-SLI-0671) identified trout and bull trout critical habitat, marbled murrelet, streaked horned lark, western yellow-billed cuckoo, and Canada lynx potentially present in the action area. Based on the effects and exposure analyses and implementation of all impact and avoidance and minimization measures, the biological assessment concludes that the project activities, as proposed warrant an effect determination of **May Affect, Is Not Likely to Adversely Affect** for bull trout and bull trout critical habitat and marbled murrelet. The project warrants a **No Effect** determination for streaked horned lark, western yellow-billed cuckoo, and Canada lynx.

It is our understanding that with federal concurrence this satisfies our responsibilities under Section 7(c) of the Endangered Species Act at this time. We will continue to remain

aware of any change in status of these species and will be prepared to reevaluate potential project impacts if necessary.

Please contact the project biologist, Kristin Murray, at 360-788-7453 or murakm@wsdot.wa.gov if you have any questions or need additional clarification.

Sincerely,

A handwritten signature in blue ink, appearing to read 'April Magrane', with a stylized flourish at the end.

April Magrane, Biology Lead, WSDOT Northwest Region

cc: Jeff Horton, FHWA Area Engineer

Kristin Murray, Wetland and Fisheries Biologist, WSDOT Northwest Region

George Carlson, Environmental Manager, WSDOT NW Region

Jason Koreski, Project Engineer, WSDOT Northwest Region

Rebecca McAndrew, USACE/WSDOT Liaison

Leslie Durham, USFWS/WSDOT Liaison

WSDOT USFW Project Notification Form

Note: The proper version of this form must be submitted to either the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (or both). See <http://wwwi.wsdot.wa.gov/Environment/FishWildlife/> for submittal procedures.

Project Name:

Sr20/Sharpes Corner Vicinity - Improvements

Submittal Date:

July 13, 2016

Work Order:

XL4998

WIN:

A02029K

Project Location:

State Route 20, Mile Post 47.04 to 48.40

Geographical Coordinates: 48.45278400 / -122.58615600 to 48.46260000 / -122.57076200

Indicate Township / Range / Section

This project is located on State Route (SR) 20 between MP 47.04 to MP 48.40 and SR 20 Spur MP 47.89 to MP 48.40, within Skagit County and the City of Anacortes. Specifically, the project is located within portions of Township 34 North, Range 2 East, Sections 5 & 8.

County:

Skagit

Region:

Northwest

Project Biologist:

Kristin Murray, murrakm@wsdot.wa.gov, 360-788-7453

The project area was visited several times to delineate wetlands and streams and review habitat for terrestrial species.

Reviewing Biologist:

April P. Magrane, magrana@wsdot.wa.gov, 206-440-4522

Review completed.

Signed June 24, 2016 @ 8:20 PM

Form Completed Date:

WRIA:

3: Lower Skagit - Samish

6th Field Hydrologic Unit Code (HUC) Name
Fidalgo Island-Frontal Padilla Bay

6th Field HUC number
171100020502

Site Visit Date:
March 31, 2016

Date of Early Coordination:
April 14, 2016

Explain and summarize Early Coordination activities with the Services:
WSDOT presented the project to USFWS and NMFS at a pre-BA meeting. Feedback from the Services indicated the project could be submitted programmatically if the project treats stormwater from all new and replaced PGIS, uses the limited operating period in murrelet habitat outside of Anacortes, and provides specific details on night work. A tiered BO would be needed for night work. Because the project is treating all new and replaced PGIS, no Hi-Run modeling is required.

For USFWS jurisdiction species and critical habitats, this is a:
Informal Consultation

Does the project meet the conditions of the programmatic biological assessment?
☒ **Yes** ☐ **No**

Please explain:
Nighttime work will occur due to high traffic volumes. Seasonal high traffic volumes, ferry traffic, and local heavy traffic due to a nearby refinery require night work.

Is this a reference biological assessment?
☐ **Yes** ☒ **No**

Is this an after the fact consultation for the USFWS?
☒ **Yes** ☐ **No**

Will this project be submitted Fast Track for the NMFS?
☒ **Yes** ☐ **No**

Will this project be submitted Fast Track for the USFWS?
☒ **Yes** ☐ **No**

Effect determinations for USFWS species and critical habitats that can occur in the project action area:

No Effect:

**Canada Lynx
Streaked Horned Lark
Western Yellow-billed Cuckoo**

Not Likely to Adversely Affect:

**Marbled Murrelet
Bull Trout
Bull Trout Critical Habitat**

USFWS IPaC number for project
01EWF00-2016-SLI-0671

Check all project activities that apply (for both NMFS and USFWS projects)

**Create new pollution generating impervious surface
Upland vegetation removal & management
Riparian and Wetland Vegetation Removal and Management
Heavy equipment operation
Cut and fill operations
Use of Artificial Lighting**

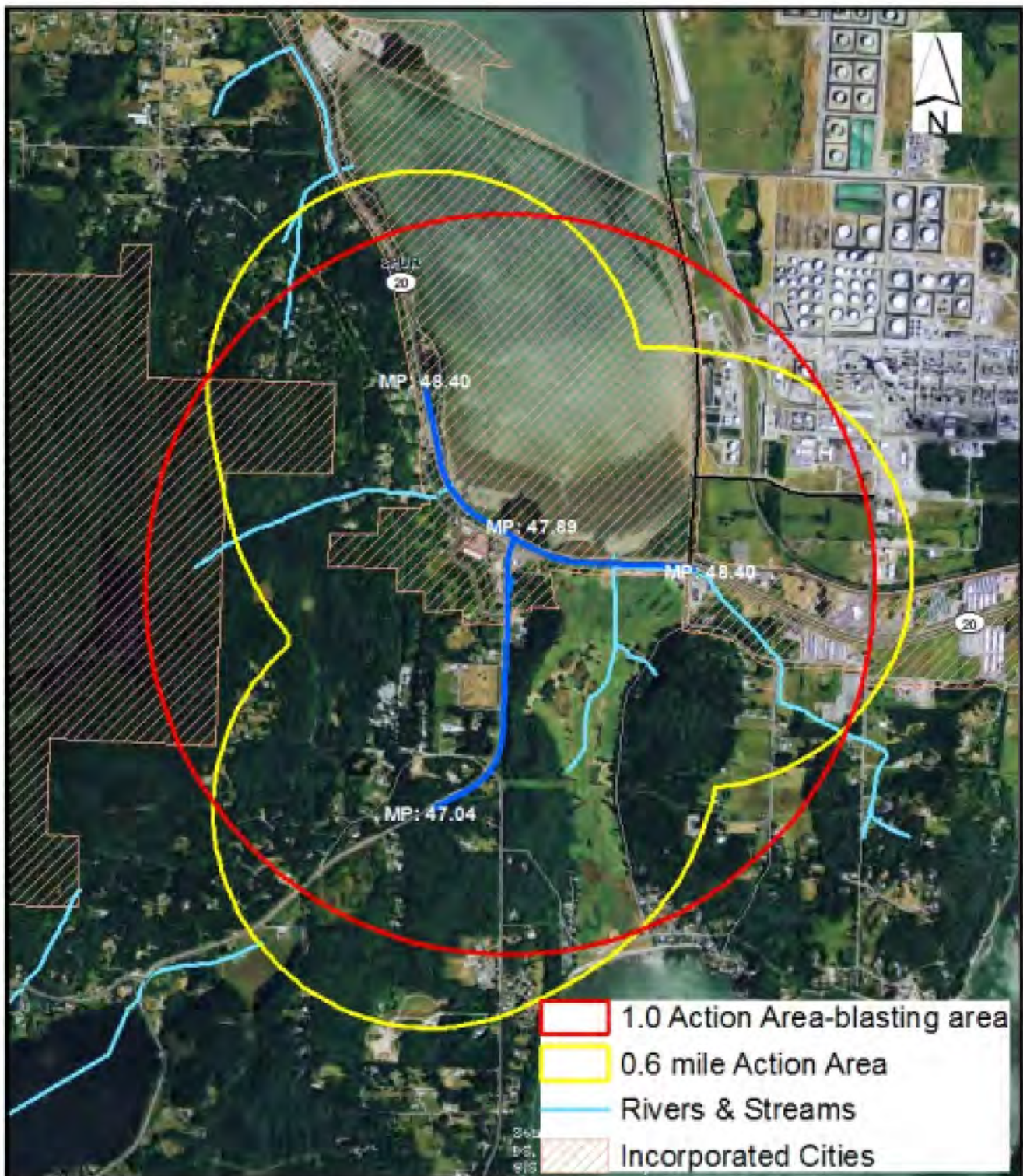
Check all project activities that apply (USFWS projects only)

Safety Improvements

Project action area:

The action area is estimated to include a 3,200 foot (0.60 mile) radius around the project site to account for the anticipated increase in noise levels due to construction. A 1 mile radius around a blasting area will be used. Although no in-water work is proposed, stormwater effects on listed aquatic species in Fidalgo Bay will be considered.

Attach map and photographs:



**Washington State
Department of Transportation**

ES&T Project/Station/Legend.mxd 11/11/2011

SR20 - SHARPES CORNER CURRENT PROJECT FEATURES



Project Description:

The project intends to improve the safety and capacity of the SR 20/SR 20 Spur Interchange (AKA Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional roadway improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd/Gibraltar Road intersection. The new lane configuration here will include two lanes in the southbound direction (toward Oak Harbor) and a single lane in the northbound direction. A multi-lane roundabout will be constructed at the intersection of SR 20/Miller Rd/Gibraltar Road.

Other notable work includes the relocation of utilities, both under and above ground, new illumination systems at the roundabouts, a multi-use path connecting SR 20/Sharpes Corner and the SR 20/March's Point road, potential rock blasting on the east side of SR 20 just south of Sharpes Corner, and landscaping/planting of disturbed areas throughout the project. All stormwater from new and replaced, a total of 1.24 acres, will be treated on-site with bioswales (basic and compost-amended) and vegetated filter strips (basic, narrow area, and compost amended). Wetland and buffer impacts of 0.16 acre and 0.19 acre, respectively, will be mitigated at the nearby WSDOT owned Fidalgo Bay mitigation site.

Project Equipment List

Heavy equipment will include traffic control equipment, lighting, rock drills, chain saws, compressors, dump trucks, excavators, graders, backhoes, roller/compactor, asphalt pavers, pavement grinders.

Indicate equipment that will be working below the ordinary high water mark (OHWM)

No equipment will be working in streams.

Is this an emergency project?

☒ **Yes** ☐ **No**

Does the project have any USFWS listed species or critical habitats on the county list? If no, then no effect for USFWS.

☐ **Yes** ☒ **No**

Does the project have any USFWS listed species or critical habitats in the mapped project area on IPaC (you can use an unofficial list if you think you have a no effect project)? If no, then no effect. Fill in the remaining required fields and the minimization measures and print the USFWS no effect form. If yes, continue with the rest of the form.

☐ **Yes** ☒ **No**

Does the project have sensitive habitats (within 200 feet of wetlands or surface waters) where staging, refueling, or other activities should be restricted?

☐ **Yes** ☒ **No**

Indicate mileposts within project area where restrictions apply.

Wetlands are located throughout the project corridor. No storage or materials or equipment will occur in sensitive areas not permitted for impact. HVF and BMPs will be used to protect wetlands and streams in the project corridor.

Will the project have construction equipment operating within the wetted channel of any waterbody?

☒ **Yes** ☐ **No**

Will detours be used?

☒ **Yes** ☐ **No**

Will the project include work at night?

☐ **Yes** ☒ **No**

Will artificial lights be used over or adjacent to an aquatic area?

☒ **Yes** ☐ **No**

Will blasting occur?

☐ **Yes** ☒ **No**

Number of blasts:

2

Will there be measures to protect listed species during blasting?

☐ **Yes** ☒ **No**

Please explain:

Blasting will occur outside the marbled murrelet nesting season (April 1 to September 23) to avoid impacts. No other listed terrestrial species or habitats are located within the action area.

Indicate dates when blasting will occur

Blasting is expected to occur in one day with one week of rock drilling prior to blasting. This will occur before April 1.

Will impact pile driving occur?

☒ **Yes** ☐ **No**

Will piles be removed on the project?

☒ **Yes** ☐ **No**

Is the project for slide abatement and repair?

☒ **Yes** ☐ **No**

Will cutting or filling occur?

☐ **Yes** ☒ **No**

Indicate cut area (excavated area) above the ordinary high water mark (OHWM).

Area: 1.77 acres (77,101 square feet)

Indicate fill area above the ordinary high water mark (OHWM)

Area: 2.31 acres (100,624 square feet)

Will cutting or filling occur within 300 ft of a water body that has listed aquatic species or their habitat?

☐ **Yes** ☒ **No**

Will any soils be exposed?

☐ **Yes** ☒ **No**

What is the erosion potential?

Low

Will bare soils be revegetated or hydroseeded after construction?

☐ **Yes** ☒ **No**

Describe the proposed methods.

Areas will be mulched and/or hydroseeded to stabilize exposed soils.

Project Timing

Construction Start Date

April 2, 2018

Construction End Date

November 22, 2019

Total Working Days
150

Will the project need a Hydraulic Project Approval (HPA) or have an aquatic zone of impact requiring in-water work?

☒ **Yes** ☐ **No**

Will the project have daily limited operating periods? If yes, please explain. If no leave blank

The project will have limited operating periods during the marbled murrelet nesting season (April 1 to September 23) on SR 20 from MP 47.66 to 47.30. In addition, blasting will be done outside the nesting season.

Will the project have any other seasonal operating restrictions not covered above? If yes, please explain. If no leave blank

Within suitable murrelet habitat, no daytime work will be allowed in the same area where night work occurred. Night construction work zones will be restricted to those areas a distance of 100 meters or greater from day construction work zones. Night construction activity, other than traffic control activities, will occur from one hour after sunset to one hour before sunrise from April 1 to September 23. This restriction would not apply to night time activities conducted between September 23 and April 1.

Project Aquatic Habitat Impacts

Elevated pollutant delivery (non-sediment)?

☒ **Yes** ☐ **No**

Will there be elevated sediment/turbidity?

☒ **Yes** ☐ **No**

Will riparian habitat functions be altered?

☐ **Yes** ☒ **No**

Explain

Minor permanent impacts will occur to the buffer of a non-fish bearing stream (0.01 acre) and along the Fidalgo Bay buffer (0.27 acre). Temporary buffer impacts of 0.08 acres will also occur for construction access. Impacts are largely road prism and are dominated by maintained grasses and invasive plants such as Scot's broom and Himalayan blackberry. Temporary impacts will be replanted with native vegetation. Mitigation for wetland and buffer impacts will occur at the Fidalgo Bay Mitigation Site along the bay.

Will there be elevated surface water temperature?

☒ **Yes** ☐ **No**

Will there be substrate disturbance?

☒ **Yes** ☐ **No**

Will there be loss of benthic invertebrate habitat and potential food web effects?

☒ **Yes** ☐ **No**

Will there be elevated in-water noise from pile driving?

☒ **Yes** ☐ **No**

Fish harm or harassment from in-water work or handling?

☒ Yes ☐ No

Will there be effects on fish migration?

☒ Yes ☐ No

Will there be impacts to wetlands that have fish habitat?

☒ Yes ☐ No

Will there be permanent or temporary fish habitat displacement?

☒ Yes ☐ No

Will there be altered water quality delivery, such as a change to a stormwater conveyance structure?

☒ Yes ☐ No

Will there be streambank/shoreline habitat loss/modification or reduced habitat connectivity?

☐ Yes ☒ No

Explain.

Impacts to 0.27 acre within the buffer of Fidalgo Bay and 0.01 acre of the unnamed stream will occur. Impacts occur to mostly road prism and maintained grassy or shrub vegetation within the right of way. Temporary impact areas will be restored with native vegetation. Permanent impacts will be mitigated at the Fidalgo Bay Mitigation Site.

Will natural stream processes and/or floodplains be altered?

☒ Yes ☐ No

Will the project have beneficial effects?

☒ Yes ☐ No

Environmental Setting

Baseline Conditions. Document general baseline conditions in the action area as they relate to the proposed action and effects. Discuss surrounding land use if appropriate.

The project area is located in the central portion of Fidalgo Island next to Fidalgo Bay largely within the City of Anacortes. Land use in the project area is primarily commercial development with scattered residential, recreational, and open space land use to the west. Commercial development includes a large golf course south of SR 20. Industrial development includes the Tesoro oil refinery located 0.25 miles north of the SR 20 intersection and Marches Point Road. Fidalgo Bay is a 650-acre aquatic reserve managed by the Washington Department of Natural Resources.

Describe the vegetation in the project action area:

Vegetation in the action area has been altered by land use. Areas of commercial and residential development are either un-vegetated or dominated by herbaceous/grassy, and ornamental vegetation. Vegetation that is present is dominated by scattered patches of mixed deciduous and coniferous forest. A golf course and the Tesoro refinery are dominated by maintained grassy vegetation.

Habitat in the project action area

5% Riparian, 15% Meadow, 5% Coniferous Forest, 25% Deciduous Forest, 15% Mixed Forest, 2% Wetlands, 1% Rock-talus, 17% Developed, and 15% Other

Do streams, rivers, or other waterbodies occur in the project action area?

☐ Yes ☒ No

Stream name 1 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

Fidalgo Bay parallels SR 20 and SR 20 Spur to the north of the project. Within the action area, Fidalgo Bay is shallow mud-flat. Since SR 20 parallels Fidalgo Bay, riparian vegetation is sparse in areas that have been rip-rapped to protect the road from tidal erosion. These areas are dominated by maintained grassy vegetation or invasive shrub vegetation (Scot's broom, Himalayan blackberry, with some pea-fruit rose). One knob of land juts out in the Bay that is dominated by mixed forest of western red cedar, Pacific madrone, and red alder trees with an understory of oso-berry, oceanspray, pea-fruit rose, and western swordfern. The Fidalgo Bay mitigation site at the east end of the project is vegetated with planted native trees and shrub vegetation. No in-water impacts are proposed for this project. Minor buffer impacts to grassy or maintained shrubby vegetation will occur.

Stream name 2 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

On the east side of SR 20 at milepost (MP) 48.17 an unnamed stream flows out of the golf course through a pump house/tide gate into Fidalgo Bay. This stream feature is primarily ditched and is associated with Wetland 9. Overall, the stream lacks habitat and is dominated by small gravels and fines. Some stream shade comes from common cattail, reed canarygrass, and Himalayan blackberry. The stream is considered non-fish bearing (WDFW, Thompson D.). Minor impacts will occur along the stream buffer. No in-water work will occur.

Stream name 3 in action area and describe spawning gravels, embeddedness, riparian cover, refuge area riffles, etc. Focus on areas where impacts may occur. If the stream is a tributary of a larger stream or river, indicate distance to nearest confluence.

On the west side of the project along the SR 20 Spur near MP 48.12 a stream locally known as Aqua Creek flows under SR 20 Spur into Fidalgo Bay. Three-spine stickleback were observed during a site visit; therefore, the stream would be considered fish bearing. No in-water work or buffer impacts will occur.

Project Impacts to Streambank, Streambed, and Shoreline

Will there be riprap placement in the project area along streambanks or shorelines ?

☒ Yes ☐ No

Will work on streambanks or shorelines improve fish habitat?

☒ Yes ☐ No

Indicate why there will be no fish habitat improvements.

Native vegetation will be replanted along Fidalgo Bay and treatment of new and replaced impervious surface will provide some improvements along the shoreline.

Will the stream bed, lake bed or marine bed be disturbed?

☒ Yes ☐ No

Pollution Generating Impervious Surface

Will the project create new PGIS?

☐ Yes ☒ No

Existing PGIS

Area: 19.32 acres (841,579 square feet)

Post-project PGIS

Area: 20.56 acres (895,594 square feet)

Net gain of PGIS

Area: 1.24 acres (54,014 square feet)

Replaced PGIS

Area: 16,683 square feet (.383 acres)

Area of existing PGIS that is currently treated (pre-project treatment)

Area: .644 acres (28,053 square feet)

Area of post-project PGIS that will be treated.

Area: 2.23 acres (97,139 square feet)

Will stormwater from the new impervious surface area be treated?

☐ Yes ☒ No

Will there be 100% infiltration of new and existing PGIS?

☒ Yes ☐ No

Indicate if infiltration is not feasible and why.

Geotechnical investigations indicate soils are not conducive to infiltration in the project area.

Fish Handling

Will the project have fish handling?

☒ Yes ☐ No

Will an HPA be needed?

☒ Yes ☐ No

Project Terrestrial Impacts

Total permanent vegetation impact area (all vegetation types including riparian)

Area: 2.24 acres (97,574 square feet)

Total temporary vegetation impact area (all vegetation types)
Area: 1.84 acres (80,150 square feet)

Total vegetation impact area (all vegetation types)
Area: 4.08 acres (177,725 square feet)

Will the project have riparian vegetation impacts?
☐ Yes ☒ No

Temporary riparian impact area
Area: 3,485 square feet (.08 acres)

Permanent riparian impact area
Area: 12,197 square feet (.28 acres)

Total riparian impact area.
Area: 15,682 square feet (.36 acres)

If you are removing mature trees in the riparian zone, describe the species and approximate tree size and number removed

Cut and fill will only impact roadside vegetation dominated by grasses with some Himalayan blackberry, Scot's broom, and pea-fruit rose. Native re-planting will occur. Permanent buffer impacts will be mitigated at the Fidalgo Bay Mitigation Site.

Area of on-site riparian restoration
Area: 3,485 square feet (.08 acres)

USFWS Listed Species/Critical Habitat Impacts & Effect Determinations

Only fill out the USFWS species that are on your IPaC list. Leave the others blank.

Marbled Murrelet

The programmatic will provide formal coverage for marbled murrelet

Is the project located in a county where marbled murrelet is on the USFWS species list?

☒ **No** ☐ **Yes**

After mapping your project in IPaC, was marbled murrelet on the species list returned by IPaC?

☐ **Yes** ☒ **No**

Is the project located within 70 miles of marine waters?

☐ **Yes** ☒ **No**

Is the project located within a covered mapped city boundary? If the project has multiple areas, all must be within municipal city boundaries to answer yes.

☐ **Yes** ☒ **No**

Does the project have suitable murrelet habitat either within the action area, or within 0.25 mile of disturbance activities, or 1 mile for blasting?

☐ **Yes** ☒ **No**

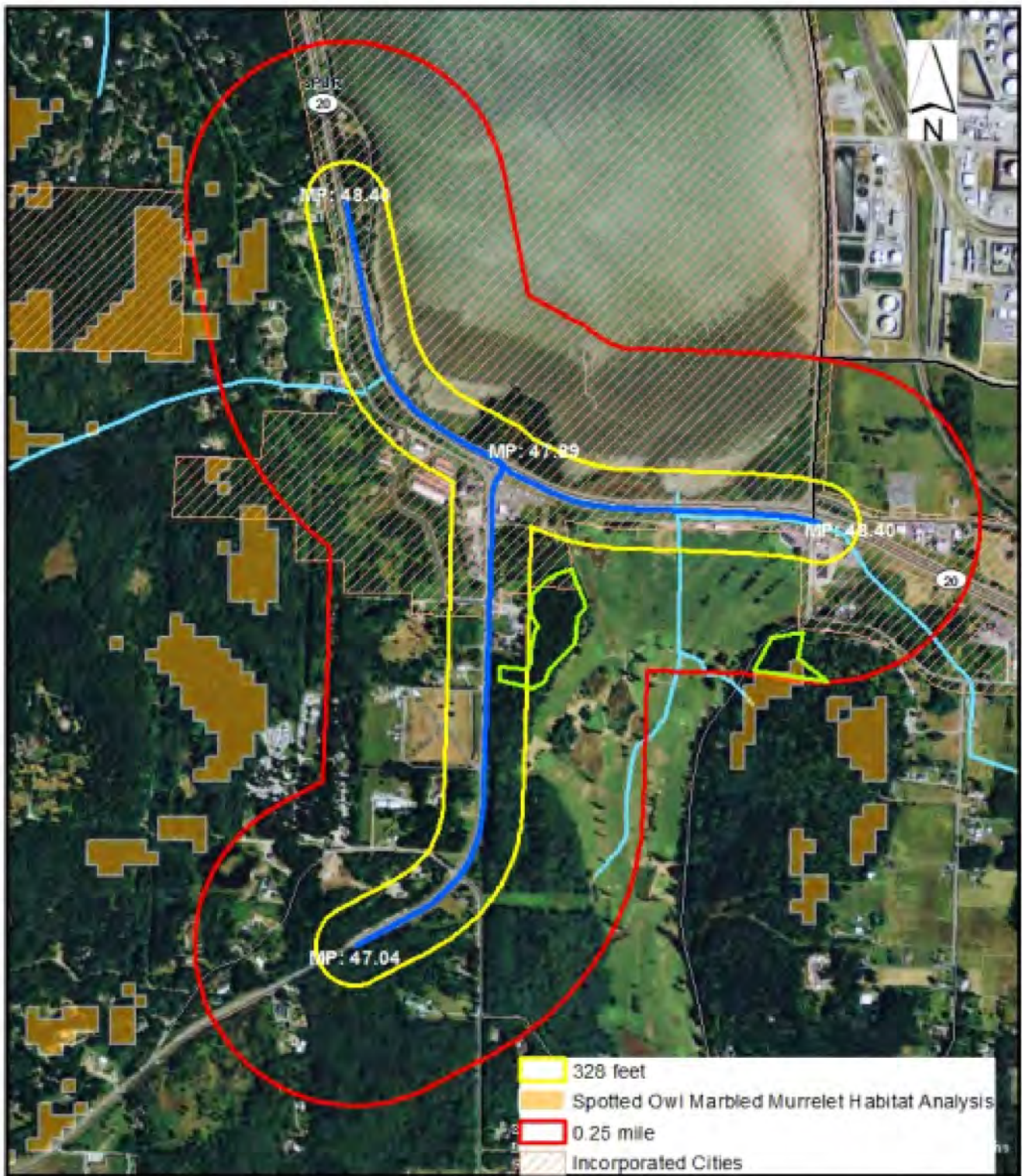
Will the project qualify as a low-impact project and be eligible for informal coverage for disturbance, regardless of distance to suitable nest stand?

☒ **Yes** ☐ **No**

Will your project expose suitable nesting habitat to visual or noise disturbance stressors during the marbled murrelet nesting season (April 1 – September 23)?

☐ **Yes** ☒ **No**

Map of Habitat Affected



**Washington State
Department of Transportation**

SR 20/Sharpes Corner Vicinity-Improvements

0 0.05 0.1 0.2 Miles

Date

ES:\17\SR20\SR20\Legend.mxd 11/11/2011

Will the project use the limited operating period of beginning working 2 hours after sunrise and quitting 2 hours before sunset?

☐ Yes ☒ No

Will the project have blasting and expose suitable nesting habitat within 0.25 mile of the blast during the nesting season?

☒ Yes ☐ No

Will the project include removal of suitable marbled murrelet habitat outside of critical habitat, and create a canopy gap, either within or outside of the nesting season?

☒ Yes ☐ No

Comments

Two areas of potentially suitable nesting habitat were identified within the project area (polygons outlined in green above); however, land use within the action area is fairly disturbed from development and no sitings have been made on Whidbey Island. Portions of the project are located within the city limits of Anacortes. No LOP is proposed within municipal boundaries.

Effect Determination:

Not Likely to Adversely Affect

Rationale

No suitable nest trees are located within 328 feet of the project and a LOP will be used during the nesting season. In addition, no marbled murrelet sitings are indicated within 18 miles of the project. Therefore, project effects are expected to be insignificant and discountable and are Not Likely to Adversely Affect marbled murrelet.

Marbled Murrelet Critical Habitat

The programmatic will provide formal coverage for marbled murrelet critical habitat.

Is the project located within a critical habitat unit? If not, is it within 0.5 mile of suitable habitat that is also within a critical habitat unit?

☐ No ☒ Yes

Bull Trout

The programmatic will provide formal coverage for bull trout

Is the project located in a county where bull trout is on the USFWS species list?

☒ No ☐ Yes

After mapping your project in IPaC, was bull trout on the species list returned by IPaC?

☐ Yes ☒ No

Is there bull trout spawning/rearing, FMO habitat in your project area, or do bull trout have access to your action area through FMO or spawning/rearing habitat?

☐ Yes ☒ No

Will juvenile bull trout or eggs be exposed to elevated turbidity levels?

☒ Yes ☐ No

Will your project have new PGIS?

☐ Yes ☒ No

Indicate the amount of new PGIS in spawning/rearing habitat.

Area: 0 square feet

Will the project include pile removal in marine/estuarine or freshwaters?

☒ Yes ☐ No

Will the project have cut and fill activities adjacent to bull trout FMO or spawning/rearing habitat?

☐ Yes ☒ No

Cut and fill amount adjacent to FMO habitat above the ordinary high water mark (OHWM)

Area: 11,761 square feet (.27 acres)

Cut and fill amount adjacent to FMO habitat below the ordinary high water mark (OHWM)

Area: 0 square feet

Total Cut and fill amount adjacent to FMO habitat (below + above the OHWM)

Area: 11,761 square feet (.27 acres)

Cut and fill area adjacent to spawning/rearing habitat above the ordinary high water mark (OHWM)

Area: 0 square feet

Cut and fill area adjacent to spawning/rearing habitat below the ordinary high water mark (OHWM)

Area: 0 square feet

Total Cut and fill amount adjacent to spawning/rearing habitat (below + above the OHWM)

Area: 0 square feet

Will the project affect either streambanks/shorelines or streambeds/lakebeds/marine bottoms in FMO habitat?

☒ Yes ☐ No

Will the project affect either streambanks/shorelines or streambeds/lakebeds/marine bottoms in spawning/rearing habitat?

☒ Yes ☐ No

Will there be streambank/shoreline hardening from placement of rock, rip-rap, concrete or other structural features in any bull trout habitat (FMO and/or spawning/rearing)?

☒ Yes ☐ No

Will there be riparian vegetation removal adjacent to bull trout habitat (FMO or spawning/rearing)?

☒ Yes ☐ No

Will the project have in-water pile driving in any bull trout habitat?

☒ Yes ☐ No

Will the project have fish moving within bull trout habitat? If so, please report all bull trout handled to HQ via email.

☒ Yes ☐ No

Comments

Bull trout FMO (foraging, migratory, overwintering) marine habitat is found within Fidalgo Bay; however, no in-water impacts will occur in Fidalgo Bay with minor vegetation impacts within the buffer of the bay. Impacts are to grassy/herbaceous vegetation and shrubs such as Scot's broom and Himalayan blackberry.

Effect Determination:

Not Likely to Adversely Affect

Rationale

Bull trout may use Fidalgo Bay within the action area. The project will treat all new and impervious surfaces, will protect water quality during construction, has no in-water work, and minor buffer impacts to grassy and/or maintained vegetation; therefore, impacts are insignificant and discountable and the project is Not Likely to Adversely Affect bull trout.

Bull Trout Critical Habitat

The programmatic will provide formal coverage for bull trout critical habitat.

Is the project located within designated critical habitat?

☒ **No** ☐ **Yes**

Will the project result in impacts to one or more of the critical habitat PCEs?

☒ **Yes** ☐ **No**

Effect Determination:

Not Likely to Adversely Affect

Rationale

Bull trout marine critical habitat is mapped in Fidalgo Bay. The project will treat all new and impervious surfaces, has no in-water work, and minor buffer impacts to grassy and/or maintained vegetation; therefore, impacts are insignificant and discountable and the project is Not Likely to Adversely Affect bull trout critical habitat.

Canada Lynx

The programmatic will provide informal coverage for Canada Lynx

Is the project located in a county where Canada lynx is on the USFWS species list? These areas are located within the montane areas of the Okanogan highlands or the Cascade Mountains.

☒ **No** ☐ **Yes**

After mapping your project in IPaC, was Canada lynx on the species list returned by IPaC?

☐ **Yes** ☒ **No**

Will the project be within the developed limits of a city or town?

☐ **Yes** ☒ **No**

Comments:

Parts of the project are located within the city of Anacortes.

Effect Determination:

No Effect

Rationale

Habitat within the action area is fragmented by development and not suitable; therefore, the project will have No Effect on Canada lynx.

Canada Lynx Critical Habitat

The programmatic will provide formal coverage for Canada Lynx critical habitat.

Lynx critical habitat occurs on SR 20 between MP 157.4 to 167.04 and MP 214.34 to 214.70. Is there designated critical habitat within the project action area? If no, done

☐ No ☒ Yes

Streaked Horned Lark

The programmatic will provide informal coverage for Streaked Horned Lark

Is streaked horned lark on the county list, or does the activity occur in Pierce, Thurston, Mason, Grays Harbor, Pacific, Wahkiakum, or Cowlitz Counties?

☒ No ☐ Yes

After mapping your project in IPaC, was streaked horned lark on the species list returned by IPaC?

☐ Yes ☒ No

Will there be ground disturbing activities (either permanent or temporary) to potential suitable nesting habitat during the breeding or non-breeding season as identified by the project biologist?

☒ Yes ☐ No

Will the project have visual or noise disturbance in streaked horned lark potential nesting habitat from April 15 to August 31?

☐ No ☒ Yes

Effect Determination:

No Effect

Rationale:

The project action area is not located within current range of the streaked horned lark and does not include remnant prairie habitat or suitable beach habitat. The project will have No Effect on streaked horned lark because there is no streaked horned lark or habitat in the project action area.

Western Yellow-billed Cuckoo

The programmatic will provide informal coverage for Yellow-billed Cuckoo. This bird is listed in all of Washington State. There is no proposed or designated critical habitat in Washington State.

Is yellow-billed cuckoo on the IPaC county or project-specific list?

☐ Yes ☒ No

Does the project action area contain mature, wooded, non-coniferous riparian areas that are equal or greater than 50 acres in size?

☒ **Yes** ☐ **No**

Will the project occur during October-April?

☐ **Yes** ☒ **No**

Will the project have effects to potential riparian habitat, in hardwood stands that are a minimum of 50 acres in size?

☒ **Yes** ☐ **No**

Effect Determination:

No Effect

Rationale

The project action area does not include suitable riparian habitat for nesting. The project will have No Effect on western yellow-billed cuckoo because there is not suitable habitat in the project action area.

Project Minimization Measures

Stormwater Quality and Quantity Minimization Measures

MM-1. All projects (except exempt activities as listed in section 3-2.2 of the Highway Runoff Manual (HRM, WSDOT 2014), are subject to minimum stormwater management requirements as outlined in Section 3-3 of the HRM. Non-exempt projects must address erosion control if = 7,000 ft² of soil will be disturbed or if there is = 2000 ft² of new, replaced, or new + replaced impervious surface. Erosion control requirements include: 1) a temporary erosion and sediment control (TESC) plan (see TESC Manual), and a project specific spill prevention, control and countermeasures (SPCC) Plan as required in Standard Specification 1.07-15(1).

☐ Yes ☒ No

MM-2. Projects within 200 feet of surface water will install and maintain Best Management Practices (BMPs) as stated in the Temporary Erosion and Sediment Control Manual to ensure that no foreign material, such as pavement slurry from asphalt grinding equipment, is sidecast, and to control and prevent sediments from entering aquatic systems.

☐ Yes ☒ No

MM-3. Projects will at a minimum comply with Washington Department of Ecology's State Water Quality Standards or permit modifications. Permit modifications are limited to temporary extension of the turbidity plume.

☐ Yes ☒ No

MM-4. Projects that drain to waters that may be used by listed fish species and create more than 500 ft² of new pollution generating impervious surface in any TDA will use the most current WSDOT stormwater effects analysis guidance to evaluate the potential effects of each proposed project. The PBA Determination Form and/or supplemented documents must include the following information at a minimum: 1) Sufficient information to assess pre-project and post-project stormwater pollutant loadings and end of pipe concentrations. 2) Identify the receiving waterbodies for the stormwater runoff associated with the new pollution generating impervious surface. 3) Identify any proposed new (or modified) stormwater outfalls/structures.

☐ Yes ☒ No

MM-4 cont'd. 4) A qualitative or quantitative description of pre-and post-project mixing zones or dilution analysis, consistent with WSDOT stormwater effects analysis guidance. If exposure to listed fish species in the dilution zone cannot be discounted, a quantitative description is recommended. 5) Describe potential effects to hydrology (i.e., peak flows, base flows, flow durations, etc.) and in-stream conditions (i.e., bed and bank scour or erosion, channel stability, etc.) due to the proposed project.

☐ Yes ☒ No

MM-5. The project will not cause or contribute to bed or bank scour or erosion (channel instability), and will not measurably affect base, peak, or flow durations in any Threshold Discharge Area (TDA) or receiving waterbody.

☐ Yes ☒ No

MM-6. Stormwater will be infiltrated and/or dispersed when possible.

☐ Yes ☒ No

Aquatic Area Buffers Minimization Measures

MM-7. No contractor staging areas will be allowed within 200 feet of potentially suitable wetland, stream, estuarine, river or marine drainage as identified by the project biologist, unless site specific review completed by the project biologist indicates that no impacts to the sensitive resource areas will occur due to topography or other factors.

☐ Yes ☒ No

MM-8. Temporary material storage piles consisting of erosive materials will be placed outside the 100-year floodplain during the rainy season (October 1 through June 1) except for emergency projects, or unless site specific review completed by the project biologist indicates that topography or other factors preclude runoff from entering waterbodies containing listed fish species or their prey. Such temporary storage piles will be stabilized with plastic sheeting, straw bales, or other BMPs, to prevent sediment delivery to these waterbodies. Material to be used within 12 hours of deposition will not be considered a temporary material storage pile.

☐ Yes ☒ No

MM-9. All excavated materials will be removed to an upland location where they cannot enter the water body.

☐ Yes ☒ No

Vegetation Removal Minimization Measures

MM-11. Minimize removal of riparian vegetation and replant riparian vegetation. Replanting may not be possible in permanent impact areas, the roadway clear zone, or adjacent to or under bridges. However, potential replanting of riparian vegetation near the site should be evaluated. The PBA Determination Form will provide the justification for the removal of riparian vegetation and will include the proposed replanting plans, if applicable.

☐ Yes ☒ No

MM-12. Vegetation will only be grubbed from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.

☐ Yes ☒ No

MM-13. Disturbance to riparian vegetation from the operation of heavy equipment will be minimized as practicable by straddling it with heavy equipment or by pruning it without damaging the roots. Existing riparian vegetation outside of the work area will not be removed or disturbed.

☐ Yes ☒ No

Revegetation and Slope Stability Minimization Measures

MM-18. All unstable slopes resulting from construction activities with a high likelihood of delivery of material to listed species-bearing waters will be stabilized within 2 days from October 1 to April 30, and within 7 days from May 1 to September 30.

☐ Yes ☒ No

MM-19. Temporarily disturbed areas will be restored to pre-work conditions to the extent possible, including protecting existing root systems and allowing re-sprouting of herbaceous and woody plants. Native trees and shrubs will be used that are endemic to the project vicinity or region of the State where the activity is occurring.

☐ Yes ☒ No

MM-20. All exposed areas will be mulched and seeded with an approved native or noninvasive herbaceous seed mix following construction and/or planted with native woody vegetation and trees (if appropriate) during the first available planting season.

☐ Yes ☒ No

General Construction Minimization Measures

MM-21. Construction impacts will be confined to the minimum area necessary to complete the project.

☐ Yes ☒ No

MM-22. Boundaries of clearing limits will be clearly flagged to prevent disturbance outside of the limits.

☐ Yes ☒ No

Pollutant Protection Minimization Measures

MM-23. BMPs, as stated in the Highway Runoff Manual, will be used to ensure that no foreign material such as oil or fuel from construction equipment will enter any wetlands, flowing or standing water.

☐ Yes ☒ No

MM-24. All equipment will be fueled and maintained more than 200 feet from the nearest wetland, ditches, flowing or standing water, unless site specific review completed by the project biologist indicates that no impacts to the resource areas will result due to topography or other factors. Exceptions to this requirement are allowed for large cranes, pile drivers, and drill rigs if they cannot be easily moved.

☐ Yes ☒ No

MM-25. Equipment will be checked daily for leaks and will be well maintained to prevent lubricants and any other deleterious materials from entering waters of the State. Prior to entering the water or below the OHWM, all equipment will be free of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials. Wash water will not be discharged to any water body without pre-treatment.

☐ Yes ☒ No

Concrete Work Minimization Measures

MM-27. For projects involving concrete, concrete truck chute cleanout areas will be established to properly contain wet concrete and wash water and prevent it from entering wetlands and other waterbodies.

☐ Yes ☒ No

MM-28. The contractor will protect all inlets and catchments from stormwater runoff from fresh concrete, tackifier, paving, or paint striping if inclement weather unexpectedly occurs.

☐ Yes ☒ No

MM-29. All concrete will be poured in the dry, or within confined waters not being dewatered to surface waters, and will be allowed to cure a minimum of 7 days before contact with surface water.

☐ Yes ☒ No

Restrictions in Rainy Weather Minimization Measures

MM-32. No paving, chip sealing, or stripe painting will be initiated in rainy weather.

☐ Yes ☒ No

Cutting and Filling Minimization Measures

MM-66. Fill material will only be placed in specified and permitted locations. Fill placement may be permanent or temporary and will be located in a way that minimizes impacts to sensitive areas.

☐ Yes ☒ No

MM-67. Temporary fills must be entirely removed and the site restored to pre-existing contours.

☐ Yes ☒ No

Herbicide Use Minimization Measures

MM-75. Herbicides will not be used within 200 ft of listed fish species spawning and rearing streams unless site specific review completed by the project biologist indicates that topography or other factors preclude herbicides from reaching spawning and rearing stream occupied by listed fish species.

☐ Yes ☒ No

Lighting Minimization Measures

MM-76. Temporary lights for night work will be directed away from waters with listed fish species to the greatest extent possible, with the intent to prevent light from shining on surface waters.

☐ Yes ☒ No

MM-77. When permanent lighting is needed on a bridge or road segment adjacent to surface waters with listed fish species, individual "cobra head" or similar lamps will be used when possible, rather than area lights that illuminate larger areas. Lights will be directed away from waters with listed fish species to the extent possible.

☐ Yes ☒ No

Marbled Murrelet and N. Spotted Owl Minimization Measures

MM-88. If an active murrelet or northern spotted owl nest is discovered, the activity will cease immediately. A WSDOT and USFWS biologist will be notified immediately and all activities within the disturbance threshold distances (within 0.25 mile of an active nest tree for all activities except blasting, which is 1 mile) will be postponed until after the nesting season.

☐ Yes ☒ No

MM-89. When working within the early northern spotted owl or murrelet nesting season is unavoidable (i.e., due to adverse weather conditions and snow at high elevations [including blasting], low temperature or coastal fog, or emergency actions addressed in this PBA), work will be phased to the extent possible so activities within disturbance threshold distances are conducted as late as possible in the nesting period.

☐ Yes ☒ No

MM-90. All activities that may result in visual or noise disturbance based on accepted thresholds, within suitable murrelet nesting habitat will restrict activities to between two hours after sunrise and two hours before sunset during the murrelet nesting season (April 1 to September 23).

☐ Yes ☒ No

MM-92. Activities will not downgrade a forested stand of suitable murrelet nesting habitat to unsuitable murrelet nesting habitat.

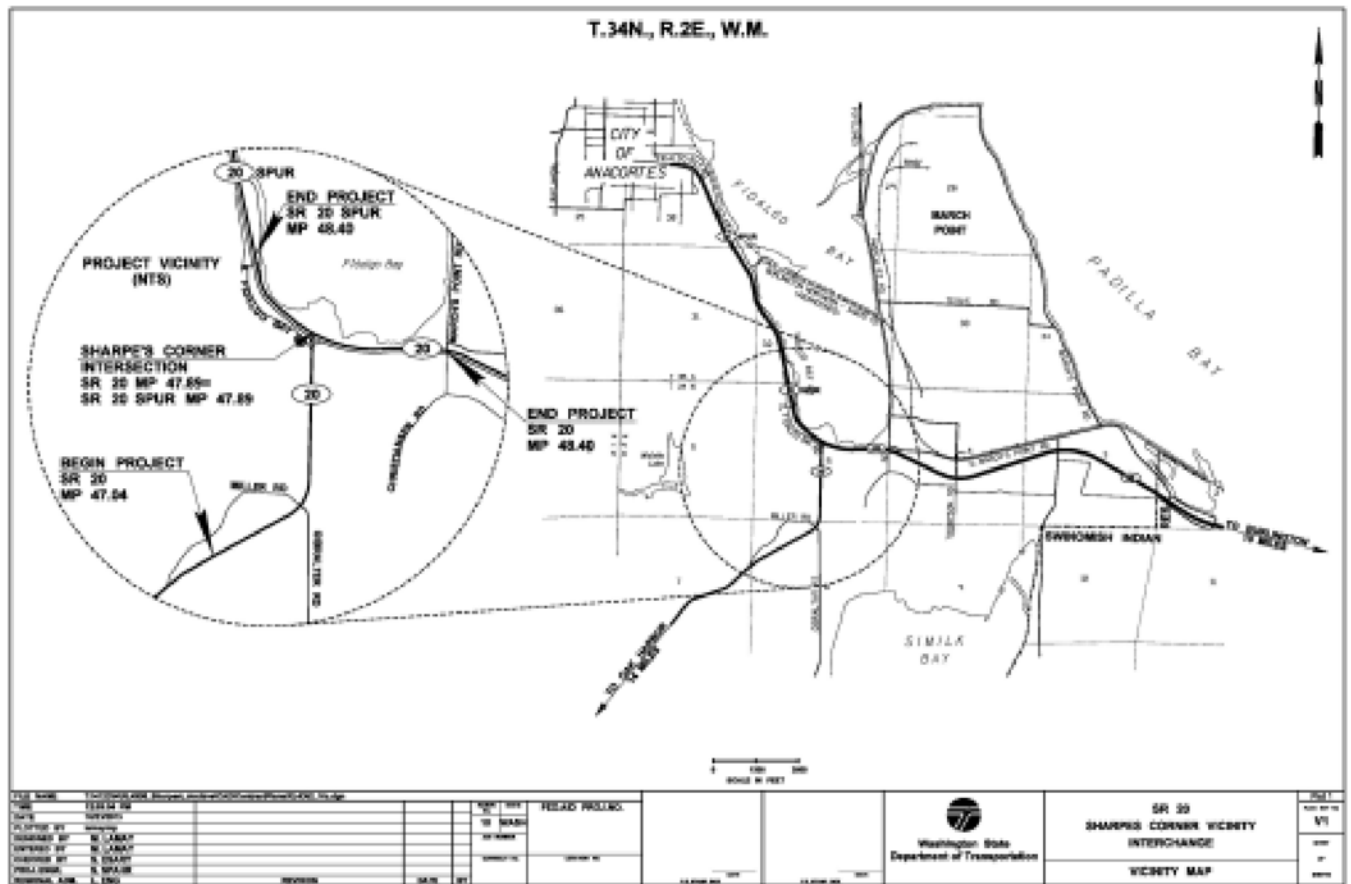
☐ Yes ☒ No

Minimization Measures Documentation

Will the project use all applicable minimization measures?

☐ Yes ☒ No

Vicinity Map & Photos





United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish and Wildlife Office
510 DESMOND DRIVE SE, SUITE 102
LACEY, WA 98503
PHONE: (360)753-9440 FAX: (360)753-9405
URL: www.fws.gov/wafwo/



Consultation Code: 01EWF00-2016-SLI-0671

April 12, 2016

Event Code: 01EWF00-2016-E-00708

Project Name: Kristin Murray

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website:

<http://wdfw.wa.gov/mapping/phs/> or at our office website:

http://www.fws.gov/wafwo/species_new.html. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at <http://www.fws.gov/pacific/eagle/for> information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: <http://www.nmfs.noaa.gov/pr/laws/mmpa/>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:

National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

Attachment



United States Department of Interior
Fish and Wildlife Service

Project name: Kristin Murray

Official Species List

Provided by:

Washington Fish and Wildlife Office
510 DESMOND DRIVE SE, SUITE 102
LACEY, WA 98503
(360) 753-9440
<http://www.fws.gov/wafwo/>

Consultation Code: 01EWF00-2016-SLI-0671

Event Code: 01EWF00-2016-E-00708

Project Type: TRANSPORTATION

Project Name: Kristin Murray

Project Description: This project is located on State Route (SR) 20 between MP 47.04 to MP 48.40 and SR 20 Spur MP 47.58 to MP 48.40, within Skagit County and the City of Anacortes. The project intends to improve the safety and capacity of the SR 20/SR 20 Spur Interchange (AKA Sharpes Corner) by replacing the existing signal with a multi-lane roundabout. Additional roadway improvements include widening SR 20 between Sharpes Corner and the SR 20/Miller Rd./Gibraltar Rd. intersection. The new lane configuration here will include two lanes in the southbound direction (toward Oak Harbor) and a single lane in the northbound direction. A multi-lane roundabout will be constructed at the intersection of SR 20/Miller Rd./Gibraltar Rd.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.



Project name: Kristin Murray

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United States Department of Interior
Fish and Wildlife Service

Project name: Kristin Murray

Project Counties: Skagit, WA



United States Department of Interior
Fish and Wildlife Service

Project name: Kristin Murray

Endangered Species Act Species List

There are a total of 6 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	Status	Has Critical Habitat	Condition(s)
Marbled murrelet (<i>Brachyramphus marmoratus</i>) Population: CA, OR, WA	Threatened	Final designated	
Streaked Horned lark (<i>Eremophila alpestris strigata</i>)	Threatened	Final designated	
Yellow-Billed Cuckoo (<i>Coccyzus americanus</i>) Population: Western U.S. DPS	Threatened	Proposed	
Fishes			
Bull Trout (<i>Salvelinus confluentus</i>) Population: U.S.A., conterminous, lower 48 states	Threatened	Final designated	
Dolly Varden (<i>Salvelinus malma</i>)	Proposed Similarity of Appearance (Threatened)		
Mammals			
Canada Lynx (<i>Lynx canadensis</i>)	Threatened	Final designated	



United States Department of Interior
Fish and Wildlife Service

Project name: Kristin Murray

Population: Contiguous U.S. DPS			



United States Department of Interior
Fish and Wildlife Service

Project name: Kristin Murray

Critical habitats that lie within your project area

There are no critical habitats within your project area.





LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 19.0 ftHOLE No. H-29-16Sheet 2 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
25	-5										The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 18' Depth of casing during bail test: 18' Water depth before bailing: 6.6' Water depth after bailing: Dry Recharge after 15 minutes :none Dry Hole		

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.

End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4
Depth of boring during bail test: 18'
Depth of casing during bail test: 18'
Water depth before bailing: 6.6'
Water depth after bailing: Dry
Recharge after 15 minutes: none

Dry Hole



LOG OF TEST BORING

Start Card SE60111Job No. XL-4998SR 020Elevation 5.7 ftHOLE No. H-30-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 13, 2016 Completion December 13, 2016 Well ID# _____ Equipment CME 45 (9A2-523)Station X 18+43.53 Offset 76.8 feet right Hole Dia 4 (inches) Historical SPT Efficiency 89.4%Northing 538352.6131 Easting 1217089.211 Collected by Region Survey Crew Method Hollow Stem AugerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5.0			20 40 60 80	5 7 7 3 (14)	D-1		Well graded GRAVEL with sand and silt, sub-angular, medium dense, gray, moist, homogeneous. Recovered: 1.2 ft Retained: 1.1 ft		
				2 3 2 3 (5)	D-2		Organic SILT with sand, medium stiff, gray, moist, homogeneous. Recovered: 0.7 ft Retained: 0.6 ft		
5				2 1 1 1 (2)	D-3		SILT with organics, soft, gray, moist, homogeneous. Recovered: 1.6 ft Retained: 1.5 ft		
0.0					S-1		SILT with organics, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 2.0 ft		
				0 0 0 0 (0)	D-4		SILT with organics, a few wood debris and traces of shells, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
10					S-2		SILT with organics, a few wood debris and traces of shells, gray, moist, homogeneous. Recovered: 1.8 ft Retained: 1.8 ft		
-5.0				0 0 0 0 (0)	D-5		SILT with organics. a few wood debris and traces of shells, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
15				0 0 0 0 (0)	D-6		SILT with organics, a few wood debris and traces of shells, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
-10.0									
20									

Job No. XL-4998

SR 020

Elevation 5.7 ft

HOLE No. H-30-16

Sheet 2 of 2

Project Sharpes Corner Vicinity Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
15	-15										The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 16 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 20.0' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 20' Depth of casing during bail test: 18' Water depth before bailing: 20' Bailed bore hole water level to 20' Recharge after 15 minutes: 20'		
20	-20												
25	-25												
30	-30												
35	-35												
40	-40												
45	-45												



LOG OF TEST BORING

Start Card SE60111Job No. XL-4998SR 020Elevation 4.7 ftHOLE No. H-31-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 13, 2016 Completion December 13, 2016 Well ID# _____Equipment CME 45 (9A2-523)Station X 20+68.89Offset 61.5 feet rightHole Dia 4
(Inches)Historical
SPT Efficiency 89.4%Northing 538342.2737Easting 1217320.215Collected by Region Survey CrewMethod Hollow Stem Auger

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
				1 9 16 10 (25)		D-1		Well graded GRAVEL with sand and silt, sub-angular, dense, dark gray, moist, homogeneous. Recovered: 1.0 ft Retained: 0.9 ft		
				4 4 2 2 (6)		D-2		SILT with organics and wood debris, medium stiff, very dark gray, moist, homogeneous. Recovered: 0.7 ft Retained: 0.6 ft		
5	0.0			0 0 1 1 (1)		D-3		SILT with organics and traces of gravel, sub-angular, very soft, gray, moist, homogeneous. Recovered: 1.6 ft Retained: 1.5 ft		
						S-1		No Recovery. Pushed through gravels.		
				0 0 0 0 (0)		D-4		SILT, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
10	-5.0					S-2		SILT, gray, moist, homogeneous. Recovered: 1.8 ft Retained: 1.8 ft		
				0 0 0 0 (0)		D-5		SILT with organics and traces of shells, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
15	-10.0									
				0 0 0 0 (0)		D-6		SILT with organics and traces of shells, very soft, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
20	-15.0									



LOG OF TEST BORING

Job No. XL-4998SR 020Elevation 4.7 ftHOLE No. H-31-16Sheet 2 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			Field SPT (N)	Moisture Content	RQD								
			20	40	60	80							
25	-20										The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 20 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 19.6' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 20' Depth of casing during bail test: 18' Water depth before bailing: 20' Bailed bore hole water level to 20' Recharge after 15 minutes: 19.6'		
30	-25												
35	-30												
40	-35												
45	-40												



LOG OF TEST BORING

Start Card SE-60578 / AE-40736Job No. XL-4998-ASR 020Elevation 26.3 ftHOLE No. H-32-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 20, 2016Completion December 20, 2016

Well ID# _____

Equipment CME 850 (9A2-523)Station X 11+48.97Offset 95.2 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 89.4%Northing 538702.2005Easting 1216469.628Collected by Region Survey CrewMethod Casing Advancer and Coring

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency ◆ Field SPT (N) ◆ Moisture Content ▨ RQD 20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
25.0				15	D-1		Well graded GRAVEL with sand, sub-angular, dense, gray, moist, homogeneous. Recovered: 1.1 ft Retained: 1.0 ft		
				20					
				28	D-2		Well graded GRAVEL with sand few cobbles, sub-angular, dense, grayish brown, moist, homogeneous. Recovered: 1.0 ft Retained: 1.0 ft		
				(48)					
				18					
				21					
				24					
				27					
				(45)					
5				RQD	C-1		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				0%					
				FF	C-2		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				6					
20.0				RQD					
				40%					
				FF					
				4					
10									
				RQD	C-3		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				58%					
				FF					
				4					
15.0									
15									
10.0									
20									

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 26.3 ftHOLE No. H-32-16Sheet 2 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
5											The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 15' Depth of casing during bail test: 15' Water depth before bailing: 7.7' Water depth after bailing: Dry Recharge after 15 minutes :none Dry Hole		
25													
0													
30													
-5													
35													
-10													
40													
-15													
45													



LOG OF TEST BORING

Start Card SE60111Job No. XL-4998SR 020Elevation 6.3 ftHOLE No. W1-2-16Sheet 1 of 3Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start January 11, 2017Completion January 11, 2017

Well ID# _____

Equipment CME 850 (9A2-523)Station X 22+17.63Offset 56.5 feet rightHole Dia 4
(inches)Historical SPT Efficiency 89.4%Northing 538340.3988Easting 1217471.862Collected by Region Survey CrewMethod Casing Advancer

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80						
5.0							2 2 4 4 (6)	D-1		Silty SAND with gravel and some organics, sub-angular, loose, brown, moist, homogeneous. Recovered: 0.8 ft Retained: 0.7 ft		
							4 5 3 2 (8)	D-2		Silty SAND with gravel, sub-angular, loose, gray, wet, homogeneous. Lost Water Circulation for entire test hole. Recovered: 1.0 ft Retained: 0.9 ft		
5							0 1 1 2 (2)	D-3		SILT with gravel, sub-angular, very loose, gray, moist, homogeneous. Recovered: 0.7 ft Retained: 0.7 ft		
0.0								S-1		No Recovery.		
10							0 0 0 0 (0)	D-4		SILT, very loose, dark gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
-5.0								S-2		No Recovery.		
15							0 0 0 0 (0)	D-5		SILT with traces of shells, very loose, dark gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
-10.0								S-3		SILT with traces of shells, dark gray, moist. Recovered: 2.0 ft Retained: 2.0 ft		
20												

Job No. XL-4998

SR 020

Elevation 6.3 ft

HOLE No. W1-2-16

Sheet 2 of 3

Project Sharpes Corner Vicinity Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	● SPT Efficiency ◆ Field SPT (N) ■ Moisture Content ▨ RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
-15				0 0 0 0 (0)	D-6			SILT with traces of shells, very loose, dark gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
					S-4			No Recovery, dark gray, moist.		
-20				0 0 1 1 (1)	D-7			SILT with traces of shells, very loose, dark gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
					S-5			No Recovery. Peat on outside of tube.		
-25				1 1 2 2 (3)	D-8			PEAT, soft, dark brown, wet, homogeneous. Changing back to SILT - 31.5 Recovered: 2.0 ft Retained: 2.0 ft		
					S-6			No Recovery.		
-30				0 0 0 0 (0)	D-9			Sandy SILT with gravel, sub-rounded, very loose, gray, wet, homogeneous. Recovered: 1.5 ft Retained: 1.4 ft		
					S-7			Sandy SILT with gravel, sub-rounded, gray, wet. Recovered: 0.6 ft Retained: 0.6 ft		
-35				0 0 1 1 (1)	D-10			Sandy SILT with gravel, sub-rounded, very loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
45										



Depth (ft)	Elevation (ft)	Profile	● SPT Efficiency ◆ Field SPT (N) ■ Moisture Content ▨ RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
40 50 55 60 65 70	-40 -45 -50 -55 -60		20 40 60 80					The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. These boreholes will be surveyed by the design office, upon which we will update the location information. End of test hole boring at 42 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 13.5' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 42' Depth of casing during bail test: 40' Water depth before bailing: 3' Bailed bore hole water level to 13.6' Recharge after 15 minutes: 13.5'		

LOG OF TEST BORING

Start Card RE13530

Job No. XL-4998

SR 020

Elevation 5.3 ft

HOLE No. W1p-1-16

Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component

Inspector Brun. Mike #1711

Start December 12, 2016 Completion December 12, 2016 Well ID# BBC-500

Equipment CME 850 (9A2-523)

Station X 21+40.10

Offset 57.4 feet right

Hole Dia 4
(inches)

Historical
SPT Efficiency 89.4%

Northing 538342.1339

Easting 1217393.015

Collected by Region Survey Crew

Method Hollow Stem Auger

Lat

Long

Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Drill Fluid None

[illegible]

Job No. XL-4998

SR 020

Elevation 5.3 ft

HOLE No. W1p-1-16

Sheet 2 of 2

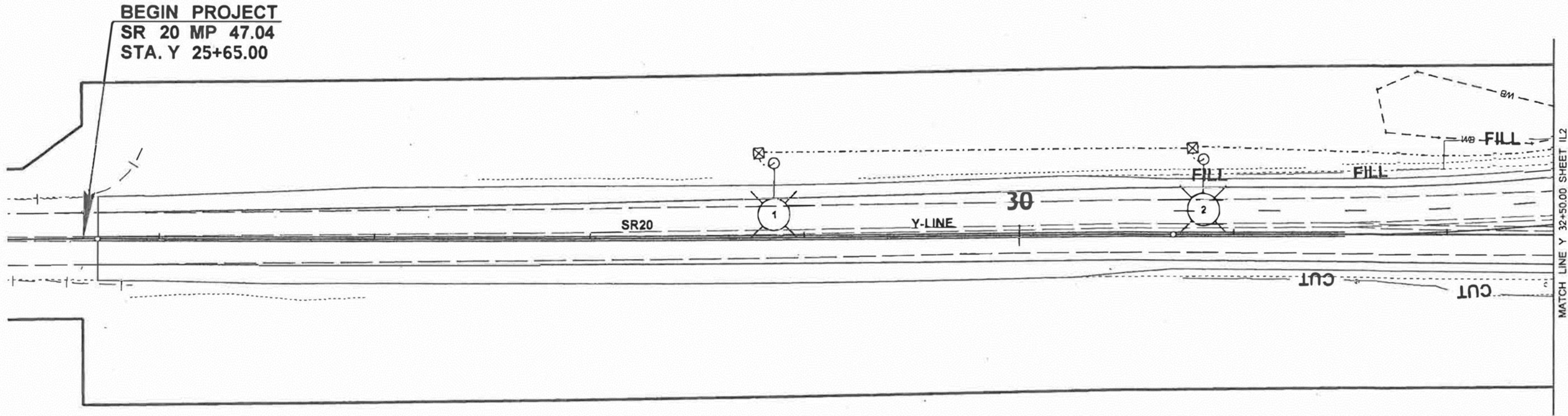
Project Sharpes Comer Vicinity Improvements

Driller Henderson, Ted

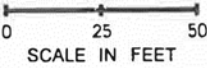
Depth (ft)	Elevation (ft)	Profile	● SPT Efficiency ◆ Field SPT (N) + Moisture Content ▨ RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
	-15					S-4		Organic SOIL, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 2.0 ft		
						D-7		Organic SOIL changing to PEAT - 23.5, soft, light brown, moist, stratified. Recovered: 2.0 ft Retained: 1.9 ft PEAT.		
25	-20				0 1 2 3 (3)					
								A flush mount monument was installed on this boring. The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. These boreholes will be surveyed by the design office, upon which we will update the location information. End of test hole boring at 25 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 19.8' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 25' Depth of casing during bail test: 25' Water depth before bailing: 25' Bailed bore hole water level to 15' Recharge after 15 minutes: 19.8'		
30	-25									
35	-30									
40	-35									
45										

SEC. 8, T.34N., R.2E., W.M.

LUMINAIRE SCHEDULE				SERVICE NO. SAB 4352 120/240V				
LUMINAIRE NUMBER	CIRCUIT	LOCATION		TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS
		STATION	OFFSET					
1	B	Y LINE 28+85	34' LT	LED (200W HPS EQUIVALENT)	16	40		ILLUMINATION
2	A	Y LINE 30+86	35' LT	LED (200W HPS EQUIVALENT)	16	40		ILLUMINATION

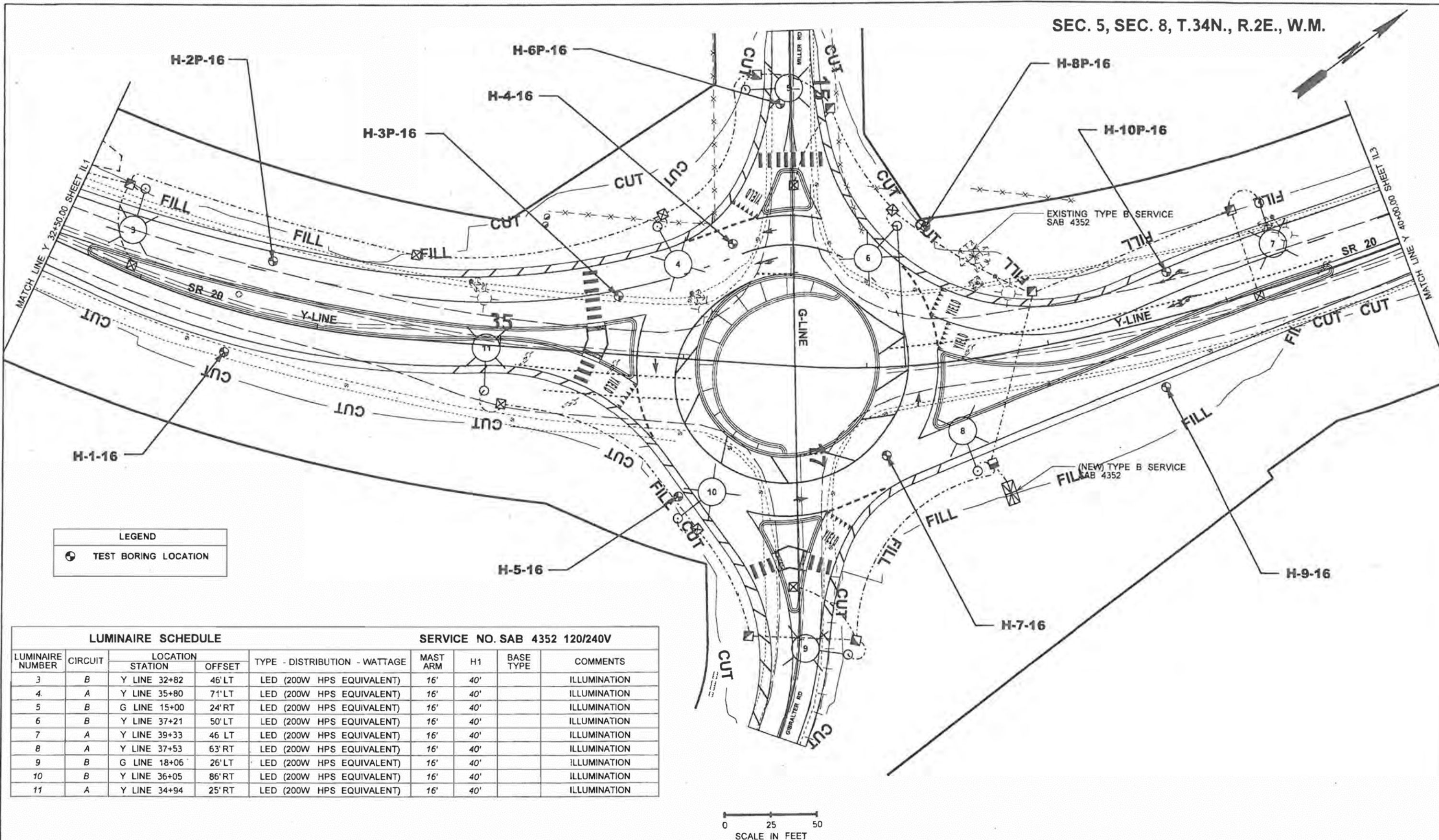


LEGEND	
	TEST BORING LOCATION



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TIME 9:31:35 AM								PLAN REF NO IL1											
DATE 5/9/2017										TEST BORING LOCATION		SHEET 1 OF 13 SHEETS							
PLOTTED BY saelee																			
DESIGNED BY H. WONG																			
ENTERED BY H. WONG																			
CHECKED BY H. MOSTAGHIMI																			
PROJ. ENGR. G. NG																			
REGIONAL ADM. L. ENG																			
		REVISION		DATE		BY													
										</									

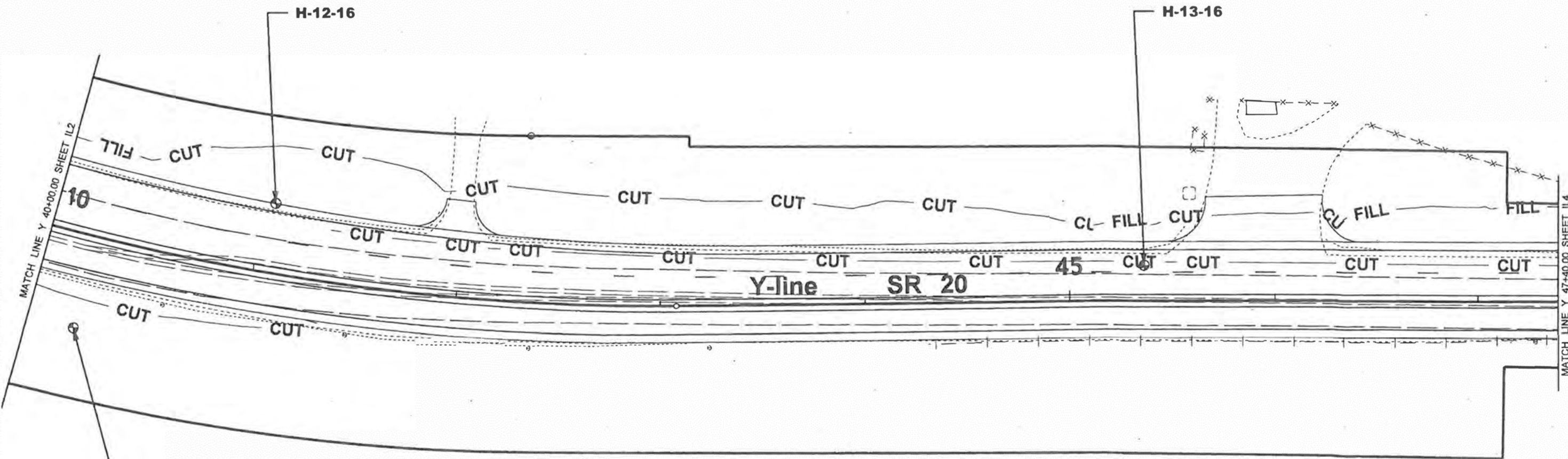
SEC. 5, SEC. 8, T.34N., R.2E., W.M.



LUMINAIRE SCHEDULE				SERVICE NO. SAB 4352 120/240V				
LUMINAIRE NUMBER	CIRCUIT	LOCATION	OFFSET	TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS
3	B	Y LINE 32+82	46' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
4	A	Y LINE 35+80	71' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
5	B	G LINE 15+00	24' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
6	B	Y LINE 37+21	50' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
7	A	Y LINE 39+33	46' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
8	A	Y LINE 37+53	63' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
9	B	G LINE 18+06	26' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
10	B	Y LINE 36+05	86' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
11	A	Y LINE 34+94	25' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION

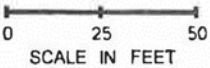
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TIME	9:31:36 AM			10	WASH				
DATE	5/9/2017			JOB NUMBER					
PLOTTED BY	saeleed			CONTRACT NO.					
DESIGNED BY	H. WONG			LOCATION NO.					
ENTERED BY	H. WONG								
CHECKED BY									
PROJ. ENGR.	G. NG								
REGIONAL ADM.	L. ENG			REVISION	DATE	BY		TEST BORING LOCATION	SHEET 2 OF 13 SHEETS

SEC. 5, T.34N., R.2E., W.M.



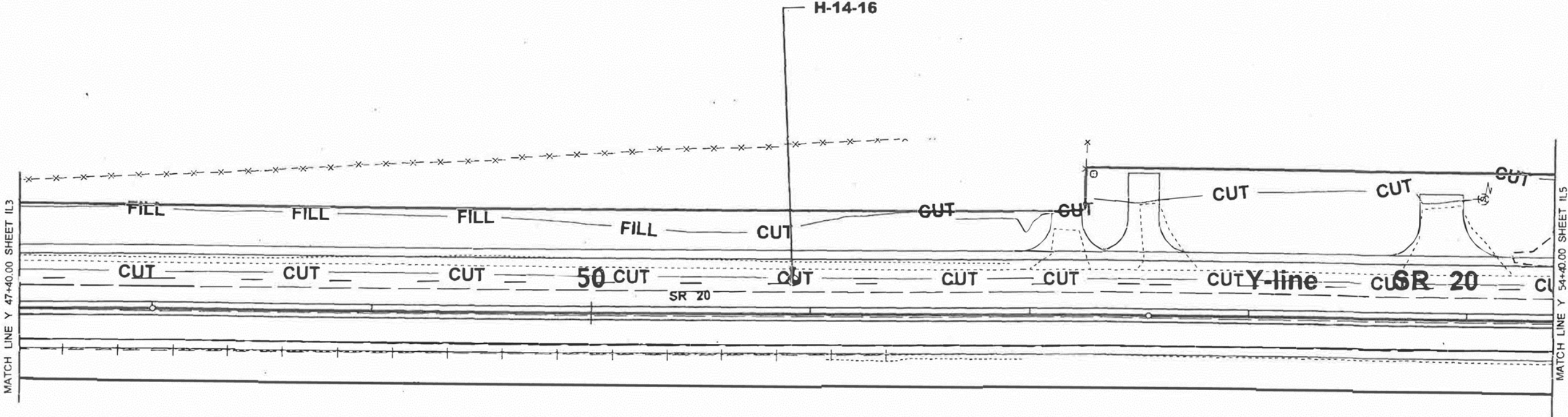
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⊕ TEST BORING LOCATION



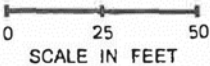
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TIME	9:31:38 AM			NO.	10								
DATE	5/9/2017												
PLOTTED BY	saeled												
DESIGNED BY	H. WONG												
ENTERED BY	H. WONG												
CHECKED BY	A. MOSTOWFY												
PROJ. ENGR.	J. KORESKI												
REGIONAL ADM.	L. ENG												
REVISION		DATE	BY	CONTRACT NO.		LOCATION NO.		P.E. STAMP BOX		P.E. STAMP BOX			

SEC. 5, T.34N., R.2E., W.M.

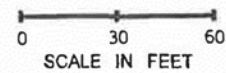
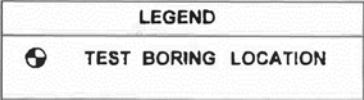


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 TEST BORING LOCATION

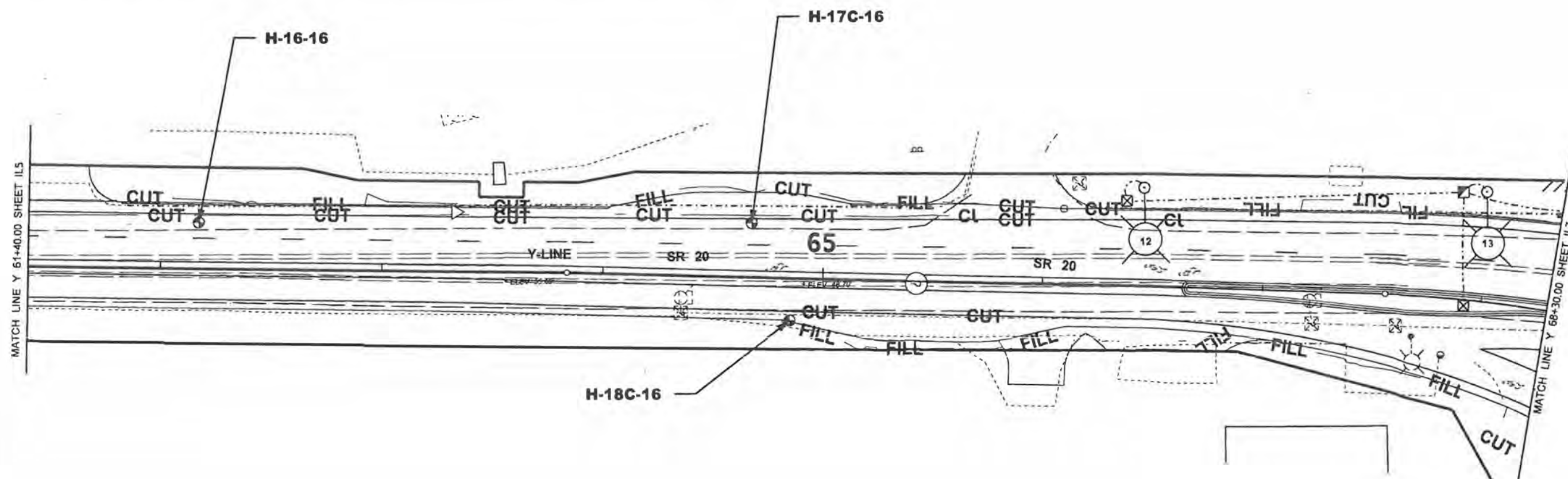


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DATE	5/9/2017				10	WASH		IL4						
PLOTTED BY	saeled													
DESIGNED BY	H. WONG				JOB NUMBER		CONTRACT NO.		LOCATION NO.		SHEET 4 OF 13 SHEETS			
ENTERED BY	H. WONG													
CHECKED BY	A. MOSTOWFY													
PROJ. ENGR.	J. KORESKI													
REGIONAL ADM.	L. ENG													
				REVISION	DATE	BY								

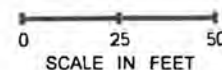


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PLOTTED BY	saeleed				JOB NUMBER			TEST BORING LOCATION						SHEET 5 OF 13 SHEETS							
DESIGNED BY	H. WONG				CONTRACT NO.																
ENTERED BY	H. WONG				LOCATION NO.			TEST BORING LOCATION						SHEET 5 OF 13 SHEETS							
CHECKED BY	A. MOSTOWFY				DATE																
PROJ. ENGR.	J. KORESKI				DATE			TEST BORING LOCATION						SHEET 5 OF 13 SHEETS							
REGIONAL ADM.	L. ENG				DATE																
REVISION				DATE		BY		TEST BORING LOCATION						SHEET 5 OF 13 SHEETS							
P.E. STAMP BOX				P.E. STAMP BOX		DATE															

LUMINAIRE SCHEDULE				SERVICE NO. SAB 0994 120/240V				
LUMINAIRE NUMBER	CIRCUIT	LOCATION		TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS
		STATION	OFFSET					
12	B	Y LINE 66+45	45' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
13	B	Y LINE 67+97	50' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION



LEGEND	
	TEST BORING LOCATION



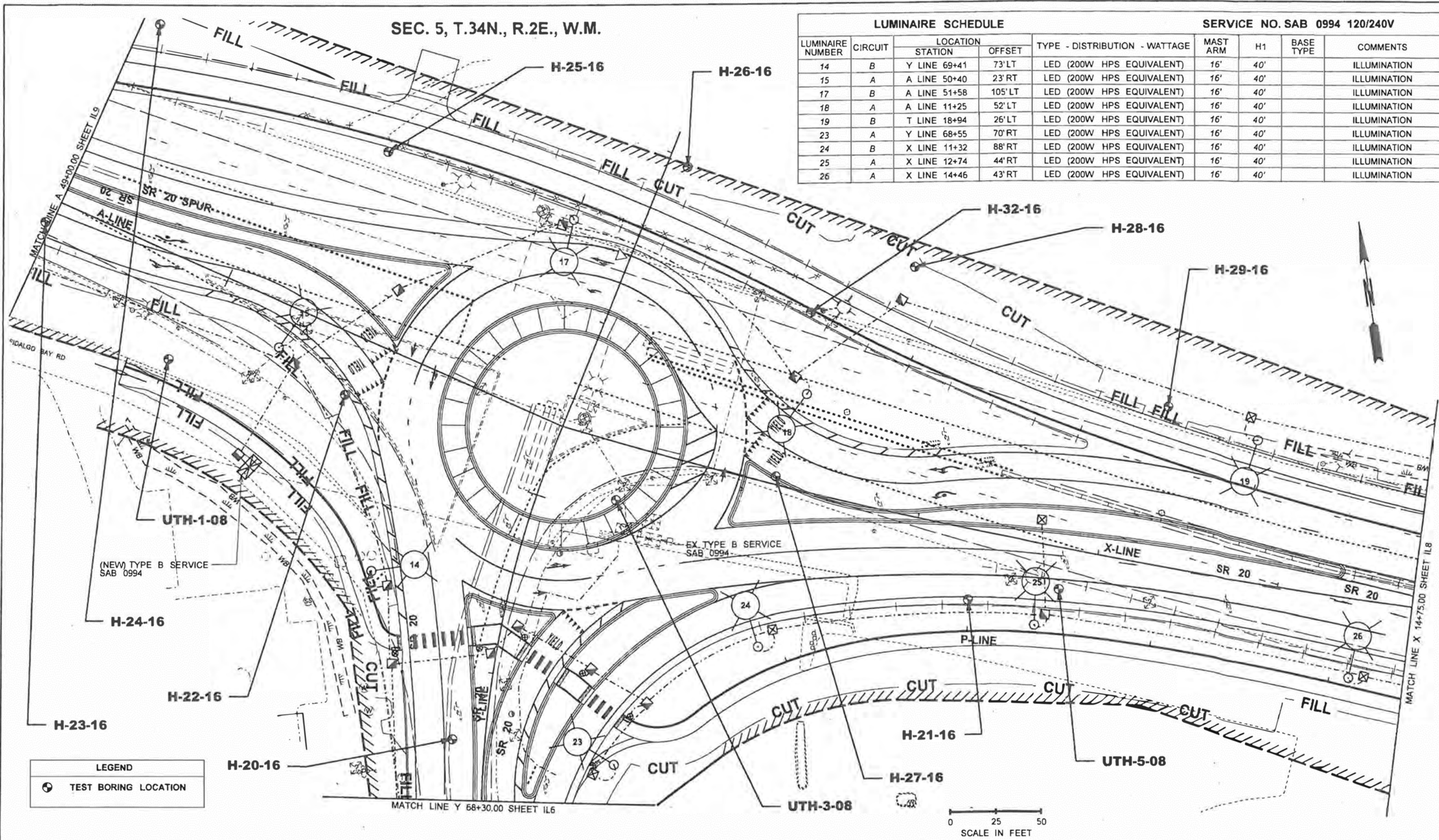
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DATE		5/9/2017						10		WASH										IL6	
PLOTTED BY		saeleed						JOB NUMBER												SHEET	
DESIGNED BY		H. WONG																		6	
ENTERED BY		H. WONG																		OF	
CHECKED BY								CONTRACT NO.		LOCATION NO.										13	
PROJ. ENGR.		G. NG																		SHEETS	
REGIONAL ADM.		L. ENG		REVISION		DATE		BY						DATE		DATE				TEST BORING LOCATION	
														P.E. STAMP BOX		P.E. STAMP BOX					

SEC. 5, T.34N., R.2E., W.M.

LUMINAIRE SCHEDULE

SERVICE NO. SAB 0994 120/240V

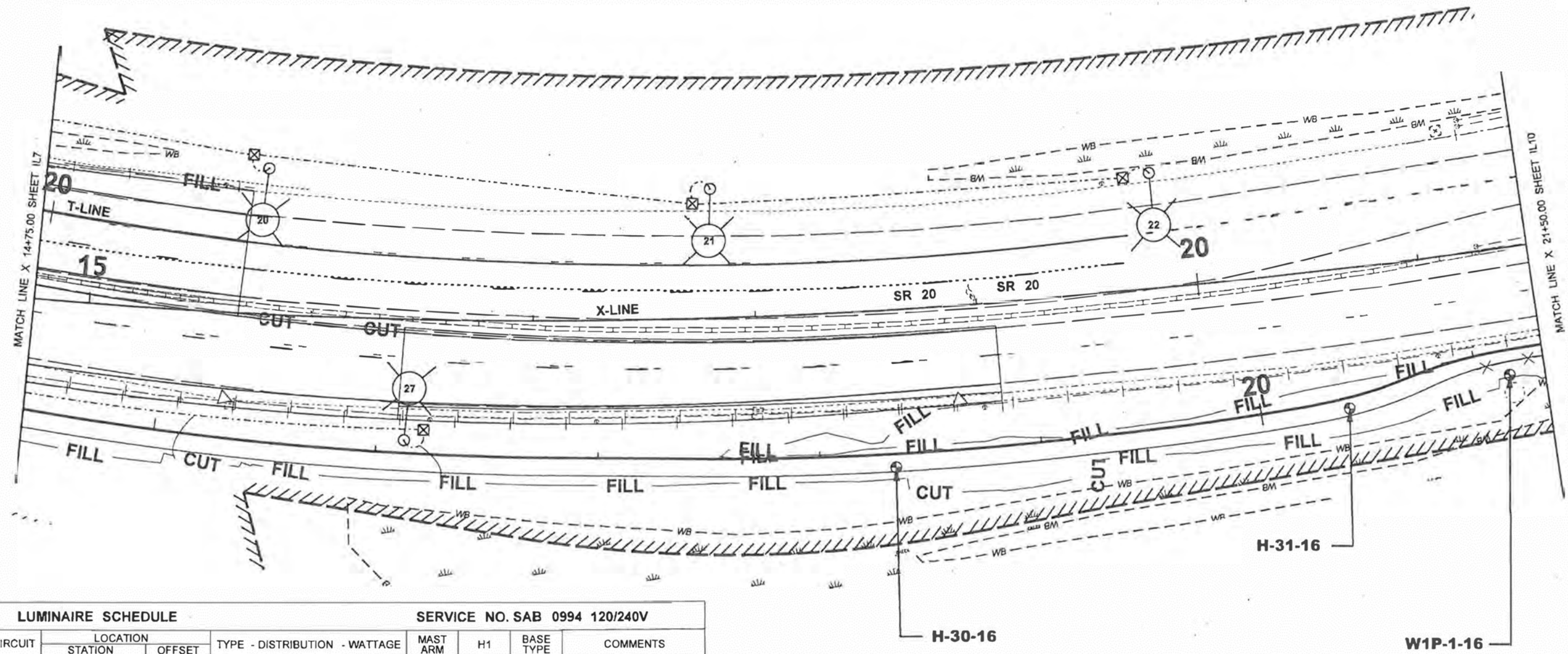
LUMINAIRE NUMBER	CIRCUIT	LOCATION STATION	OFFSET	TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS
14	B	Y LINE 69+41	73' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
15	A	A LINE 50+40	23' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
17	B	A LINE 51+58	105' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
18	A	A LINE 11+25	52' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
19	B	T LINE 18+94	26' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
23	A	Y LINE 68+55	70' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
24	B	X LINE 11+32	88' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
25	A	X LINE 12+74	44' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
26	A	X LINE 14+46	43' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION



LEGEND	
	TEST BORING LOCATION

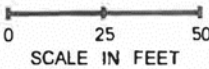
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DATE 5/9/2017						JOB NUMBER										SHEET 7 OF 13 SHEETS				
PLOTTED BY saeled								CONTRACT NO.		LOCATION NO.										
DESIGNED BY H. WONG																				
ENTERED BY H. WONG																				
CHECKED BY																				
PROJ. ENGR. G. NG																				
REGIONAL ADM. L. ENG																				
REVISION					DATE	BY														

SEC. 5, T.34N., R.2E., W.M.



LUMINAIRE SCHEDULE				SERVICE NO. SAB 0994 120/240V				
LUMINAIRE NUMBER	CIRCUIT	LOCATION	TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS	
		STATION	OFFSET					
20	B	X LINE 15+78	66' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
21	B	X LINE 17+81	58' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
22	B	X LINE 19+83	55' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
27	A	X LINE 16+43	54' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION

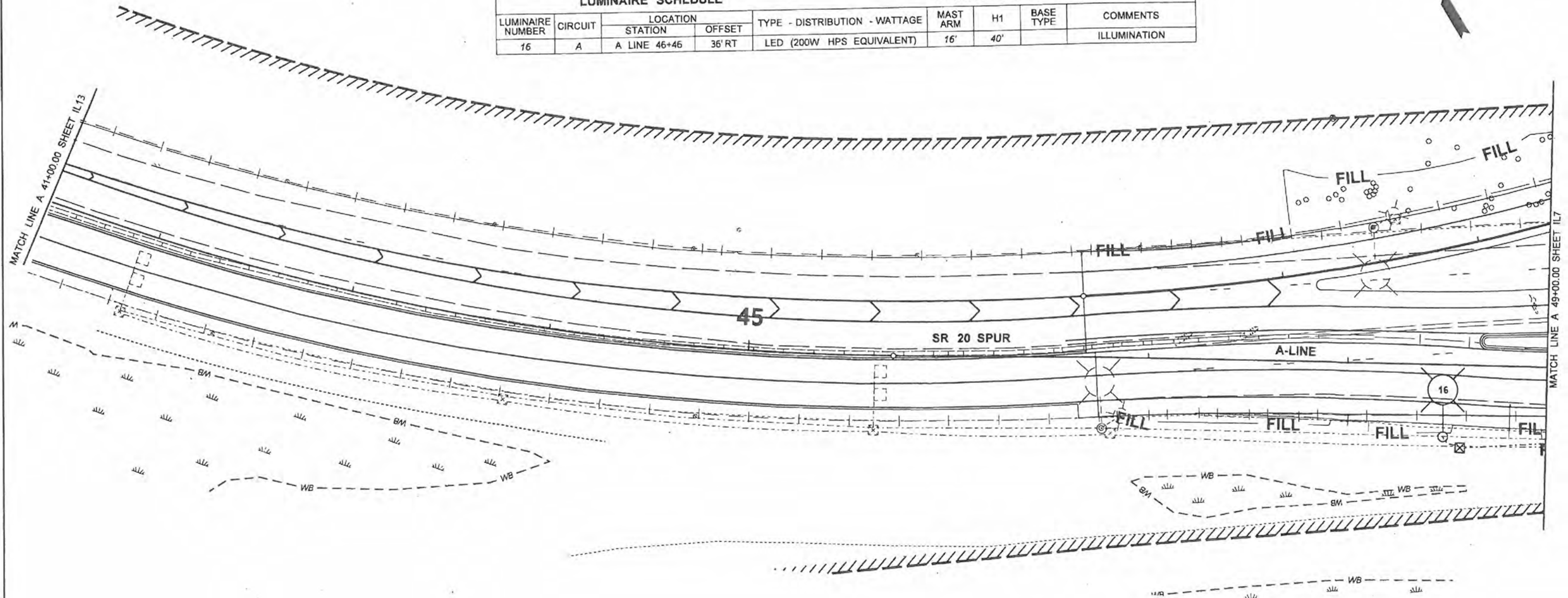
LEGEND	
	TEST BORING LOCATION



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TIME	9:31:44 AM										PLAN REF NO
DATE	5/9/2017										IL8
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DESIGNED BY	H. WONG										8
ENTERED BY	H. WONG										OF
CHECKED BY											13
PROJ. ENGR.	G. NG										SHEETS
REGIONAL ADM.	L. ENG										
REVISION		DATE	BY	FED.AID PROJ.NO.		LOCATION NO.		DATE		P.E. STAMP BOX	

SEC. 5, T.34N., R.2E., W.M.

LUMINAIRE SCHEDULE					SERVICE NO. SAB 0994 120/240V			
LUMINAIRE NUMBER	CIRCUIT	LOCATION		TYPE - DISTRIBUTION - WATTAGE	MAST ARM	H1	BASE TYPE	COMMENTS
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16	A	A LINE 46+46	36' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION

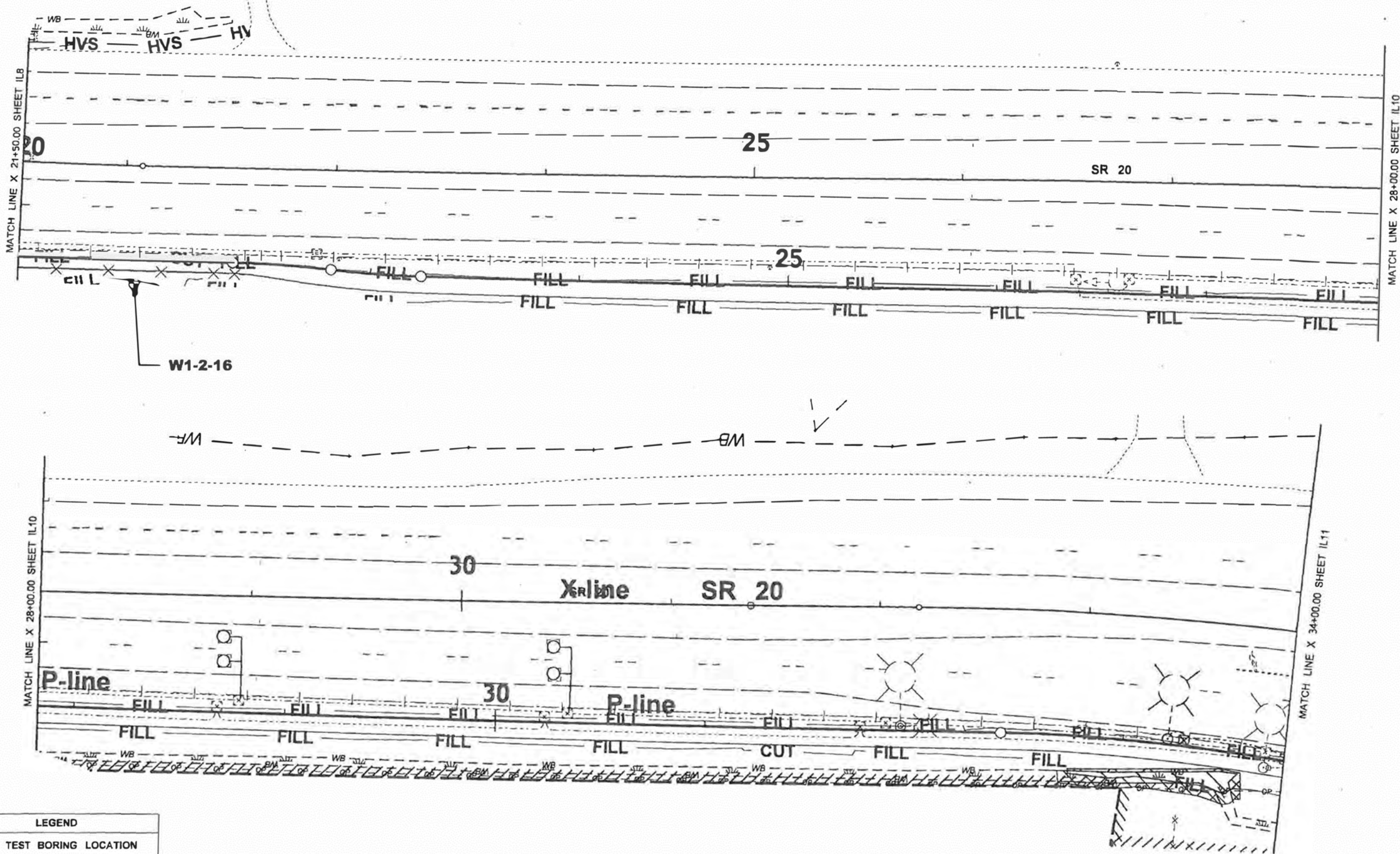


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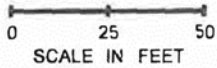
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TIME 9:31:45 AM	DATE 5/9/2017	DESIGNED BY H. WONG	ENTERED BY H. WONG	10	WASH							PLAN REF NO IL9
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REVISION				DATE	BY							

SEC. 5, T.34N., R.2E., W.M.

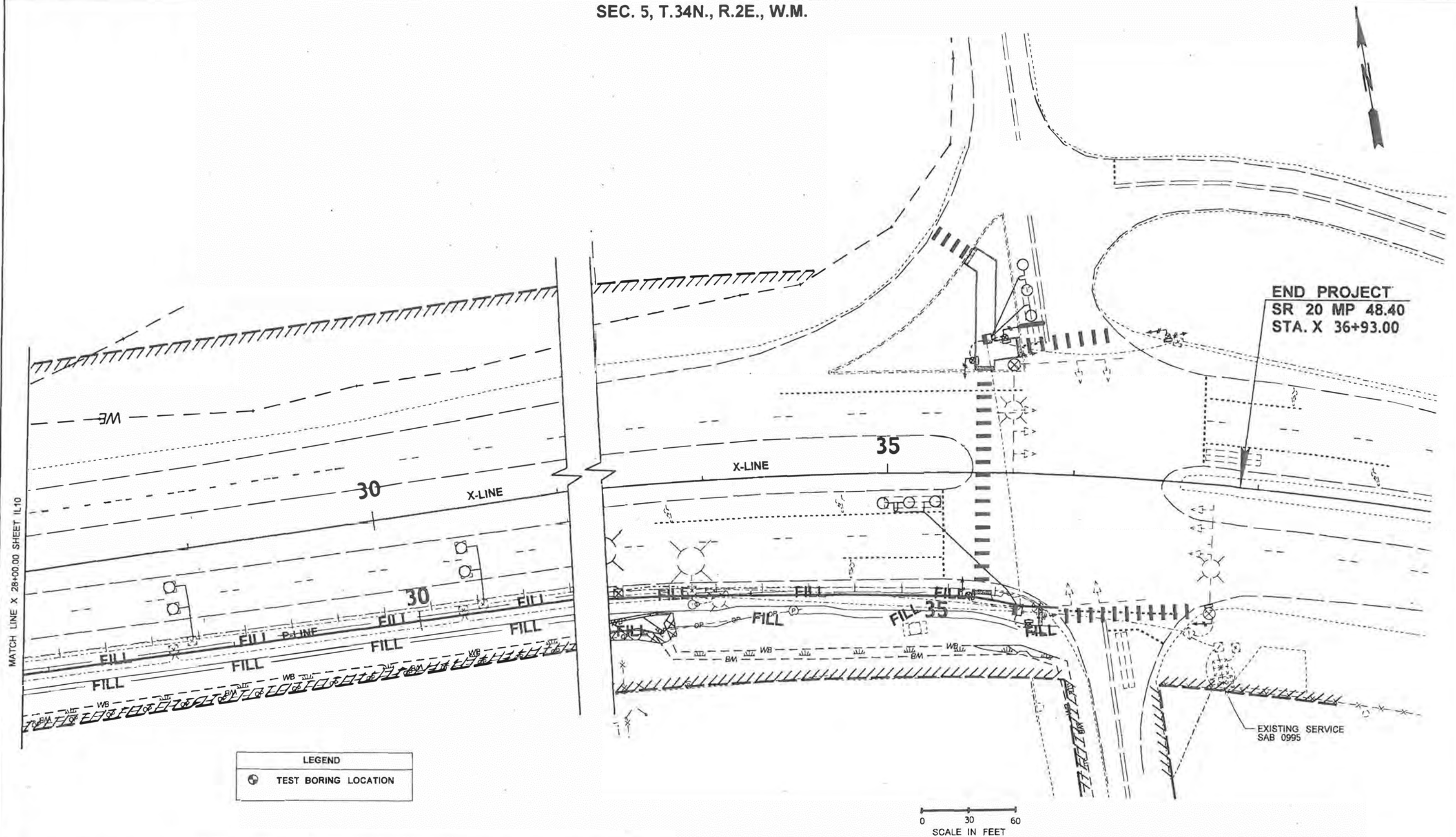


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DATE 5/9/2017																SHEET 10 OF 13 SHEETS			
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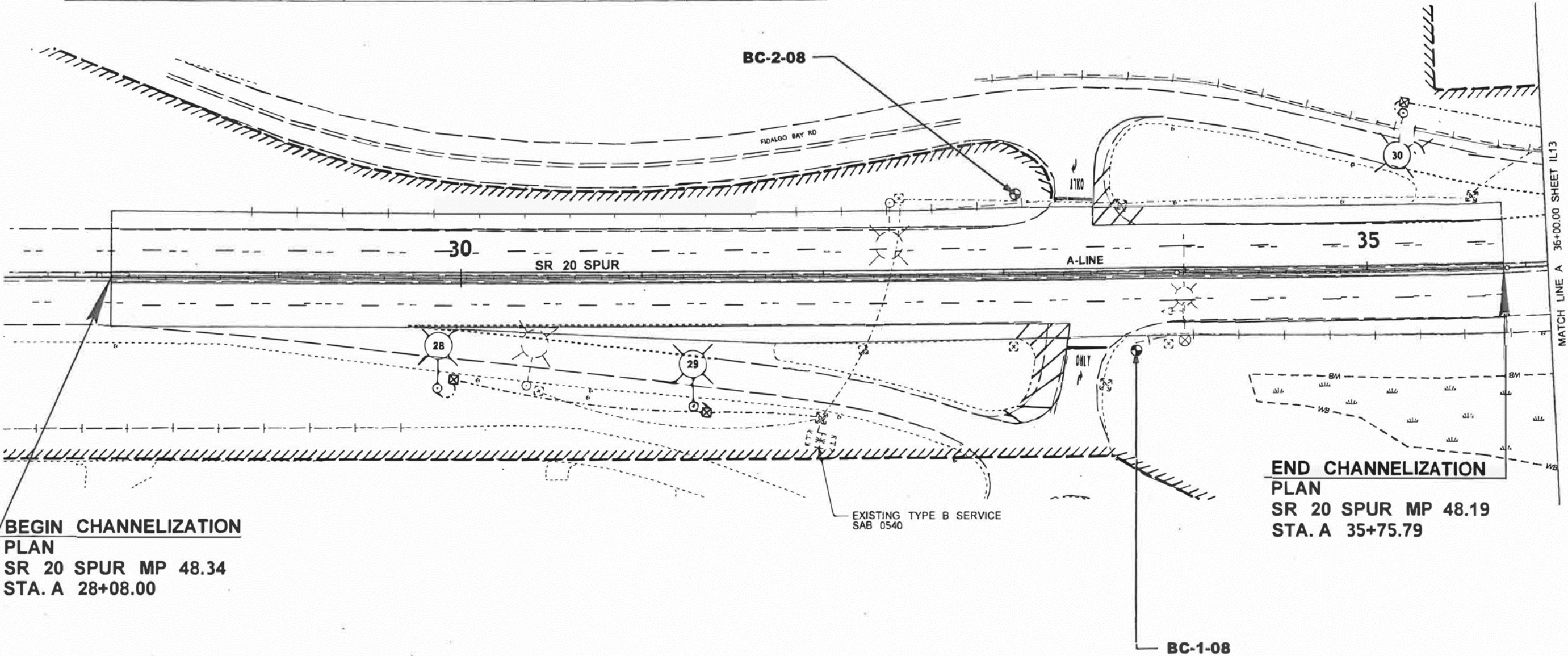
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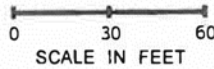
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29	LTG1	A-LINE 31+28	70' RT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION
30	LTG1	A-LINE 35+22	87' LT	LED (200W HPS EQUIVALENT)	16'	40'		ILLUMINATION



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SR 20 SPUR MP 48.34
STA. A 28+08.00

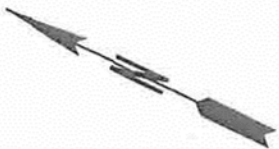
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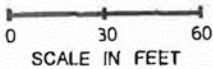
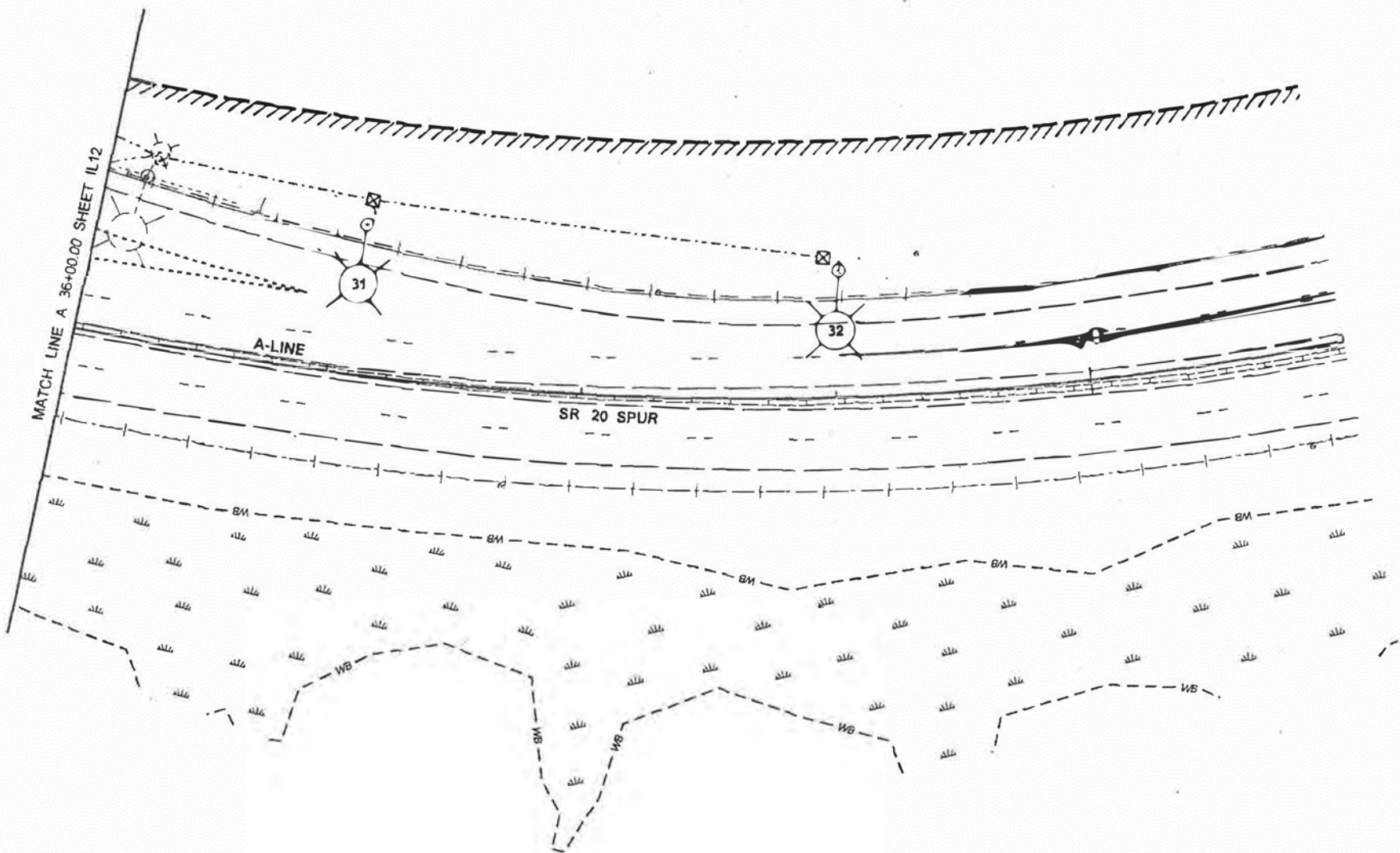
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TIME 9:31:49 AM	DATE 5/9/2017	PLOTTED BY saelee	DESIGNED BY H. WONG	ENTERED BY H. WONG	CHECKED BY	PROJ. ENGR. G. NG	REGIONAL ADM. L. ENG					PLAN REF NO IL12
REVISION				DATE	BY	CONTRACT NO.		LOCATION NO.		TEST BORING LOCATION		SHEET 12 OF 13 SHEETS

SEC. 5, T.34N., R.2E., W.M.



LUMINAIRE SCHEDULE					SERVICE NO. SAB 0540 120/240V			
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LEGEND	
	TEST BORING LOCATION



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PROJ. ENGR. G. NG		REGIONAL ADM. L. ENG		REVISION		DATE		BY		CONTRACT NO.		LOCATION NO.		TEST BORING LOCATION	
P.E. STAMP BOX		DATE		P.E. STAMP BOX		DATE									

May 9, 2017

Appendix A-2.0i

TO: Gabe Ng, PE
Project Engineer
NWR Bellingham Office
NB82-55 

FROM: T. M. Allen / M. Fish
Geotechnical Office, MS: 47365

SUBJECT: SR 20, Sharps Corner Vicinity Improvements, XL4998
Geotechnical Recommendations for Cut Slopes and Bedrock Encounters

INTRODUCTION

This memorandum summarizes our geotechnical recommendations for the *SR 20, Sharps Corner Vicinity Improvement Project, XL-4998*. The purpose of our geotechnical investigation was to determine whether bedrock would be encountered in any of the cut slopes, ditches, or utility trenches and to provide geotechnical related design recommendations based upon our findings.

PROJECT SUMMARY

SR 20 is the only direct land access to the city of Oak Harbor, the Whidbey Island Naval Air Station, and the rest of Whidbey Island. On average, more than 30,000 vehicles pass through the Sharps Corner intersection every day, creating heavy traffic congestion. Traffic turning west on SR20 toward Whidbey Island often backs up beyond the turn lane, leaving vehicles stopped on the highway, increasing the chance of rear-end collisions. The project calls for constructing a roundabout at the busy intersection between SR20 and SR20 Spur to help improve safety and relieve congestion (Figure 1). Cuts in this area are generally less than 10 feet in height and utility trenches are generally less than 5 feet in depth.

GEOTECHNICAL INVESTIGATION

NWR Materials was responsible for drilling and logging the test borings on this project. We reviewed and finalized the test borings logs that were relevant to the scope of our geotechnical investigation. The test boring logs are located in Appendix A, the test boring locations are displayed on Figure 2, and photographs of the rock core can be found in Appendix B.

We reviewed the project plans and cross sections to locate the areas where cuts are proposed for any slopes, ditches, or utilities. We conducted a site reconnaissance to observe bedrock outcrops, surficial water conditions, and other pertinent geological/geotechnical information. We also conducted a seismic refraction investigation to determine the P-wave velocity of the bedrock. The seismic line consisted of 12 geophones at 5 foot spacing. For the seismic investigation, we conducted two end shots and one center-of-line shot by striking a sledgehammer on a metal plate that was located

adjacent to the line. The seismic refraction results are located in Appendix C and the location of the seismic refraction line is displayed on Figure 2. Our laboratory testing consisted of uniaxial compressive strength testing of the rock core. The laboratory testing results are located in Appendix D.

SITE CONDITIONS

The project lies just south of Fidalgo Bay at the intersection of SR20 and SR20 Spur. The proposed roundabout is near an elevation of 25 feet above sea level. To the south, SR20 increases in elevation and to the north, SR20 Spur also increases in elevation. A small cut slope exists just to the east of the SR20/SR20 Spur intersection along the northern side of the highway.

Site Geology

At the location of the proposed roundabout, bedrock of the Fidalgo Complex is just below the ground surface (Figure 3). According to Dragovich et al. (2000), the Fidalgo Complex consists of interbedded heterogeneous metavolcanic greenstone and metasedimentary rocks that are Jurassic to Cretaceous in age. The metasedimentary rocks are thinly to very thickly bedded metasandstone with lesser metasiltstone, and metaconglomerate with rare thin metagraywacke and metachert layers. The metasedimentary rocks are also interbedded with andesite to dacite metavolcanic rocks (greenstones). Overlying the bedrock of the Fidalgo Complex, Dragovich et al. (2000) has described a Fraser-age continental glacial till deposit consisting of a nonstratified, dense to very dense diamicton composed of clay, silt, sand, and gravel in various proportions and scattered with cobbles and boulders.

Subsurface Conditions

The materials encountered while drilling the test borings near the proposed roundabout have been grouped into Engineering Stratigraphic Units (ESUs) based upon engineering properties and material classifications. Each of these units are briefly described below in their stratigraphic position from the ground surface to increasing depth.

ESU 1 – Sandy Silt with Gravel: Test borings H-16-16, H-17c-16, H-18c-16, H-21-16, H-22-16, H-23-16, H-24-16, H-25-16, H-26-16, H-27-16, H-28-16, H-29-16, and H-32-16 encountered this unit from the ground surface to 23 feet below-ground-surface (bgs). This unit generally consists of loose to medium dense, light brown, dry to wet, sub-angular, sandy silt or silty sand with gravel. The SPT blow counts for this unit ranged between 3 and 48 blows/ft. Grain size analyses were not performed on any of the SPT samples from this unit. Seismic P-wave velocities for this unit were approximately 300 ft/sec (Appendix C).

ESU 2 – Metasiltstone: Test borings H-16-16, H-17c-16, H-18c-16, H-22-16, H-25-16, H-26-16, H-27-16, H-28-16, H-29-16, and H-32-16 encountered this unit from 1-foot bgs to 14-feet bgs. This unit generally consists of grayish black, fine grained, slightly too highly weathered, moderately strong metasedimentary rock that contains close to moderately spaced discontinuities in fair to good condition. Rock Quality Designation (RQD) ranged between 0% and 67% with fracture frequency between 2 and 50. The seismic P-wave velocities for this unit were approximately 6000 ft/sec (Appendix C) and the uniaxial Compressive Strengths (UCS) ranged between 9000 psi and 16000 psi (65 MPa and 110 MPa) (Appendix D).

Our review of the rock core and a bedrock outcrop just north of the proposed roundabout reveals that, at this location, at least the upper 10 feet of bedrock contains strong rock that is weathered and fractured (Figure 4 & Appendix B). Discontinuities are very close to moderately spaced, with very low-to-low persistence and tight to open apertures. The discontinuities are clean to containing some surface staining.

We have described below the approximate bedrock elevations along three of the proposed project alignments (i.e. centerline stationing).

Line A: Near Stations 48+70 to 51+05 the proposed ditches left of centerline, catch basins DR3/3, DR3/4, and DR3/5, and the culverts connecting these catch basins may encounter bedrock near elevations 23 to 26 feet.

Line T: Near Stations 12+70 to 14+50 the proposed ditches right of centerline may encounter bedrock near elevation 26 feet. Near Stations 15+50 to 17+10 the proposed ditches left and right of centerline and the proposed cut slopes left of centerline may encounter bedrock near elevations 22 to 26 feet.

Line X: Near Stations 11+50 to 12+00 the proposed ditches, cut slopes, catch basin DR3/6, and culverts left of centerline may encounter bedrock near elevations 22 to 26 feet.

We have also prepared a fence diagram that displays the test boring stick figures and the ESU's along Line T (Figure 5).

Surface and Groundwater

At the time of our site reconnaissance, we observed no standing water near the proposed roundabout. The test borings near the proposed roundabout did not contain groundwater wells, so groundwater elevations are based upon the bail recharge tests that were conducted at the conclusion of drilling. These tests indicate that the groundwater table is most likely located along the bedrock contact between ESU 1 and ESU 2, and that seasonable variation in the groundwater elevation can be expected.

GEOTECHNICAL ANALYSIS

We conducted our seismic investigation approximately 100 feet to the north of the proposed roundabout due to high traffic volumes and ambient noise, and the potential for high groundwater elevations along the survey lines A, T, & X (Figure 2). The seismic line sat on top of a bedrock outcrop that contained little overburden (Figure 4). To acquire the P-wave velocity of the bedrock, we picked "first breaks" on the seismic data and conducted a time-term inversion. Our analysis indicates that the P-wave velocity of the bedrock is approximately 6000 ft/second (Appendix C).

GEOTECHNICAL RECOMMENDATIONS AND CONSTRUCTION CONSIDERATIONS

Based upon the results of our geotechnical investigation, we recommend for the proposed cut slopes to be constructed at their designed 2H:1V (~27 degrees) slope angle. In addition, bedrock may be encountered while constructing these slopes or while excavating for the ditches, culverts or catch basins.

The P-wave velocities that we acquired on the bedrock outcrop just north of the proposed roundabout are consistent with the lower RQD values, higher fracture frequencies, and the weathering we observed in the rock core. The UCS testing results indicate that the bedrock is strong to very strong and would require a single blow to

many blows with a geologic hammer to break an intact rock specimen (ISRM, 1978). According to the Caterpillar Performance handbook, P-wave velocities in metamorphic rocks (i.e. metasilstone) below approximately 6300 ft/second are rippable utilizing a D8R track-type tractor (Figure 6). Based upon the bedrock seismic P-wave velocities, the UCS testing results, and our observations, any bedrock that is encountered while constructing the cut slopes or while excavating for the ditches, culverts or catch basins may be rippable. Although our test results, observations, and seismic analysis indicates that the bedrock may be rippable, for permitting and contracting issues, the contractor should assume that blasting will be required.

Based upon the bail recharge tests, the contractor should anticipate encountering groundwater while constructing the cut slopes or while excavating for the ditches, culverts or catch basins. Constructing this project in the drier time of year (i.e. June through September) may reduce the chances of encountering groundwater in these excavations.

INTENDED REPORT USE AND LIMITATIONS

This memorandum has been prepared to assist in the engineering design and construction of the subject project. It should not be used, in part or in whole, for other purposes without contacting the Geotechnical Office for a review of the applicability of such reuse. This memorandum should be made available to prospective contractors for their information or factual data only and not as a warranty of ground conditions.

The conclusions and recommendations contained in this memorandum are based on the Geotechnical Office's understanding of the project at the time that the memorandum was written and on site conditions that existed at the time of the field investigation. Because of this assumption, these recommendations should be considered subject to change depending on the actual subsurface conditions encountered. Actual subsurface conditions can be discovered only during earthwork and construction operations. If significant changes to the nature, configuration, or scope of the project occur during the design process, the Geotechnical Office should be consulted to determine the impact of such changes on the recommendations and conclusions presented in this memorandum.

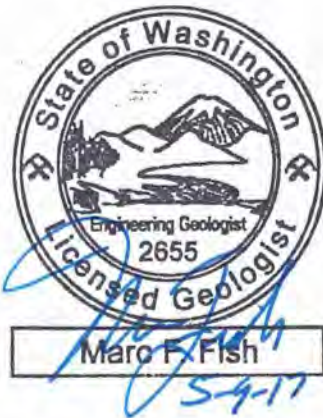
If you have questions or require further information, please contact Marc Fish at (360) 709-5498 or Jim Struthers at (360)-709-5409.

REFERENCES

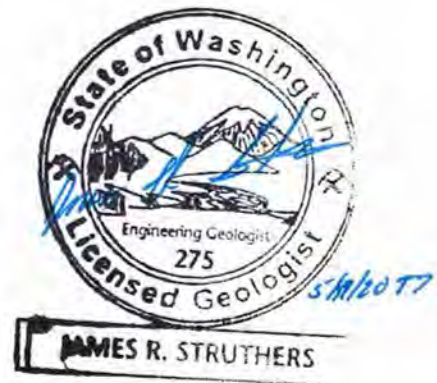
Dragovich, J.D., Troost, M.L., Norman, D.K., Anderson, G., Cass, J., Gilbertson, L.A., McKay Jr, D.T., "Geologic Map of the Anacortes South and La Conner 7.5-minute Quadrangles, Skagit and Island Counties, Washington" Washington State Department of Natural Resources, 2000

Caterpillar Performance Handbook, Edition 44, January 2014

Suggested Methods For the Quantitative Description of Discontinuities in Rock Masses, International Society for Rock Mechanics (ISRM) Commission on Standardization of Laboratory and Field Tests, 1978.



Prepared By:
Marc Fish, L.E.G.
Assistant Chief Engineering Geologist

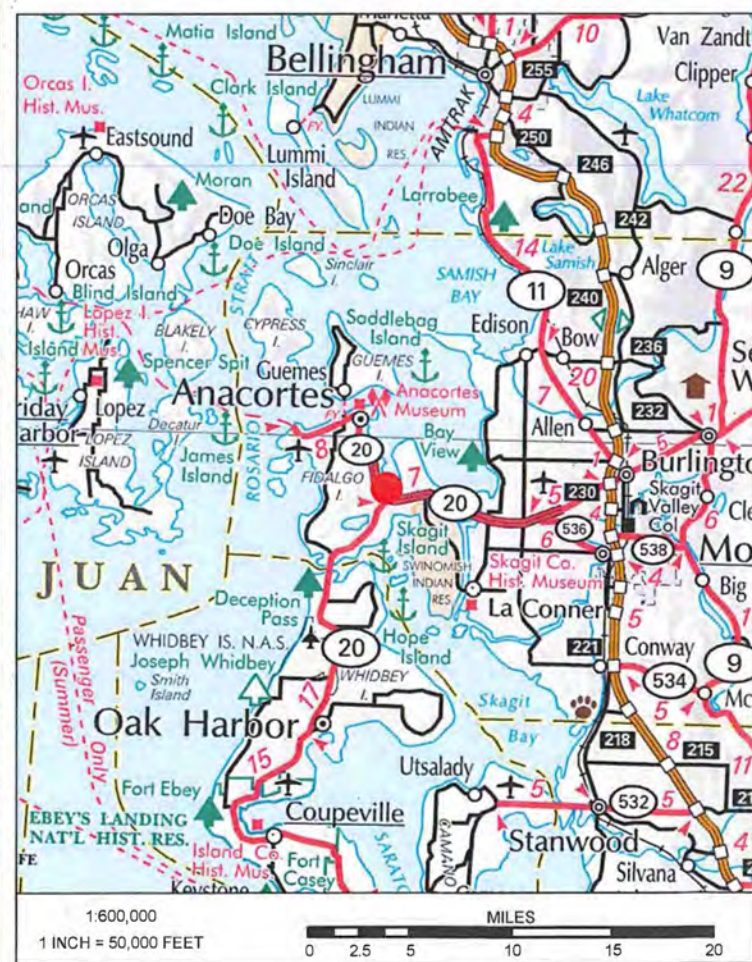
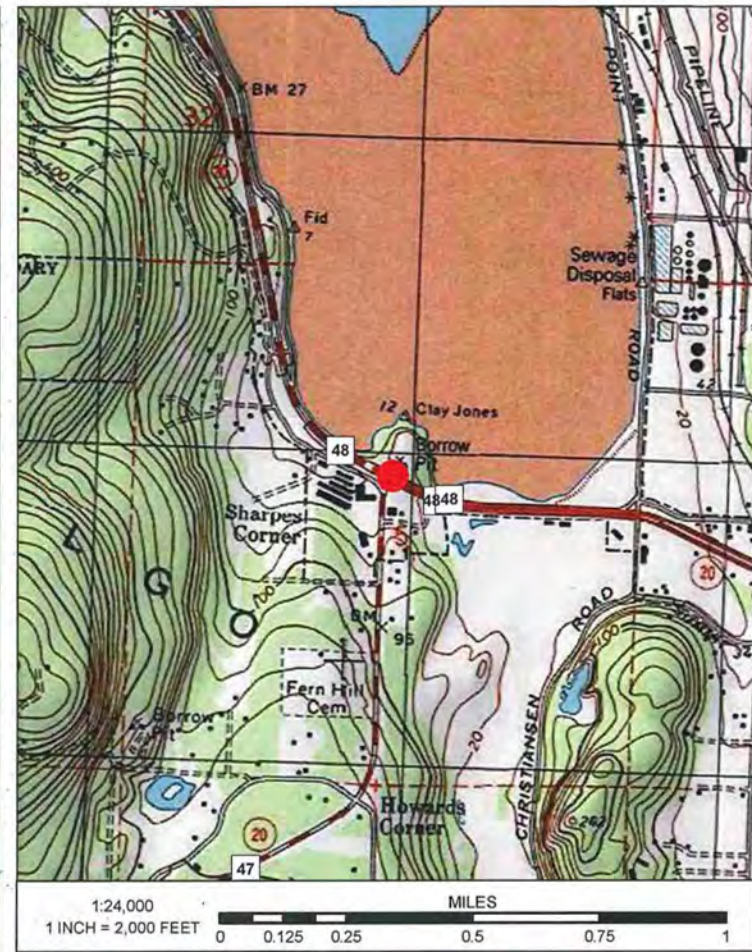
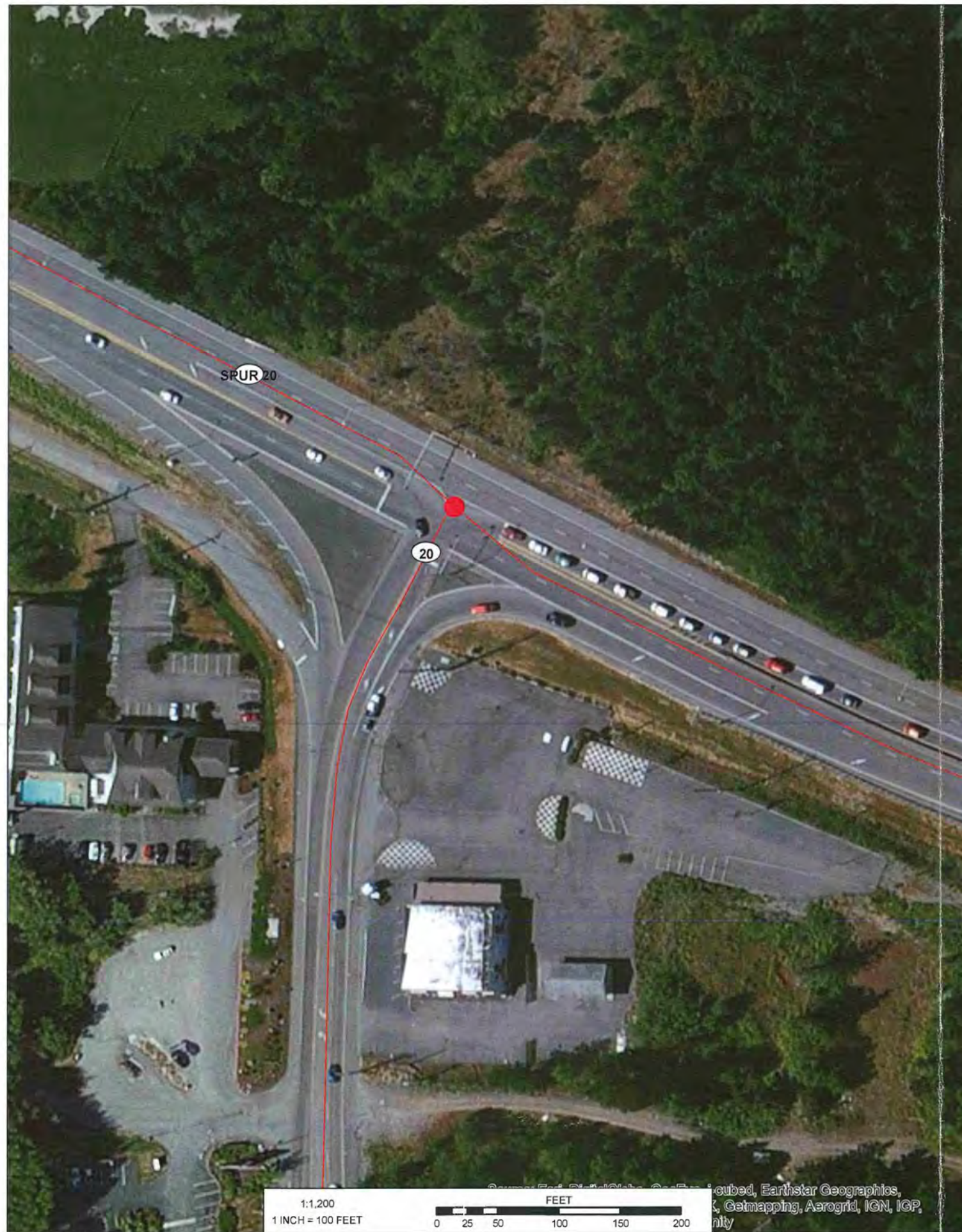


Reviewed By:
Jim Struthers, L.E.G.
Chief Engineering Geologist

Agency/Approval Authority:
Tony M. Allen, P.E.
State Geotechnical Engineer

Attachments: Figures 1-6, Appendix A, B, C & D

TMA/mff



LEGEND

- Site
- State Route
- WSDOT Regions
- County Boundaries (1:500K)



JOB # XL-4998 STATE ROUTE 020 MILEPOST 47.84 to 47.94

FIGURE 1: SITE VICINITY

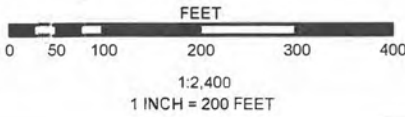
Sharps Corner Vicinity
Improvements

WSDOT GEOTECHNICAL OFFICE

PREPARED BY Tracy Trople DATE January 31, 2017



- Legend**
- Test Boring Locations
 - Milepost Markers
 - Seismic Line
 - State Route



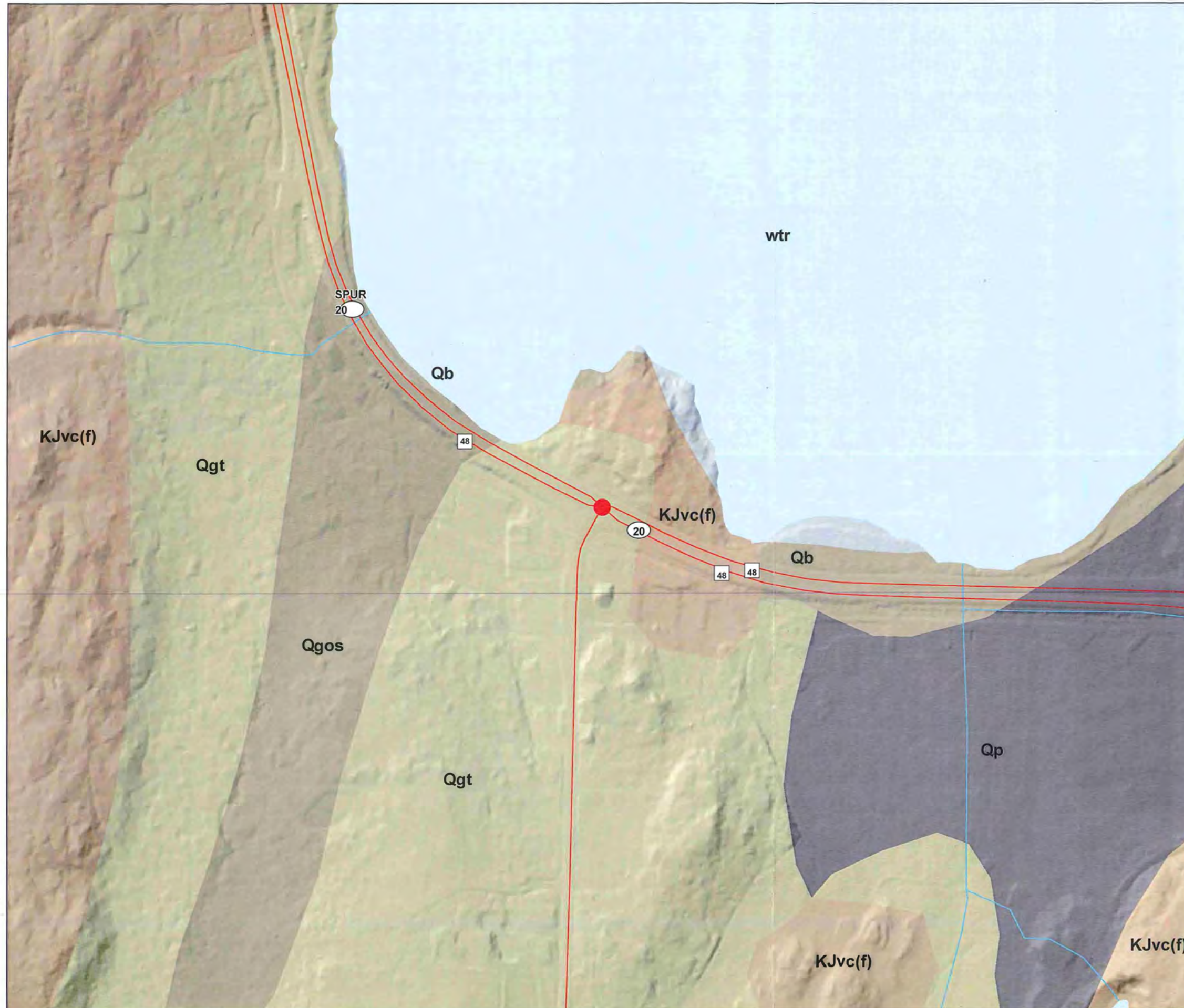
JOB # XL-4998 STATE ROUTE 20 MILEPOST 47.84 to 47.94

FIGURE 2: FIELD EXPLORATION
SR20 Sharpes Corner Vicinity
Improvements

WSDOT GEOTECHNICAL OFFICE

PREPARED BY Tracy Trople Date: 4/17/2017

Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Legend

- Site
- Milepost Markers
- State Route
- Waterbodies
- Rivers & Streams

Geologic Units 100K

Holocene

- Qb - beach deposits
- Qp - peat deposits

Pleistocene

- Qgos - continental glacial outwash, sand, Fraser-age, mostly Vashon Stade in western WA; unnamed in eastern WA
- Qgt - continental glacial till, Fraser-age, mostly Vashon Stade in western WA; unnamed in eastern WA

Cretaceous - Jurassic

- KJvc(f) - volcaniclastic deposits or rocks, Fidalgo ophiolite of Brown and others (1979)

Other

- wtr - water

100K Geology: Washington State Department of Natural Resources, Division of Geology and Earth Resources, 2010.

FEET
0 100 200 400 600 800
1:4,800
1 INCH = 400 FEET

JOB # XL-4998 STATE ROUTE 20 MILEPOST 47.84 to 47.94

FIGURE 3: GEOLOGY
SR20 Sharpes Corner Vicinity Improvements



This bedrock outcrop is located just east of the seismic line location.

JOB # XL-4998

STATE ROUTE 20

MILEPOST 47.84 to 47.94

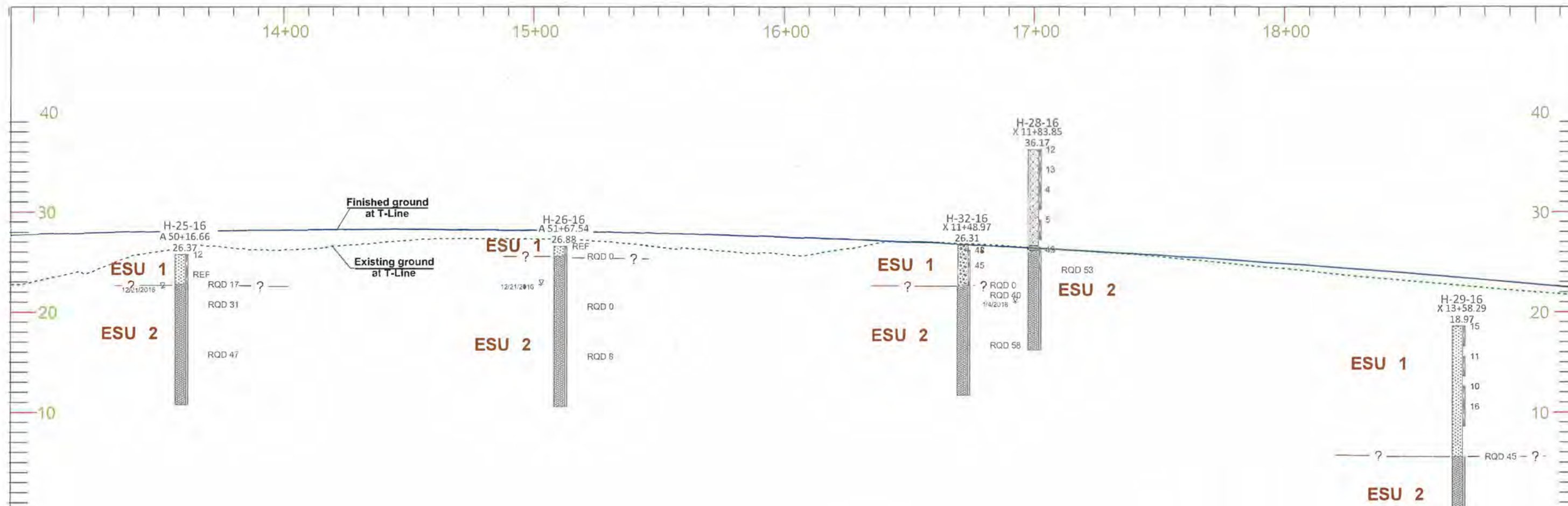
FIGURE 4: NEAR BY BEDROCK OUTCROP

SR20 Sharpes Corner Vicinity
Improvements

WSDOT GEOTECHNICAL OFFICE

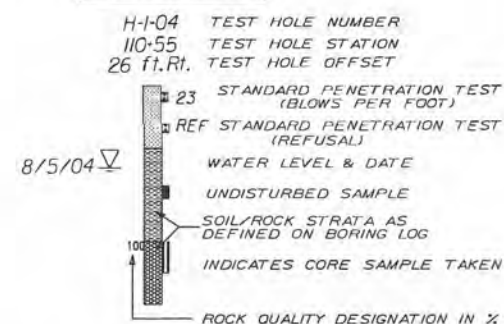
PREPARED BY Tracy Trople

Date: 4/17/2017



ESU 1: Sandy SILT with gravel
 ESU 2: Grayish black, fine grained METASILSTONE

TEST HOLE LEGEND



SCALE
 1"=10' Vertical
 1"=40' Horizontal

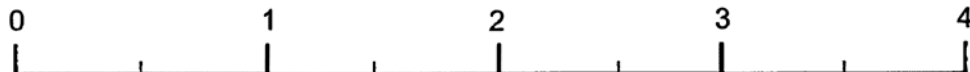
JOB# XL-4998	STATE ROUTE 020	MILEPOST(S) 48.1
FIGURE 5: T-LINE PROFILE WITH SUBSURFACE CONDITIONS SR 20 Sharps Corner Vicinity Improvements		
WSDOT GEOTECHNICAL OFFICE		
PREPARED BY Dale Gietz		DATE April, 2017

D8R

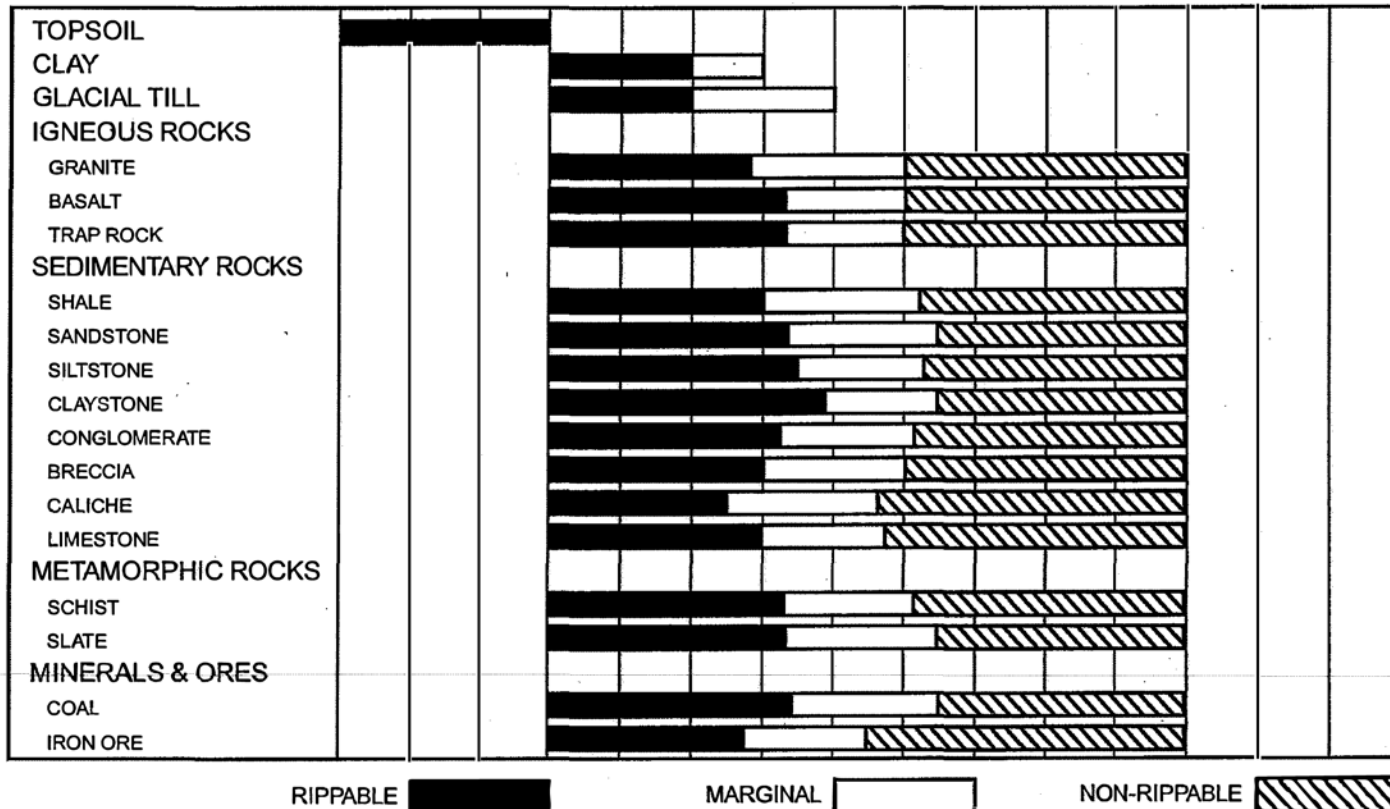
- Multi or Single Shank No. 8 Ripper
- Estimated by Seismic Wave Velocities

Seismic Velocity

Meters Per Second × 1000



Feet Per Second × 1000



JOB # XL-4998

STATE ROUTE 20

MILEPOST 47.84 to 47.94

FIGURE 6: RIPPABILITY ACCORDING TO CATEPILLAR PERFORMANCE HANDBOOK

SR20 Sharpes Corner Vicinity
Improvements

WSDOT GEOTECHNICAL OFFICE

PREPARED BY Tracy Trople

Date: 4/17/2017

APPENDIX A



Boring and Test Pit Legend

Sampler Symbols	
	Standard Penetration Test
	Non-Standard Sized Penetration Test
	Shelby Tube
	Piston Sample
	Washington Undisturbed
	Vane Shear Test
	Core
	Becker Hammer
	Bag Sample

Well Symbols	
	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Seal
	Inclinometer Casing or PVC Pipe in Cement Bentonite Grout
	Sand
	Vibe Wire in Grout
	Miscellaneous, noted on boring log

Laboratory Testing Codes	
AL	Atterberg Limits
CD	Consolidated Drained Triaxial
CN	Consolidation Test
CSS	Cyclic Simple Shear
CU	Consolidated Undrained Triaxial
DG	Degradation
DN	Density
DS	Direct Shear Test
DSS	Direct Simple Shear
GS	Grain Size Distribution
HT	Hydrometer Test
JS	Jar Slake
LA	LA Abrasion
LOI	Loss on Ignition
MC	Moisture Content
pH	pH of Soil
PT	Point Load Compressive Test
RES	Resistivity
RM	Resilient Modulus
RS	Torsional Ring Shear Test
SG	Specific Gravity
SL	Slake Test
UC	Unconfined Compression Test
UU	Unconsolidated Undrained Triaxial
HC	Hydraulic Conductivity

Soil Density Modifiers			
Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0 - 4	Very Loose	0 - 1	Very Soft
5 - 10	Loose	2 - 4	Soft
11 - 24	Medium Dense	5 - 8	Medium Stiff
25 - 50	Dense	9 - 15	Stiff
> 50	Very Dense	16 - 30	Very Stiff
(REF)	Refusal	31 - 60	Hard
		> 60	Very Hard

Angularity	
Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers	
Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure	
Stratified	Alternating layers of varying material or color at least 6 mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6 mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCI Reaction	
No HCI Reaction	No visible reaction.
Weak HCI Reaction	Some reaction with bubbles forming slowly.
Strong HCI Reaction	Violent reaction with bubbles forming immediately.

Degree of Vesicularity of Pyroclastic Rocks	
Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

Grain Size		
Fine Grained	< 0.04 in	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	0.04 to 0.2 in	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 0.2 in	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State		
Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength			
Grade	Description	Field Identification	Uniaxial Compressive Strength approx
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	0.15 to 3.6 ksi
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	3.6 to 7.3 ksi
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	7.3 to 15 ksi
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	15 to 29 ksi
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 29 ksi

Discontinuities			
Spacing		Condition	
Very Widely	Greater than 10 ft	Excellent	Very rough surfaces, no separation, hard discontinuity wall
Widely	3 ft to 10 ft	Good	Slightly rough surfaces, separation less than 0.05 in, hard discontinuity wall.
Moderately	1 ft to 3 ft	Fair	Slightly rough surfaces, separation greater than 0.05 in, soft discontinuity wall.
Closely	2 inches to 12 inches	Poor	Slickensided surfaces, or soft gouge less than 0.2 in thick, or open discontinuities 0.05 to 0.2 in.
Very Closely	Less than 2 inches	Very Poor	Soft gouge greater than 0.2 in thick, or open discontinuities greater than 0.2 in.
RQD (%)			
$\frac{100(\text{length of core in pieces} > 100\text{mm})}{\text{Length of core run}}$			

Fracture Frequency (FF) is the average number of fractures per 1 ft of core. This does not include mechanical breaks caused by drilling or handling.

Datum:
 NAD 83/91 HARN = North American Datum of 1983/1991
 High Accuracy Reference Network
 NAVD88 = North American Vertical Datum of 1988
 SPN (ft) = State Plane North (ft)
 SPS (ft) = State Plane South (ft)



LOG OF TEST BORING

Start Card SE-60109 / AE-40083Job No. XL-4998-ASR 020Elevation 62.7 ftHOLE No. H-16-16Sheet 1 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 8, 2016Completion November 8, 2016

Well ID# _____

Equipment CME 45 (9A4-1)Station Y 62+14.47Offset 29.3 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 88.2%Northing 537865.9799Easting 1216163.297Collected by Region Survey CrewMethod Casing Advancer

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
60.0										
5										
55.0										
10										
50.0										
15										
45.0										
20										

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 62.7 ft

HOLE No. H-16-16

Sheet 2 of 2

Project SR20 Sharpes Comer Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
40								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
25								End of test hole boring at 17 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
35								Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 17' Depth of casing during bail test: 17' Bailed bore hole water level to 16.3' Recharge after 30 minutes :13.9'		
30										
30										
35										
25										
40										
20										
45										



LOG OF TEST BORING

Start Card SE-60109 / AE-40083Job No. XL-4998-ASR 020Elevation 49.2 ftHOLE No. H-17C-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 8, 2016Completion November 8, 2016

Well ID# _____

Equipment CME 45 (9A4-1)Station Y 64+67.85Offset 33.9 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 88.2%Northing 538119.9845Easting 1216167.412Collected by Region Survey CrewMethod Casing Advancer

Lat _____

Long _____

Datum NAD 83/91 HARN. NAVD88. SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
				20 17 14 11 (31)		D-1		Well graded SAND with gravel, sub-angular, dense, gray, dry, homogeneous. Recovered: 1.4 ft Retained: 1.1 ft		
				4 4 5 4 (9)		D-2		Poorly graded SAND with gravel, angular, loose, gray, wet, homogeneous. Recovered: 1.6 ft Retained: 1.4 ft		
45.0				1 2 1 1 (3)		D-3		Sandy SILT with gravel, sub-angular, very loose, light brown, wet, homogeneous. Recovered: 1.5 ft Retained: 1.5 ft		
				1 2 8 12 (10)		D-4		Sandy SILT with gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
40.0				RQD 0% FF 4		C-1		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 5%		
35.0				>>> 50/0" (REF)		D-5		No Recovery		
15										
30.0										
20										

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 49.2 ft

HOLE No. H-17C-16

Sheet 2 of 2

Project SR20 Sharpes Comer Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
25	25										The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 17 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 14.5' Depth of casing during bail test: 14.5' Bailed bore hole water level to 12.6' Recharge after 30 minutes :3.5'		
30	30												
35	35												
40	40												
45	45												



LOG OF TEST BORING

Start Card SE-60108 / AE-40081Job No. XL-4998-ASR 020Elevation 4 8.3ftHOLE No. H-18c-16Sheet 1 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start January 25, 2017Completion January 25, 2017

Well ID# _____

Equipment CME 45 (9A4-1)Station Y 64+83.14Offset 23.1 feet rightHole Dia 4
(inches)Historical
SPT Efficiency 88.2%Northing 538132.5546Easting 1216225.034Collected by OtherMethod Other

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
				3 26 50/0" (REF) RQD 43% FF 3	D-1 C-1		Sandy SILT with gravel Trace of organics, sub-angular, very dense, dark brown, moist, homogeneous. HCl not tested. Recovered: 1.5 ft Retained: 1.5 ft	01-25-2017	
45.0				RQD 67% FF 5	C-2	UC	METASILTSTONE, grayish black, fine grained, slightly weathered, strong rock. Discontinuities are closely to moderately spaced and in good condition. HCl not tested. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
5				RQD 38% FF 5	C-3		METASILTSTONE, grayish black, fine grained, slightly weathered, strong rock. Discontinuities are closely spaced and in good condition. HCl not tested. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
40.0									
10									
35.0									
15									
30.0									
20							The implied accuracy of the borehole location information displayed on this boring log is typically		



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 48.3 ftHOLE No. H-18c-16Sheet 2 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
25											sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
25											End of test hole boring at 15 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
20											Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 15' Depth of casing during bail test: 15' Bailed bore hole water level to 3.2' Recharge after 15 minutes :2.6'		
30													
15													
35													
10													
40													
5													
45													

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 28.3HOLE No. H-21-16Sheet 2 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80	2 2 8 11 (10)		D-7		Silty SAND with gravel, sub-angular, loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
5										
25										
0										
30										
5										
35										
10										
40										
15										
45										

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.

End of test hole boring at 22 ft below ground elevation.
This is a summary Log of Test Boring.
Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4
Depth of boring during bail test: 22'
Depth of casing during bail test: 20'
Water depth before bailing: 1'
Bailed bore hole water level to 12.4'
Recharge after 15 minutes :13.2'

Dry Hole



LOG OF TEST BORING

Start Card SE-60110 / AE-40084Job No. XL-4998-ASR 020Elevation 26.4ftHOLE No. H-22-16Sheet 1 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 15, 2016 Completion November 15, 2016 Well ID# _____ Equipment CME 45 (9A4-1)Station A 50+46.60 Offset 48.0 feet right Hole Dia 4 Historical SPT Efficiency 88.2%
(inches)Northing 538716.4155 Easting 1216142.875 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
25.0							15 11 8 32 (19)	D-1			Silty SAND with gravel with some cobbles, sub-angular, medium dense, light brownish gray, dry, homogeneous. Recovered: 1.5 ft Retained: 1.3 ft		
5							3 7 9 9 (16)	D-2			Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 0.8 ft Retained: 0.8 ft		
20.0							5 6 8 11 (14)	D-3			Sandy SILT with gravel, sub-angular, medium dense, moist, homogeneous. Recovered: 1.8 ft Retained: 1.7 ft		
10							5 9 11 13 (20)	D-4			Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
15.0													
15							50/0.001" (REF)	D-5			METASILTSTONE, grayish black, moist, homogeneous. Hit Rock Recovered: 0.0 ft Retained: 0.0 ft		
10.0													
20													

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 26.4 ftHOLE No. H-22-16Sheet 2 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content

RQD

End of test hole boring at 14 ft below ground elevation.
This is a summary Log of Test Boring.
Soil/Rock descriptions are derived from visual field
identifications and laboratory test data.
Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4
Depth of boring during bail test: 14'
Depth of casing during bail test: 14'
Bailed bore hole water level to 11.8'
Recharge after 15 minutes :11.4'

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 25.0 ftHOLE No. H-23-16Sheet 2 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			Field SPT (N)	Moisture Content	RQD								
25	0										The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 16 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 14' Depth of casing during bail test: 14' Bailed bore hole water level to 8.5' Recharge after 30 minutes :7.7'		
30	-5												
35	-10												
40	-15												
45	-20												



LOG OF TEST BORING

Start Card SE-60110 / AE-40084Job No. XL-4998-ASR 020Elevation 26.4 ftHOLE No. H-25-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 21, 2016Completion December 21, 2016

Well ID# _____

Equipment CME 850 (9A2-523)Station A 50+16.66Offset 94.5 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 89.4%Northing 538852.6215Easting 1216194.02Collected by Region Survey CrewMethod Casing Advancer and Coring

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
25.0			20 40 60 80	7 7 5 7 (12) >> 8	D-1		Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 1.4 ft Retained: 1.3 ft	12-21-2016	
				50/0.5" (REF) RQD 17% FF 5	D-2 C-1		Sandy SILT with gravel, sub-angular, very dense, moist, homogeneous. Recovered: 0.6 ft Retained: 0.6 ft		
5				RQD 31% FF 5	C-2		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair condition. Rock is slightly foliated and contains calcite stringers. Contacted Rock Recovered: 100%		
20.0				RQD 47% FF 4	C-3		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
10									
15.0									
15						UC			
10.0									
20							The implied accuracy of the borehole location information displayed on this boring log is typically		



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 26.4 ft

HOLE No. H-25-16

Sheet 2 of 2

Project SR20 Sharpes Comer Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	● SPT Efficiency ◆ Field SPT (N) ■ Moisture Content ▨ RQD 20 40 60 80	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5								sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
25								End of test hole boring at 15 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
0								Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 15' Depth of casing during bail test: 15' Water depth before bailing: 2.3' Bailed bore hole water level to 12.6' Recharge after 15 minutes :3.3'		
30										
-5										
35										
-10										
40										
-15										
45										



LOG OF TEST BORING

Start Card SE-60111 / AE-40085Job No. XL-4998-ASR 020Elevation 26.9 ftHOLE No. H-26-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 21, 2016Completion December 21, 2016

Well ID# _____

Equipment CME 850 (9A2-523)Station A 51+67.54Offset 138.2 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 89.4%Northing 538808.162Easting 1216345.039Collected by Region Survey CrewMethod Casing Advancer and Coring

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
		x x x x x		30 50/0.5" (REF) RQD 0% FF 50	D-1 C-1		Sandy SILT, very dense, grayish brown, moist, homogeneous. Recovered: 0.6 ft Retained: 0.6 ft METASILTSTONE, grayish black, fine grained, slightly weathered, moderately weak rock. Discontinuities are widely spaced and in fair condition. Rock is slightly foliated and contains calcite stringers. Recovered: 60%	12-21-2016	
25.0							Lost Circulation / Over Reamed		
5									
20.0				RQD 0% FF 5	C-2		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are widely spaced and in fair condition. Rock is slightly foliated and contains calcite stringers. Recovered: 80%		
10									
15.0				RQD 8% FF 20	C-3		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are widely spaced and in fair condition. Rock is slightly foliated and contains calcite stringers. Recovered: 80%		
15									
10.0									
20									



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 26.9 ft

HOLE No. H-26-16

Sheet 2 of 2

Project SR20 Sharpes Corner Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency	Field SPT (N)	Moisture Content	RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
5											The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 16 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 16' Depth of casing during bail test: 16' Water depth before bailing: 3.8' Bailed bore hole water level to 3.8' Recharge after 15 minutes :3.8'		
25													
0													
30													
-5													
35													
-10													
40													
-15													
45													



LOG OF TEST BORING

Start Card SE-60111 / AE-40085Job No. XL-4998-ASR 020Elevation 26.4 ftHOLE No. H-27-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 14, 2016 Completion December 14, 2016 Well ID# _____ Equipment CME 850 (9A2-523)Station X 11+35.15 Offset 8.1 feet right Hole Dia 4 (inches) Historical SPT Efficiency 89.4%Northing 538612.0852 Easting 1216417.318 Collected by Region Survey Crew Method Hollow Stem AugerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
25.0				9 10 9 8 (19)	D-1		Well graded SAND with gravel, sub-angular, medium dense, grayish brown, dry, homogeneous. Recovered: 1.4 ft Retained: 1.3 ft		
				6 5 7 10 (12)	D-2		SILT with sand trace gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
5				4 4 5 6 (9)	D-3		SILT trace sand and gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
20.0				2 3 4 5 (7)	D-4		SILT trace sand and gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
10				2 3 4 4 (7)	D-5		SILT trace sand and gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
15.0				>> 11 50/0.5" (REF) RQD 8% FF 4	D-6 C-1		SILT trace sand and gravel, sub-angular, very dense, light brown, moist, homogeneous. Recovered: 0.2 ft Retained: 0.2 ft Contacted Rock METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 80%		
15									
10.0									
20									

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17

12-14-2016



LOG OF TEST BORING

Job No. XL-4998-ASR 020Elevation 26.4 ftHOLE No. H-27-16Sheet 2 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
5								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
25								End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
0								Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 18' Depth of casing during bail test: 18' Water depth before bailing: 10.2' Bailed bore hole water level to 18' Recharge after 15 minutes :18'		
30										
-5										
35										
-10										
40										
-15										
45										



LOG OF TEST BORING

Start Card SE-60111 / AE-40085Job No. XL-4998-ASR 020Elevation 36.2 ftHOLE No. H-28-16Sheet 1 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 22, 2016Completion January 3, 2017

Well ID# _____

Equipment CME 850 (9A2-523)Station X 11+83.85Offset 124.7 feet leftHole Dia 4
(inches)Historical
SPT Efficiency 89.4%Northing 538716.8756Easting 1216511.804Collected by Region Survey CrewMethod Casing Advancer and Coring

Lat _____

Long _____

Datum NAD 83/91 HARN, NAVD88, SPS (ft)Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
35.0			20 40 60 80	2 5 7 9 (12)		D-1		Silty SAND with gravel, sub-angular, medium dense, light gray, dry, homogeneous. Recovered: 0.6 ft Retained: 0.6 ft		
				5 9 4 4 (13)		D-2		Silty SAND with gravel, sub-angular, medium dense, light gray, dry, homogeneous. Recovered: 0.5 ft Retained: 0.5 ft		
5				1 2 2 3 (4)		D-3		Silty SAND with gravel, sub-angular, very loose, gray, dry, homogeneous. Recovered: 0.5 ft Retained: 0.5 ft		
30.0				3 2 3 3 (5)		D-4		Silty SAND with gravel, sub-angular, loose, gray, dry, homogeneous. Recovered: 0.6 ft Retained: 0.6 ft		
10				4 21 28 25 (49)		D-5		METASILTSTONE, grayish black, dry, homogeneous. Contacted Rock Recovered: 0.5 ft Retained: 0.5 ft		
25.0				RQD 53% FF 3		C-1		METASILTSTONE, grayish black, fine grained, moderately weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. HCl not tested. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
15						C-2		Rock would not break free		
20.0										
20										

ENTERPRISE BORING LOG XL-4998-A 020 SHARPES CORNER VICINITY IMPROVEMENTS.GPJ ENTERPRISE DATA TEMPLATE.GDT 4/17/17

01-04-2018



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 36.2 ft

HOLE No. H-28-16

Sheet 2 of 2

Project SR20 Sharpes Comer Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			Field SPT (N)	Moisture Content	RQD								
15													
25													
10													
30													
5													
35													
0													
40													
-5													
45													

The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.

End of test hole boring at 20 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal

Bail/Recharge test:
Hole Diameter: 4
Depth of boring during bail test: 20'
Depth of casing during bail test: 20'
Water depth before bailing: 8.7'
Bailed bore hole water level to 17.6'
Recharge after 15 minutes :15.2'



LOG OF TEST BORING

Start Card SE-60111 / AE-40085Job No. XL-4998-ASR 020Elevation 19.0 ft.HOLE No. H-29-16Sheet 1 of 2Project SR20 Sharpes Corner Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 14, 2016 Completion December 14, 2016 Well ID# _____ Equipment CME 45 (9A4-1)Station X 13+58.29 Offset 80.6 feet left Hole Dia 4 (inches) Historical SPT Efficiency 84.8%Northing 538617.8503 Easting 1216654.675 Collected by Region Survey Crew Method Casing Advancer and CoringLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80	5 6 9 10 (15)	D-1		Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 1.4 ft Retained: 1.3 ft		
15.0				3 4 7 7 (11)	D-2		SILT with sand trace gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
5				2 4 6 7 (10)	D-3		SILT trace gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
10.0				3 5 11 15 (16)	D-4		SILT with gravel, sub-angular, medium dense, light brown, moist, laminated. Recovered: 2.0 ft Retained: 1.9 ft		
10				RQD 45% FF 2	C-1		METASILTSTONE, grayish black, fine grained, slightly weathered, strong rock. Discontinuities are closely to moderately spaced and in good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 80%		
5.0									
15									
0.0									
20									



LOG OF TEST BORING

Job No. XL-4998-A

SR 020

Elevation 19.0 ft

HOLE No. H-29-16

Sheet 2 of 2

Project SR20 Sharpes Comer Vicinity - Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
25	-5							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 18' Depth of casing during bail test: 18' Water depth before bailing: 6.6' Water depth after bailing: Dry Recharge after 15 minutes :none Dry Hole		
30	-10									
35	-15									
40	-20									
45	-25									



LOG OF TEST BORING

Start Card SE-60578 / AE-40736Job No. XL-4998-A SR 020 Elevation 26.3 ftHOLE No. H-32-16Sheet 1 of 2Project SR20 Sharpes Comer Vicinity - ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 20, 2016 Completion December 20, 2016 Well ID# _____ Equipment CME 850 (9A2-523)Station X 11+48.97 Offset 95.2 feet left Hole Dia 4 Historical SPT Efficiency 89.4%
(inches)Northing 538702.2005 Easting 1216469.628 Collected by Region Survey Crew Method Casing Advancer and CoringLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
25.0				15	D-1		Well graded GRAVEL with sand, sub-angular, dense, gray, moist, homogeneous. Recovered: 1.1 ft Retained: 1.0 ft		
				20					
				28	D-2		Well graded GRAVEL with sand few cobbles, sub-angular, dense, grayish brown, moist, homogeneous. Recovered: 1.0 ft Retained: 1.0 ft		
				(48)					
				18					
				21					
				24					
				27					
				(45)					
5				RQD	C-1		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				0%					
				FF	C-2		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				6					
20.0				RQD					
				40%					
				FF					
				4					
10									
				RQD	C-3		METASILTSTONE, grayish black, fine grained, slightly weathered, moderately strong rock. Discontinuities are closely spaced and in fair to good condition. Rock is slightly foliated and contains calcite stringers. Recovered: 100%		
				58%					
				FF					
				4					
15.0									
10.0									
20									

APPENDIX B

C-1
13.0-
17.0

SR 20

Lab G-1383

Job XL-4998

H-16-16

13.0' to 17.0'

Depth:

C-1

CORE RUN:

HOLE

C-1
120 -
14.5

3-
4-
5-
6-
7-
8-
9-
10-
11-
12-
13-
14-
15-
16-
17-
18-
19-
20-

SR 20 Lab G-1384 Job XL-4998

H-17c-16 Depth: 12.0' to 14.5'

C-1

DOI

COIL RLS

C-1

1.5-5.0

C-2

5.0-10.0

Site 20 Lab G-1385 Job XL-4998

H-18c-16

Depth 1.5' to 10.0'

C-1 - C-2

HOLE

CORE RUN

C-3

10.0-15.0

SR 20

Lab.

G-1385

Lab.

XL-4998

H-18c-16

10.0' to 15.0'

Depth:

C-3

ROLL

CORE RUN



SR 20 Lab G-1386 Lab XL-4998

H-25-16

3.0' to 13.0'

Depth:

C-1 - C-3

HOLE

CORE RUN

13.0

C-3

13.0 -

15.0

3-
4-
5-
6-
7-
8-
9-
10-
11-
12-
13-
14-
15-
16-
17-
18-
19-
20-



SR 20 Lab: G-1386 Job: XL-4998

H-25-16 13.0' to 15.0'

C-3

1001

Depth:

CORE LOG



20 - G-1387 - XL-4998

H-26-16

1.0' to 11.0'

Depth:

CORE RUN

C-1 - C-2

C-3
61.0
16.0

3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20



11.5
↑
U
C
S
↓
11.9

Site 20 Lab. G-1387 Job XL-4998
H-26-16 Depth: 11.0' to 16.0'
C-3

MOI
CORE BOX

C-1
13.0-
17.0

13.0 15.0

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20



SR 20 Job G-1388 Job XL-4998

H-27-16 Depth 13.0' to 17.0'

1001

Depth
CORP RUN

C-1

C-1
12.0 -
15.0 -

12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0



SR 20 Lab G-1389 Lab XL-4998

H-28-16 12.0' to 15.0'

Depth:

C-1

HOLE

COLLECTION



C-1
13.0 -
18.0

SR

20

Lab

G-1390

Id.

XL-4998

H-29-16

13.0' to 18.0'

Depth:

C-1

10011

COLE RUS

C-1
4.0-
5.0

C-2
5.0-
10.0

20 Lab G-1391 Lab XL-4998

H-32-16

4.0' to 10.0'

Depth:

C-1 - C-2

HOLE

CORE RUN

C-3

10.0 -
15.0

3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20



Site 20 Lab G-1391 Job XL-4998

H-32-16

10.0' to 15.0'

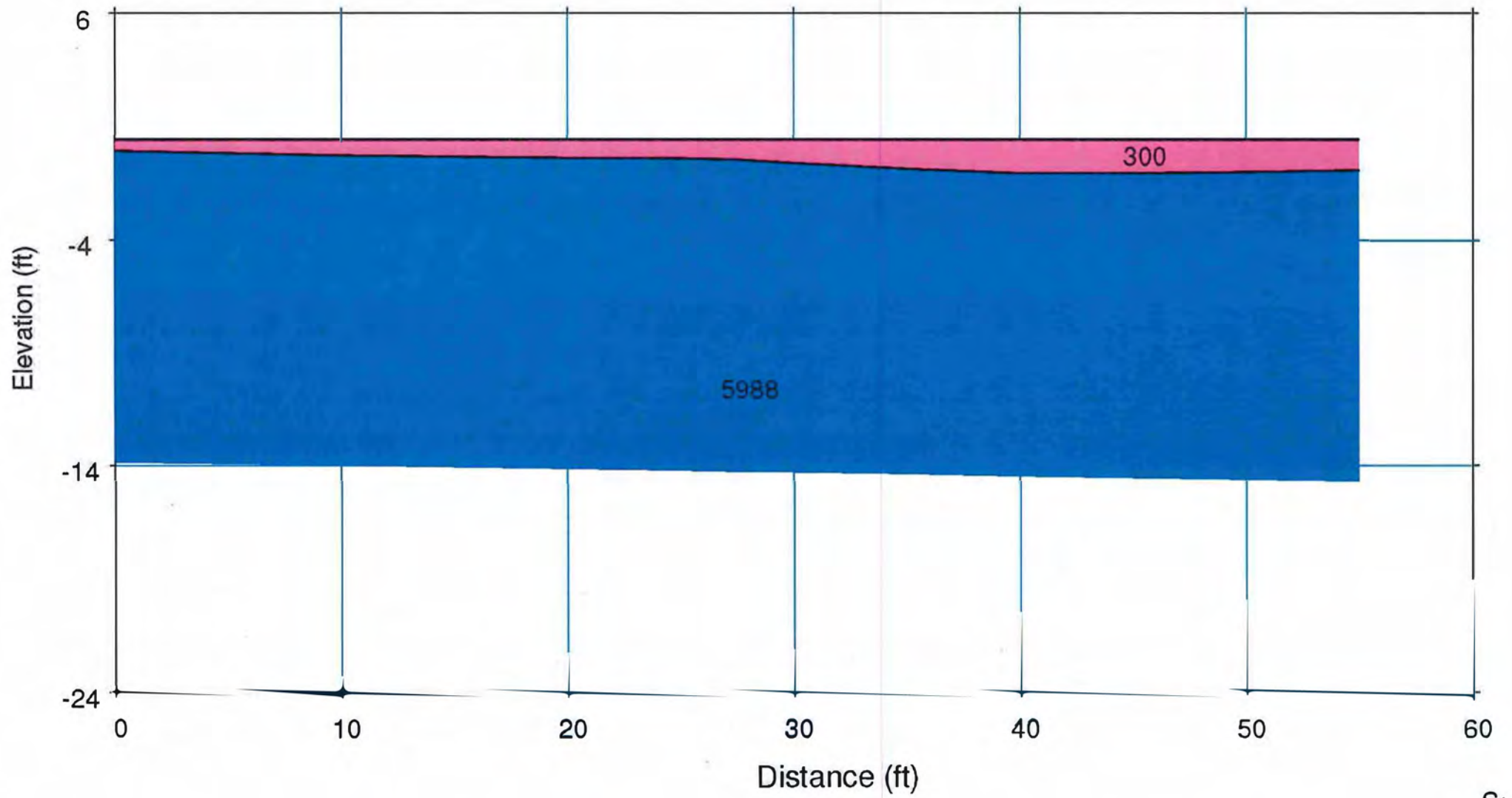
Depth:

C-3

HOLE

CORE RUN

APPENDIX C

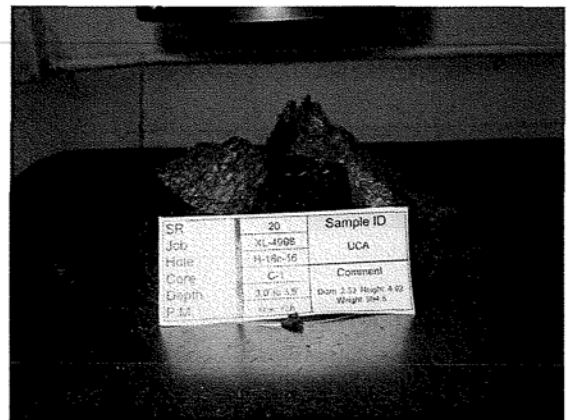
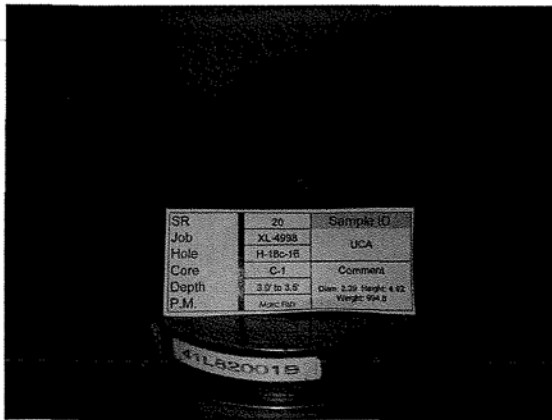
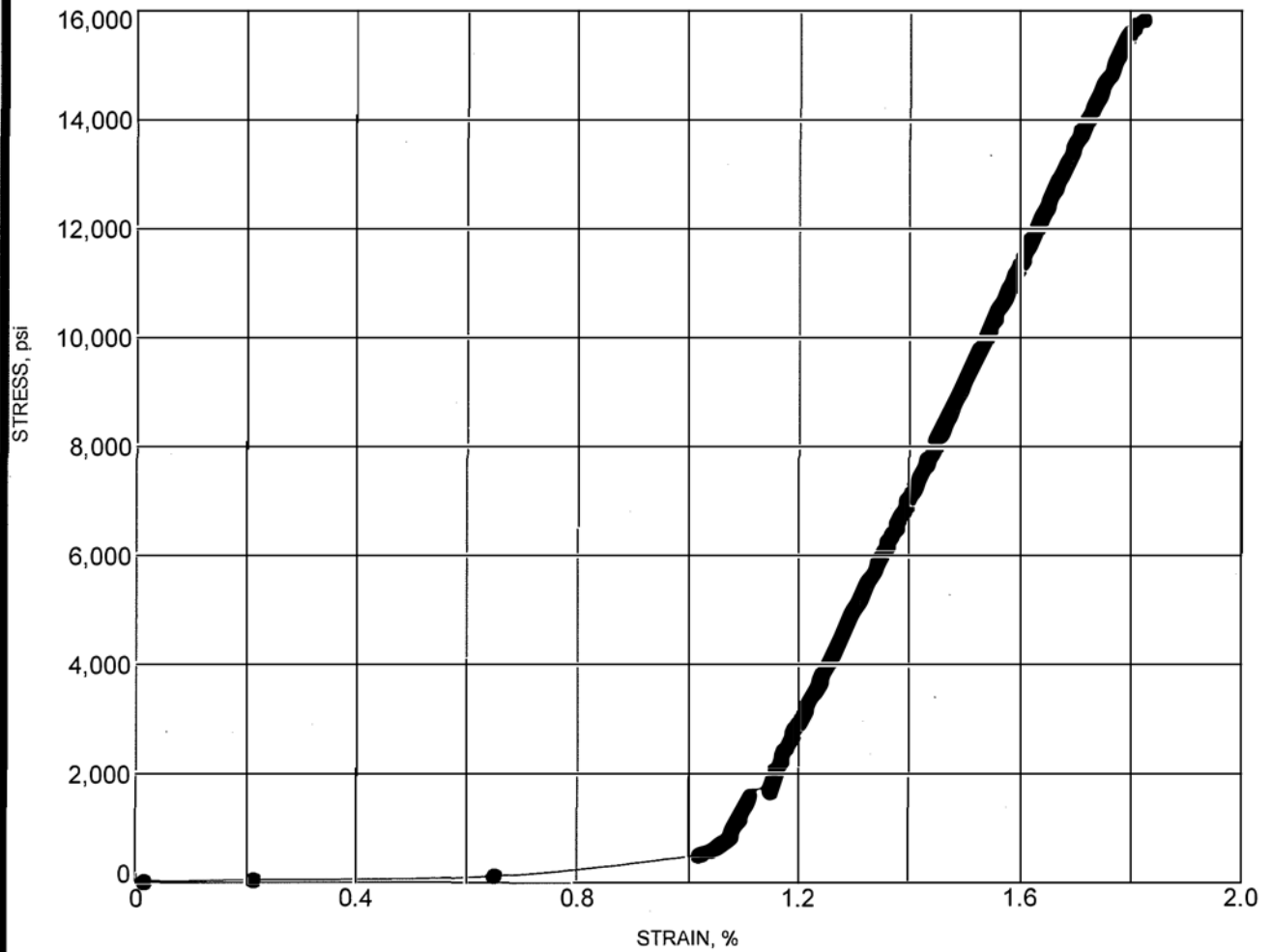


picks inversion.vs

Sc

APPENDIX D

ASTM D-7012 Method C



Core Run	Depth (ft)	Classification	Uniaxial Comp. Strength (psi)	ϵ total (in/in)	Failure Type	Loading Rate (lbs/min)
● C-1	3.0	METASILTSTONE	15,827	172	Crushing	22,500
H (in): 4.92 Diameter (in): 2.39 H/D: 2.06 Equipment: Satec 5592-F2-G1						
Comments:						



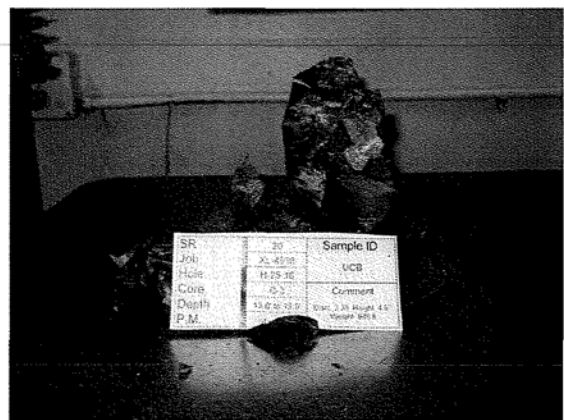
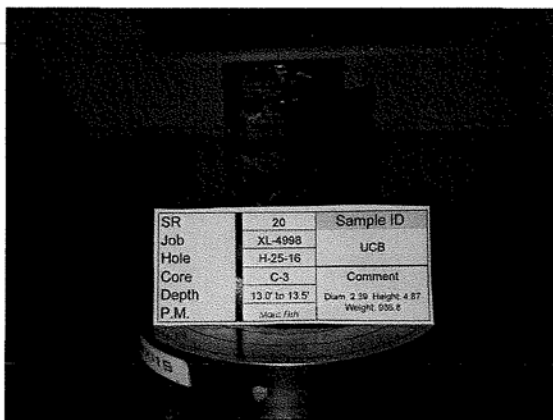
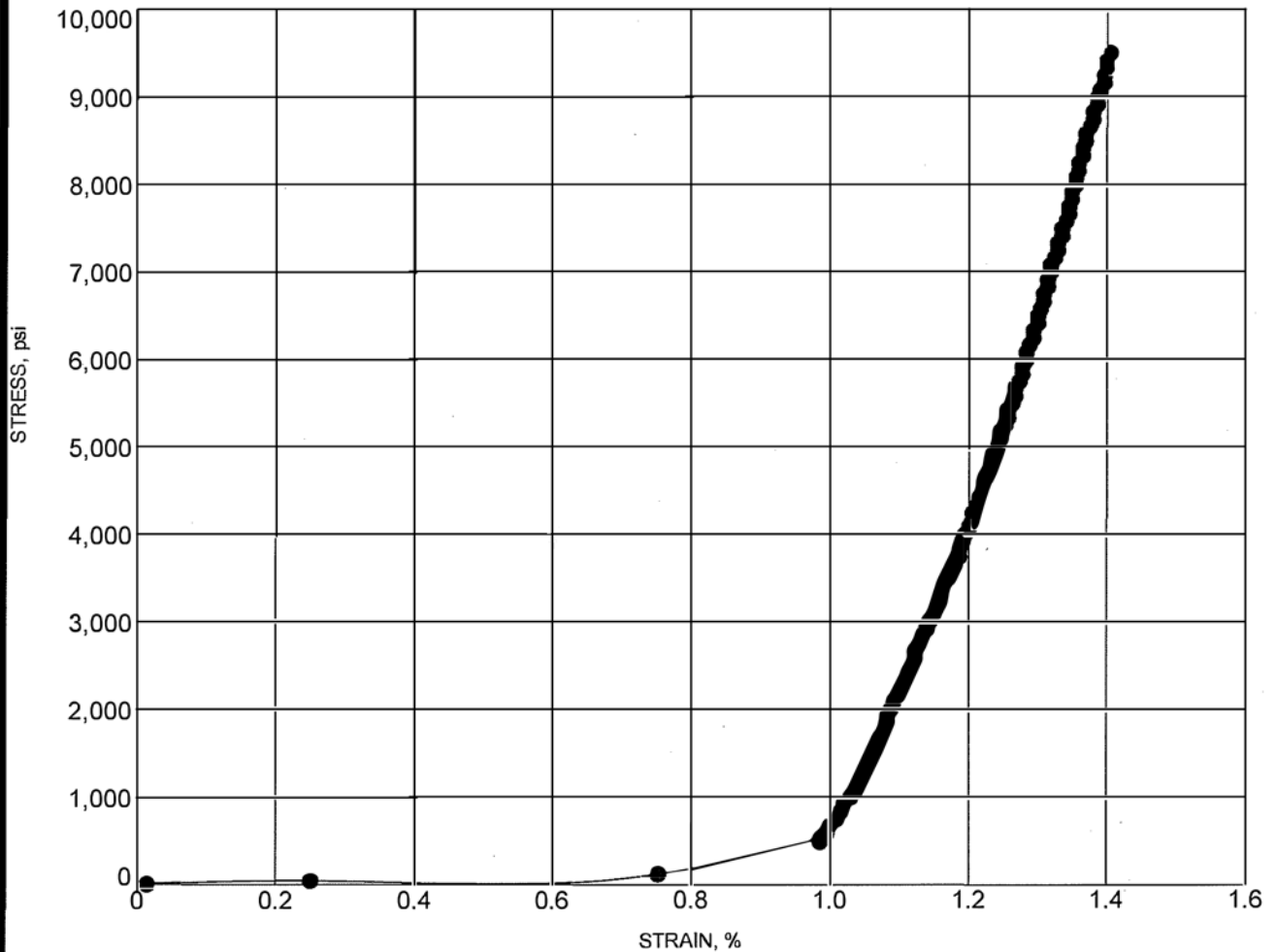
UNIAXIAL COMPRESSION TEST

Project: SR20 Sharpes Corner Vicinity - Improvements

Job No.: XL-4998-A

Hole No.: H-18c-16

ASTM D-7012 Method C



Core Run	Depth (ft)	Classification	Uniaxial Comp. Strength (psi)	ϵ total (in/in)	Failure Type	Loading Rate (lbs/min)
● C-3	13.0	METASILTSTONE	9,498	172	Crushing	22,500
H (in): 4.87 Diameter (in): 2.39 H/D: 2.04 Equipment: Satec 5592-F2-G1						
Comments: Top of core chipped while trimming.						



UNIAXIAL COMPRESSIVE TEST

Project: SR20 Sharpes Corner Vicinity - Improvements

Job No.: XL-4998-A

Hole No.: H-25-16

Appendix A-2.0j



Washington State
Department of Transportation

Memorandum

DATE: March 23, 2017

TO: Gabe Ng/Jason Koreski NB82-55

FROM: Amir Ahmad/Roger Wilson/Hon Hua NB82-29

SUBJECT: SR-20 XL-4998
Sharpes Corner Vicinity - Improvements
Roundabouts, MP 47.04 to MP 48.40
pH and Resistivity Test Report

As requested, the Northwest Region Materials Lab has completed the pH and Resistivity tests Report for the design and construction of SR-20 / Sharpes Corner Vicinity - Improvements Project in Skagit and Island Counties, Washington. This project proposes to construct new roundabouts at the SR-20 / SR-20 Spur (Sharpes Corner), and SR-20 / Miller and Gibraltar Road intersections. Other associated work includes a retaining wall, cut and fill slopes, storm water treatment facilities, bike, pedestrians mobility improvements, concrete sidewalk with curbs and gutters, and luminaires.

This memorandum presents **only** the results of our pH and Resistivity testing required for drainage pipe evaluation and selection.

Field Investigation

The field exploratory borings, within the project limits, were obtained from our previous investigation for cuts, fills, luminaires, and drainage facilities along SR 20 / Sharpes Corner Vicinity Intersection Improvement Project. The pH and resistivity test samples were interpreted from the seven (7) field exploratory borings at the vicinity of the proposed drainage pipe locations. Test samples were recovered at the approximate depths of the proposed pipe locations, and shown on the attached pH and Resistivity location plan sheets.

Soil pH and Resistivity Results

Ten (10) soil samples were tested in the NW Region Materials Laboratory for pH and resistivity to assist your office in evaluating pipe alternatives. The lab results are summarized in Table 1 below.

Table 1: Test Hole Locations and Soil Characteristics

Test No.	Boring Hole No.	Approx. Location (Station)	Offset	Depth (ft)	pH	Resistivity (Ω -cm)
pH-1-17	H-4-16	Y 62+02.11	82.5' Rt.	6.0	6.1	15,000
pH-2-17	H-5-16	Y 35+90.30	67.4' Rt.	4	6.9	15,000

Test No.	Boring Hole No.	Approx. Location (Station)	Offset	Depth (ft)	pH	Resistivity (Ω -cm)
pH-3-17	H-7-16	Y 37+18.57	57.6' Rt.	4	6.6	17,000
pH-4-17	H-16-16	Y 62+14.47	29.3' Lt.	10	8.0	1,100
pH-5-17	H-21-16	X 11+94.68	38.2' Rt.	4	7.5	3,300
pH-6-17	H-21-16	X 11+94.68	38.2' Rt.	7	7.4	2,400
pH-7-17	H-22-16	A 50+46.60	48.0' Rt.	2	7.2	3,200
pH-8-17	H-22-16	A 50+46.60	48.0' Rt.	5	7.1	2,800
pH-9-17	H-22-16	A 50+46.60	48.0' Rt.	11	7.2	2,300
pH-10-17	H-32-16	X 11+48.97	95.2' Lt.	3	7.2	4,800

Conclusions

Based on the results of the laboratory testing and recovered soil samples, the resistivity and the pH of the soil vary between (1,100 Ω -cm and 17, 000 Ω -cm) and (6.1 to 8.0) respectively indicating severe to slightly corrosive environment for steel pipes. However, the majority of the soil samples yielded lower resistivity indicating severe to moderately corrosive environment for steel pipes.

Closure

We trust this information is sufficient at this time. If you have any questions regarding this Memorandum, please call Amir Ahmadi at (206) 768-5907 or Hon Hua at (206) 768-5921.

AMA/RW/HTH:hth

Job No: SR-20, XL-4998

Serial File: 17-021

Attachments:

- Boring logs
- pH and Resistivity Locations Plan Sheets (1 through 3)



LOG OF TEST BORING

Start Card SE60108Job No. XL-4998SR 020Elevation 198.3 ftHOLE No. H-4-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 6, 2016 Completion December 6, 2016 Well ID# _____ Equipment CME 850 (9A2-523)Station Y 36+02.11 Offset 82.5 feet left Hole Dia 4 (inches) Historical SPT Efficiency 89.4 %Northing 535364.4063 Easting 1215850.824 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
				1	D-1		Silty SAND with traces of organics, sub-angular, very loose, brown, moist, homogeneous. Recovered: 1.4 ft Retained: 1.3 ft		
				1					
				2					
				2					
				(3)					
				2	D-2		Silty SAND with gravel and a few cobbles, sub-angular, loose, light brown, dry, homogeneous. Recovered: 0.5 ft Retained: 0.5 ft		
				2					
				5					
				7					
				(7)					
				5	D-3		Silty SAND, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 1.5 ft Retained: 1.4 ft		
				7					
				12					
				15					
				(19)					
				8	D-4		Silty SAND with traces of gravel, sub-angular, dense, light brown, moist, homogeneous. Recovered: 1.6 ft Retained: 1.5 ft		
				12					
				19					
				21					
				(31)					
				14	D-5		Poorly graded SAND with silt and traces of gravel, sub-angular, dense, light brown, moist, homogeneous. Recovered: 1.2 ft Retained: 1.1 ft		
				17					
				24					
				27					
				(41)					
				12	D-6		Poorly graded SAND with silt and traces of gravel, sub-angular, dense, light brown, moist, homogeneous. Recovered: 1.5 ft Retained: 1.4 ft		
				21					
				24					
				28					
				(45)					
				18	D-7		Poorly graded SAND with silt, very dense, light brown, wet, homogeneous.		
				27					

Job No. XL-4998

 SR 020

 Elevation 198.3 ft

 HOLE No. H-4-16

 Sheet 2 of 2

 Project Sharpes Corner Vicinity Improvements

 Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
							30 33 (57)				Recovered: 1.6 ft Retained: 1.5 ft	12-06-2016	
175											The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 21 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 21.0' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 19' Depth of casing during bail test: 19' Bailed bore hole water level to 18' Recharge after 15 minutes: 21' DRY HOLE		
25													
170													
30													
165													
35													
160													
40													
155													
45													



LOG OF TEST BORING

Start Card SE60108Job No. XL-4998SR 020Elevation 194.0 ftHOLE No. H-5-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 16, 2016 Completion November 16, 2016 Well ID# _____ Equipment CME 850 (9A2-523)Station Y 35+90.30 Offset 67.4 feet right Hole Dia 4 (inches) Historical SPT Efficiency 89.4%Northing 535255.7468 Easting 1215954.649 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
				2	D-1		Silty SAND with gravel, sub-angular, medium dense, brown, dry, homogeneous. Recovered: 1.9 ft Retained: 1.8 ft		
				5					
				15					
				22					
				(20)					
				24	D-2		Poorly graded SAND with gravel, sub-angular, dense, light brown, dry, homogeneous. Recovered: 1.9 ft Retained: 1.8 ft		
				25					
				23					
				24					
				(48)					
5	190.0			10	D-3		Poorly graded SAND with gravel, sub-angular, dense, light brown, dry, homogeneous. Recovered: 1.1 ft Retained: 1.0 ft		
				19					
				24					
				25					
				(43)					
				11	D-4		Poorly graded SAND with gravel, sub-angular, dense, light brown, moist, homogeneous. Recovered: 1.3 ft Retained: 1.2 ft		
				15					
				21					
				23					
				(36)					
				17	D-5		Poorly graded SAND with gravel, sub-angular, very dense, light brown, moist, homogeneous. Recovered: 1.3 ft Retained: 1.1 ft		
10	185.0			25					
				34					
				48					
				(59)					
				27	D-6		Poorly graded SAND with gravel, sub-angular, very dense, light brown, moist, homogeneous. Recovered: 1.6 ft Retained: 1.5 ft		
				40					
				44					
				50/0.5"					
				(84)					
15	180.0			20	D-7		Poorly graded SAND, very dense, light brown, wet, homogeneous.		
				31					
20	175.0								

Job No. XL-4998

 SR 020

 Elevation 194.0 ft

 HOLE No. H-5-16

 Sheet 2 of 2

 Project Sharpes Corner Vicinity Improvements

 Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
							39 43 (70)				Recovered: 1.7 ft Retained: 1.6 ft		
											The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 21 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 17.9' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 19' Depth of casing during bail test: 19' Bailed bore hole water level to 17.9' Recharge after 15 minutes: 17.9'		
170													
25													
165													
30													
160													
35													
155													
40													
150													
45													

LOG OF TEST BORING

Start Card SE60108

Job No. XL-4998

SR 020

Elevation 188.4 ftHOLE No. H-7-16Sheet 1 of 2

Project Sharpes Corner Vicinity Improvements

Driller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711

Start December 6, 2016 Completion December 6, 2016 Well ID# _____ Equipment CME 850 (9A2-523)

Station Y 37+18.57 Offset 57.6 feet right Hole Dia 4 Historical SPT Efficiency 89.4%
(inches)

Northing 535366.008 Easting 1216034.551 Collected by Region Survey Crew Method Hollow Stem Auger

Lat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				20406080						
					12	D-1		Poorly graded SAND with gravel, sub-angular, very loose, brown, dry, homogeneous. Recovered: 1.7 ft Retained: 1.6 ft		
					22					
					22					
					22					
					(4)					
					22	D-2		Poorly graded SAND, loose, light brown, moist, homogeneous. Recovered: 1.7 ft Retained: 1.6 ft		
					46					
185.0					12					
					(10)					
					10	D-3		Poorly graded SAND with gravel, sub-angular, dense, light brown, moist, homogeneous. Recovered: 1.9 ft Retained: 1.8 ft		
5					19					
					19					
					24					
					(38)					
					8	D-4		Poorly graded SAND, dense, light brown, moist, homogeneous. Recovered: 1.7 ft Retained: 1.6 ft		
					16					
180.0					21					
					23					
					(37)					
					9	D-5		Poorly graded SAND with gravel, sub-angular, dense, light brown, wet, homogeneous. Recovered: 1.9 ft Retained: 1.8 ft		
10					17					
					17					
					23					
					(34)					
					6	D-6		Poorly graded SAND, dense, light brown, wet, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
					16					
					19					
					23					
					(35)					
		</								



LOG OF TEST BORING

Start Card SE60109Job No. XL-4998SR 020Elevation 62.7 ftHOLE No. H-16-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 8, 2016 Completion November 8, 2016 Well ID# _____ Equipment CME 45 (9A4-1)Station Y 62+14.47 Offset 29.3 feet left Hole Dia 4 (inches) Historical SPT Efficiency 88.2%Northing 537865.9799 Easting 1216163.297 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
	60.0			19 16 14 18 (30)	D-1		ASPHALT. Well graded SAND with gravel, sub-angular, dense, gray, dry, homogeneous. Recovered: 1.3 ft Retained: 1.2 ft		
5				3 4 5 5 (9)	D-2		Poorly graded SAND, loose, grayish brown, wet, homogeneous. Recovered: 1.1 ft Retained: 1.1 ft		
				4 6 8 8 (14)	D-3		Silty SAND with gravel, sub-angular, medium dense, grayish brown, wet, homogeneous. Recovered: 1.3 ft Retained: 1.2 ft		
	55.0			1 2 3 4 (5)	D-4		Sandy SILT with gravel, sub-angular, loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
10				2 2 3 8 (5)	D-5		Sandy SILT with gravel, sub-angular, loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 2.0 ft		
	50.0			RQD 96% FF 4	C-1		BASALT, grayish black, fine grained, slightly weathered, moderately strong rock, with quartz veins. Discontinuities are widely spaced and in good condition. Recovered: 100%		
15									
	45.0								
20							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		



LOG OF TEST BORING

Job No. XL-4998SR 020Elevation 62.7 ftHOLE No. H-16-16Sheet 2 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD				Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20	40	60	80							
40											End of test hole boring at 17 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 13.9' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 17' Depth of casing during bail test: 17' Bailed bore hole water level to 16.3' Recharge after 30 minutes: 13.9'		
25													
35													
30													
30													
35													
25													
40													
20													
45													



LOG OF TEST BORING

Start Card SE60111Job No. XL-4998SR 020Elevation 28.3 ftHOLE No. H-21-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start January 9, 2017 Completion January 9, 2017 Well ID# _____ Equipment CME 850 (9A2-523)Station X 11+94.68 Offset 38.2 feet right Hole Dia 4 (inches) Historical SPT Efficiency 89.4%Northing 538561.614 Easting 1216461.548 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
				2 8 10 7 (18)	D-1		Sandy SILT with gravel, sub-angular, medium dense, gray, dry, homogeneous. Recovered: 0.7 ft Retained: 0.6 ft		
	25.0			6 9 11 12 (20)	D-2		Sandy SILT with gravel, sub-angular, medium dense, light brown, dry, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
5				5 6 10 12 (16)	D-3		Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
	20.0			1 4 5 8 (9)	D-4		Sandy SILT with gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
10				2 4 6 7 (10)	D-5		Sandy SILT with gravel, sub-angular, loose, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
	15.0								
15				5 4 4 5 (8)	D-6		Sandy SILT with gravel, sub-angular, loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
	10.0								
20									

Job No. XL-4998

 SR 020

 Elevation 28.3 ft

 HOLE No. H-21-16

 Sheet 2 of 2

 Project Sharpes Corner Vicinity Improvements

 Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
				2 2 8 11 (10)		D-7		Silty SAND with gravel, sub-angular, loose, gray, moist, homogeneous. Recovered: 2.0 ft Retained: 1.8 ft		
5								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. End of test hole boring at 22 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal Note: Groundwater encountered at 13.2' Bail/Recharge test: Hole Diameter: 4 Depth of boring during bail test: 22' Depth of casing during bail test: 20' Water depth before bailing: 1' Bailed bore hole water level to 12.4' Recharge after 15 minutes: 13.2'		
25										
0										
30										
-5										
35										
-10										
40										
-15										
45										



LOG OF TEST BORING

Start Card SE60110Job No. XL-4998SR 020Elevation 26.4 ftHOLE No. H-22-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start November 15, 2016 Completion November 15, 2016 Well ID# _____ Equipment CME 45 (9A4-1)Station A 50+46.60 Offset 48.0 feet right Hole Dia 4 (inches) Historical SPT Efficiency 88.2%Northing 538716.4155 Easting 1216142.875 Collected by Region Survey Crew Method Casing AdvancerLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid Polymer

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80						
25.0				15 11 8 32 (19)	D-1		ASPHALT. Silty SAND with gravel and some cobbles, sub-angular, medium dense, light brownish gray, dry, homogeneous. Recovered: 1.5 ft Retained: 1.3 ft		
5				3 7 9 9 (16)	D-2		Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 0.8 ft Retained: 0.8 ft		
20.0				5 6 8 11 (14)	D-3		Sandy SILT with gravel, sub-angular, medium dense, error 2023, moist, homogeneous. Recovered: 1.8 ft Retained: 1.7 ft		
10				5 9 11 13 (20)	D-4		Sandy SILT with gravel, sub-angular, medium dense, light brown, moist, homogeneous. Recovered: 2.0 ft Retained: 1.9 ft		
15.0									
15				50/0.001" (REF)	D-5		BASALT, black, moist, homogeneous. Hit Rock (Basalt) Recovered: 0.0 ft Retained: 0.0 ft		
10.0							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
20									

Job No. XL-4998

SR 020

Elevation 2 6ft

HOLE No. H-22-16

Sheet 2 of 2

Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted[illegible]



LOG OF TEST BORING

Start Card SE60578Job No. XL-4998SR 020Elevation 26.3 ftHOLE No. H-32-16Sheet 1 of 2Project Sharpes Corner Vicinity ImprovementsDriller Henderson, Ted Lic# 2902

Component _____

Inspector Brun, Mike #1711Start December 20, 2016 Completion December 20, 2016 Well ID# _____ Equipment CME 850 (9A2-523)Station X 11+48.97 Offset 95.2 feet left Hole Dia 4 (inches) Historical SPT Efficiency 89.4%Northing 538702.2005 Easting 1216469.628 Collected by Region Survey Crew Method Casing Advancer and CoringLat _____ Long _____ Datum NAD 83/91 HARN, NAVD88, SPS (ft) Drill Fluid None

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
25.0			20 40 60 80	15 20 28 (48)	D-1		Well graded GRAVEL with sand, sub-angular, dense, gray, moist, homogeneous. Recovered: 1.1 ft Retained: 1.0 ft	12-14-2016	
				18 21 24 27 (45)	D-2		Well graded GRAVEL with sand and a few cobbles, sub-angular, dense, grayish brown, moist, homogeneous. Recovered: 1.0 ft Retained: 1.0 ft		
5							Contacted Rock		
20.0				RQD 10% FF 9	C-1		BASALT, grayish black, fine grained, slightly weathered, moderately strong rock, with quartz veins. Discontinuities are closely spaced and in good condition. Recovered: 100%		
				RQD 10% FF 24	C-2		BASALT, grayish black, fine grained, slightly weathered, moderately strong rock, with quartz veins. Discontinuities are closely spaced and in fair condition. Recovered: 100%		
10									
15.0				RQD 20% FF 23	C-3		BASALT, grayish black, fine grained, slightly weathered, moderately strong rock, with quartz veins. Discontinuities are closely spaced and in fair condition. Recovered: 100%		
15									
10.0							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Office and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
20									



LOG OF TEST BORING

Job No. XL-4998

SR 020

Elevation 26.3 ft

HOLE No. H-32-16

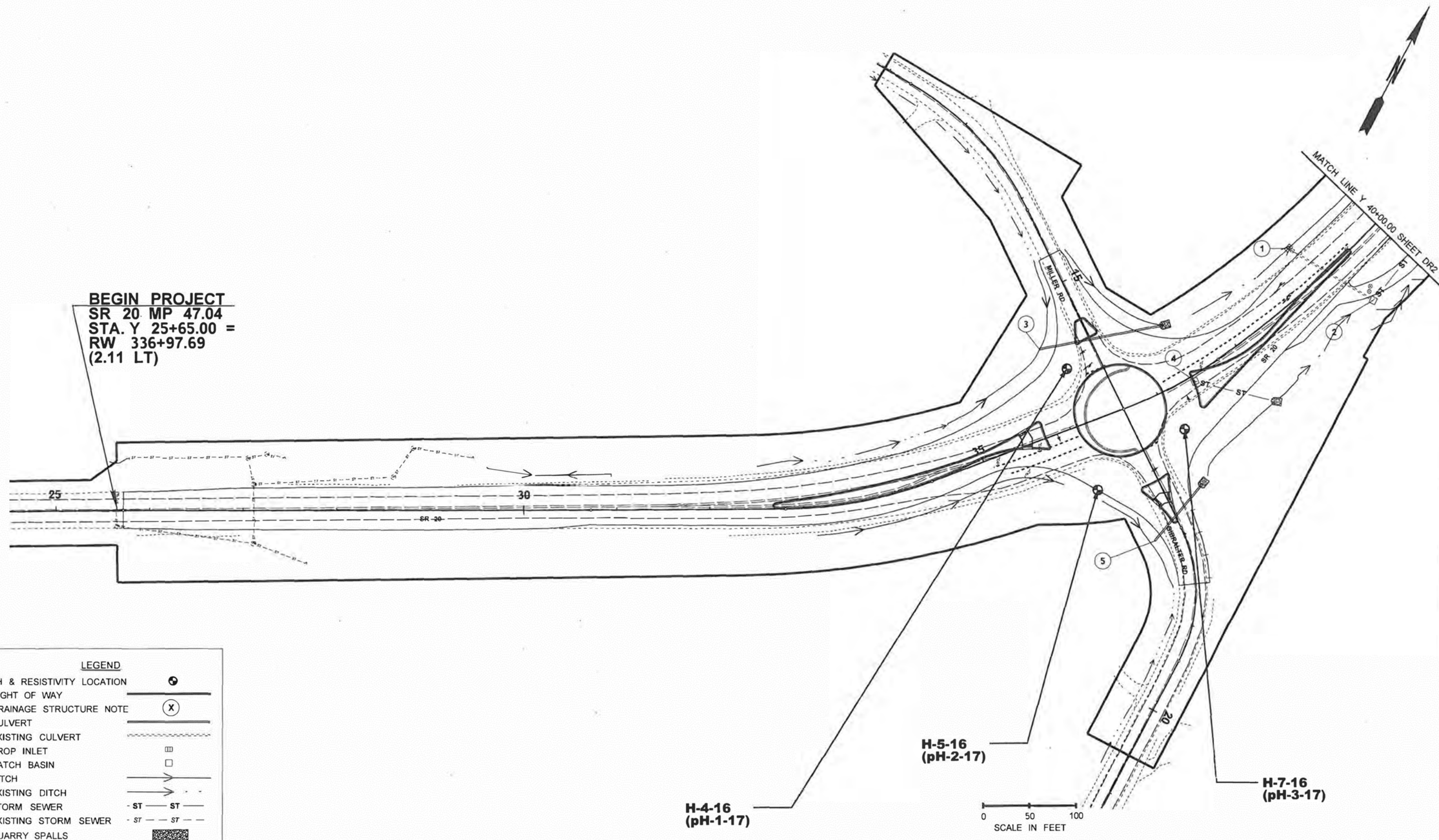
Sheet 2 of 2

Project Sharpes Corner Vicinity Improvements

Driller Henderson, Ted

Depth (ft)	Elevation (ft)	Profile	SPT Efficiency Field SPT (N) Moisture Content RQD	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			20 40 60 80							
5								End of test hole boring at 18 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
25								No Free Water		
0										
30										
-5										
35										
-10										
40										
-15										
45										

BEGIN PROJECT
SR 20 MP 47.04
STA. Y 25+65.00 =
RW 336+97.69
(2.11 LT)



LEGEND

pH & RESISTIVITY LOCATION	⊗
RIGHT OF WAY	—
DRAINAGE STRUCTURE NOTE	⊗
CULVERT	—
EXISTING CULVERT	- - -
DROP INLET	⊞
CATCH BASIN	□
DITCH	—
EXISTING DITCH	- - -
STORM SEWER	- ST - ST -
EXISTING STORM SEWER	- - ST - - ST - -
QUARRY SPALLS	▨

FILE NAME I:\Saelee\Microstation Files\SR-20\Sharpes\XL4998_PS_DR.dgn

TIME 1:29:37 PM

DATE 3/22/2017

PLOTTED BY saelee

DESIGNED BY C. CALHOUN

ENTERED BY C. CALHOUN

CHECKED BY M. LAMAY

PROJ. ENGR. G. NG

REGIONAL ADM. L. ENG

REVISION

DATE

BY

REGION
NO. 10

STATE

WASH

JOB NUMBER

CONTRACT NO.

FED.AID PROJ.NO.

LOCATION NO.

P.E. STAMP BOX

DATE



P.E. STAMP BOX

DATE



SR 20
SHARPES CORNER VICINITY
IMPROVEMENTS

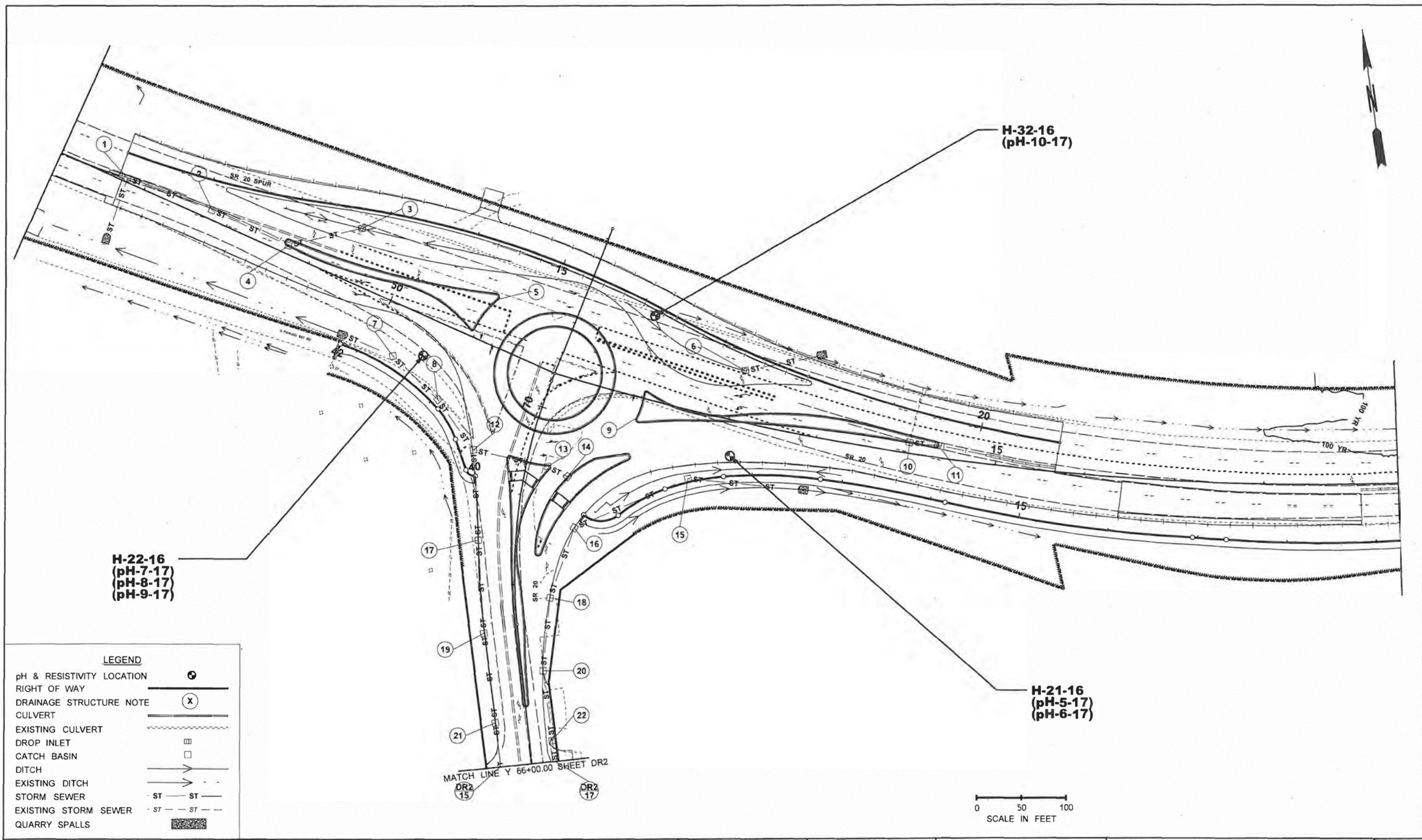
pH & RESISTIVITY PLAN

Plot 1

PLAN REF NO

DR1

SHEET
1
OF
3
SHEETS



H-22-16
(pH-7-17)
(pH-8-17)
(pH-9-17)

H-32-16
(pH-10-17)

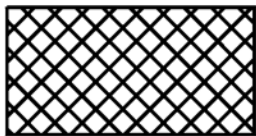
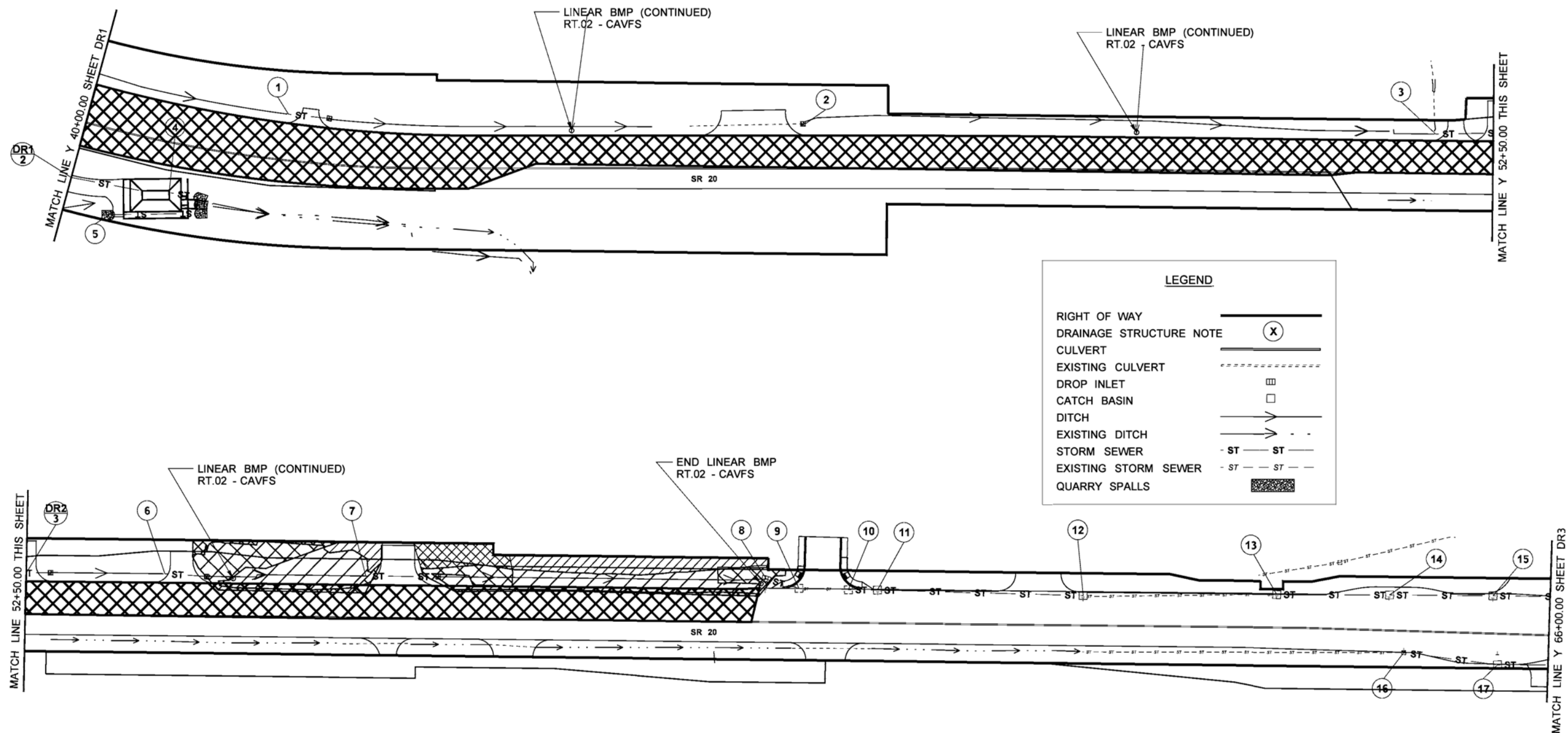
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(pH-5-17)
(pH-6-17)

LEGEND

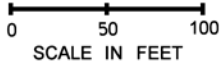
pH & RESISTIVITY LOCATION	⊙
RIGHT OF WAY	—
DRAINAGE STRUCTURE NOTE	(X)
CULVERT	—
EXISTING CULVERT	- - -
DROP INLET	⊞
CATCH BASIN	□
DITCH	—>
EXISTING DITCH	- - ->
STORM SEWER	- ST - ST -
EXISTING STORM SEWER	- ST - - ST - -
QUARRY SPALLS	▨

FILE NAME I:\Saelee\Microstation Files\SR-20\Sharpes\XL4998_PS_DR.dgn		REGION NO. 10		STATE WASH	FED.AID PROJ.NO.			SR 20 SHARPES CORNER VICINITY IMPROVEMENTS pH & RESISTIVITY PLAN	Plot 3 PLAN REF NO DR3 SHEET 3 OF 3 SHEETS
TIME 1:29:39 PM	DATE 3/22/2017	JOB NUMBER		LOCATION NO.	P.E. STAMP BOX				
PLOTTED BY saelee	DESIGNED BY C. CALHOUN	ENTERED BY C. CALHOUN	CHECKED BY M. LAMAY	PROJ. ENGR. G. NG	REGIONAL ADM. L. ENG	REVISION	DATE	BY	

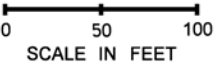
HYDRAULIC CALCULATIONS EXHIBIT SHEETS

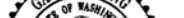


TDA 1 - SEE SHEET 1 FOR TOTAL CALCULATED AREA



FILE NAME T:\412354\XL4998 Sharpes\CAD\From Design\CHAD\HYDRAULIC CALCULATIONS EXHIBIT SHEETS XL4998.dgn														SR 20		Plot 2
TIME 1:26:39 PM					REGION NO. 10	STATE WASH	FED.AID PROJ.NO.				PLAN REF NO					
DATE 5/18/2017																
PLOTTED BY calhouc					JOB NUMBER											
DESIGNED BY C. CALHOUN																
ENTERED BY C. CALHOUN																
CHECKED BY M. LAMAY																
PROJ. ENGR. J. KORESKE					CONTRACT NO.		LOCATION NO.									
REGIONAL ADM. L. ENG		REVISION		DATE	BY									SHEET 2 OF 3 SHEETS		
										DATE	DATE	HYDRAULIC CALCULATIONS EXHIBIT				
										P.E. STAMP BOX	P.E. STAMP BOX					



FILE NAME T:\412354\XL4998_Sharpe\CAD\From_Design\Chad\HYDRAULIC CALCULATIONS EXHIBIT SHEETS XL4998.dgn										Plot 3	
TIME 1:26:46 PM						REGION NO. STATE		FED.AID PROJ.NO.		PLAN REF NO.	
DATE 5/18/2017						10 WASH					
PLOTTED BY calhouc						JOB NUMBER					
DESIGNED BY C. CALHOUN											
ENTERED BY C. CALHOUN											
CHECKED BY M. LAMAY						CONTRACT NO.		LOCATION NO.			
PROJ. ENGR. J. KORESKI											
REGIONAL ADM. L. ENG		REVISION		DATE		BY					
 										SR 20 SHARPES CORNER VICINITY IMPROVEMENTS	
 										HYDRAULIC CALCULATIONS EXHIBIT	
 										SHEET 3 OF 3 SHEETS	

XL4998 SR 20 SHARPES CORNER HYDRAULICS
AVERAGE m & n VALUES
MARCH 21, 2016 CHAD CALHOUN

Location	2-Year MRI		5-Year MRI		10-Year MRI		25-Year MRI		50-Year MRI		100-Year MRI	
	m 4.11	n .546	m 5.42	n .554	m 6.43	n .558	m 7.75	n .562	m 8.75	n .564	m 9.76	n .566
Aberdeen and Hoquiam	5.10	0.488	6.22	0.488	7.06	0.487	8.17	0.487	9.02	0.487	9.86	0.487
Bellingham	4.29	0.549	5.59	0.555	6.59	0.559	7.90	0.562	8.89	0.563	9.88	0.565
Bremerton	3.79	0.480	4.84	0.487	5.63	0.490	6.68	0.494	7.47	0.496	8.26	0.498
Centralia and Chehalis	3.63	0.506	4.85	0.518	5.76	0.524	7.00	0.530	7.92	0.533	8.86	0.537
Clarkston and Colfax	5.02	0.628	6.84	0.633	8.24	0.635	10.07	0.638	11.45	0.639	12.81	0.639
Colville	3.48	0.558	5.44	0.593	6.98	0.610	9.07	0.626	10.65	0.635	12.26	0.642
Ellensburg	2.89	0.590	5.18	0.631	7.00	0.649	9.43	0.664	11.30	0.672	13.18	0.678
Everett	3.69	0.556	5.20	0.570	6.31	0.575	7.83	0.582	8.96	0.585	10.07	0.586
Forks	4.19	0.410	5.12	0.412	5.84	0.413	6.76	0.414	7.47	0.415	8.18	0.416
Hoffstadt Cr. (SR 504)	3.96	0.448	5.21	0.462	6.16	0.469	7.44	0.476	8.41	0.480	9.38	0.484
Hoodsport	4.47	0.428	5.44	0.428	6.17	0.427	7.15	0.428	7.88	0.428	8.62	0.428
Kelso and Longview	4.25	0.507	5.50	0.515	6.45	0.509	7.74	0.524	8.70	0.526	9.67	0.529
Leavenworth	3.04	0.530	4.12	0.542	5.62	0.575	7.94	0.594	9.75	0.606	11.08	0.611
Metaline Falls	3.36	0.527	4.90	0.553	6.09	0.566	7.45	0.570	9.29	0.592	10.45	0.591
Moses Lake	2.61	0.583	5.05	0.634	6.99	0.655	9.58	0.671	11.61	0.681	13.63	0.688
Mt. Vernon	3.92	0.542	5.25	0.552	6.26	0.557	7.59	0.561	8.60	0.564	9.63	0.567
Naselle	4.57	0.432	5.67	0.441	6.14	0.432	7.47	0.443	8.05	0.440	8.91	0.436
Olympia	3.82	0.466	4.86	0.472	5.62	0.474	6.63	0.477	7.40	0.478	8.17	0.480
Omak	3.04	0.583	5.06	0.618	6.63	0.633	8.74	0.647	10.35	0.654	11.97	0.660
Pasco and Kennewick	2.89	0.590	5.18	0.631	7.00	0.649	9.43	0.664	11.30	0.672	13.18	0.678
Port Angeles	4.31	0.530	5.42	0.531	6.25	0.531	7.37	0.532	8.19	0.532	9.03	0.532
Poulsbo	3.83	0.506	4.98	0.513	5.85	0.516	7.00	0.519	7.86	0.521	8.74	0.523
Queets	4.26	0.422	5.18	0.423	5.87	0.423	6.79	0.423	7.48	0.423	8.18	0.424
Seattle	3.56	0.515	4.83	0.531	5.62	0.530	6.89	0.539	7.88	0.545	8.75	0.5454
Sequim	3.50	0.551	5.01	0.569	6.16	0.577	7.69	0.585	8.88	0.590	10.04	0.593
Snoqualmie Pass	3.61	0.417	4.81	0.435	6.56	0.459	7.72	0.459	8.78	0.461	10.21	0.476
Spokane	3.47	0.556	5.43	0.591	6.98	0.609	9.09	0.626	10.68	0.635	12.33	0.643
Stevens Pass	4.73	0.462	6.09	0.470	8.19	0.500	8.53	0.484	10.61	0.499	12.45	0.513
Tacoma	3.57	0.516	4.78	0.527	5.70	0.533	6.93	0.539	7.86	0.542	8.79	0.545
Vancouver	2.92	0.477	4.05	0.496	4.92	0.506	6.06	0.515	6.95	0.520	7.82	0.525
Walla Walla	3.33	0.569	5.54	0.609	7.30	0.627	9.67	0.645	11.45	0.653	13.28	0.660
Wenatchee	3.15	0.535	4.88	0.566	6.19	0.579	7.94	0.592	9.32	0.600	10.68	0.605
Yakima	3.86	0.608	5.86	0.633	7.37	0.644	9.40	0.654	10.93	0.659	12.47	0.663

Index to Rainfall Coefficients (English Units)
Figure 2-5.4A

Appendix A-3.0b

20 miles

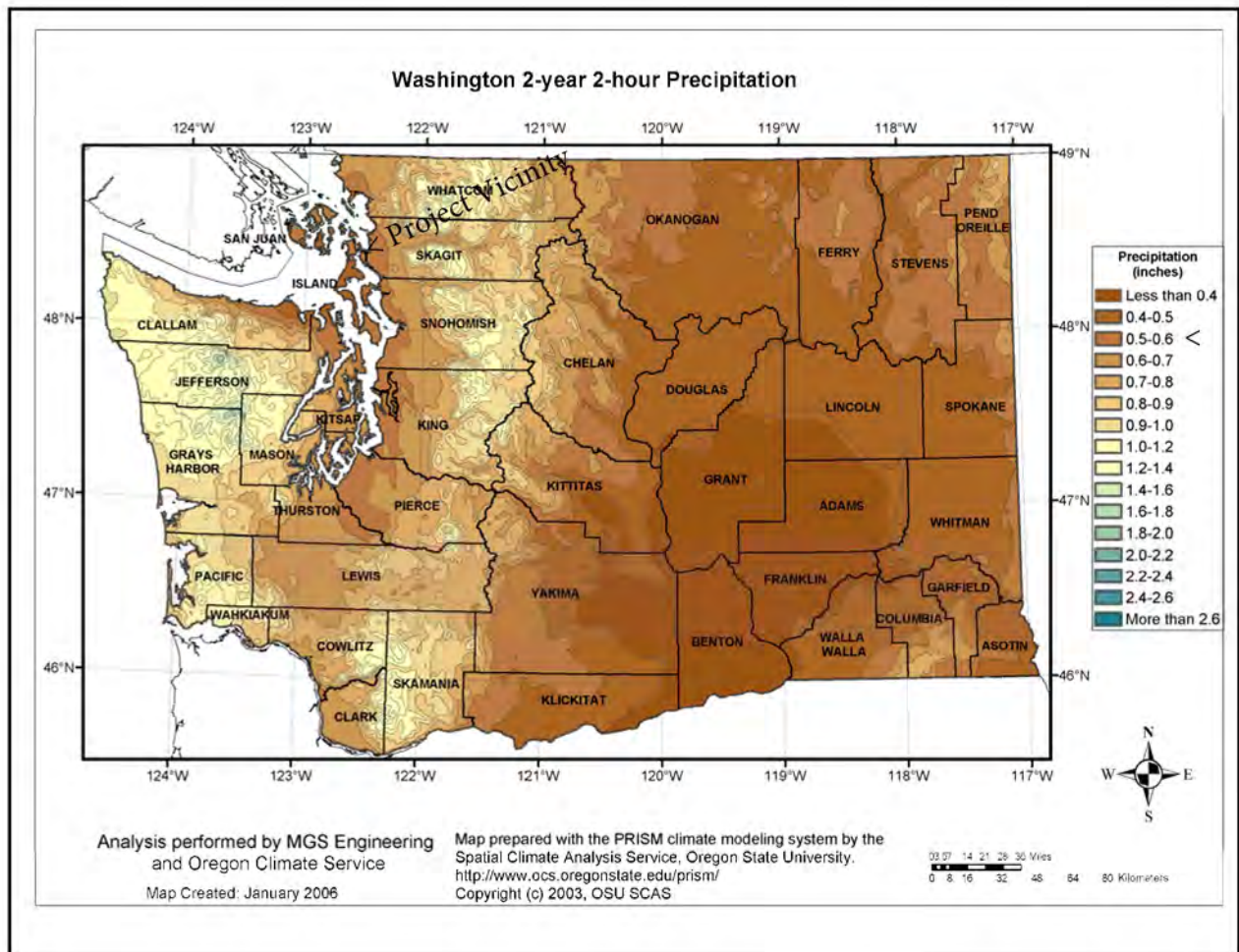
12 miles

Appendix A-3.0c

Washington 2-hour Isopluvial Maps

Statewide update on January 2006

Also available on the Environmental Workbench in ArcView

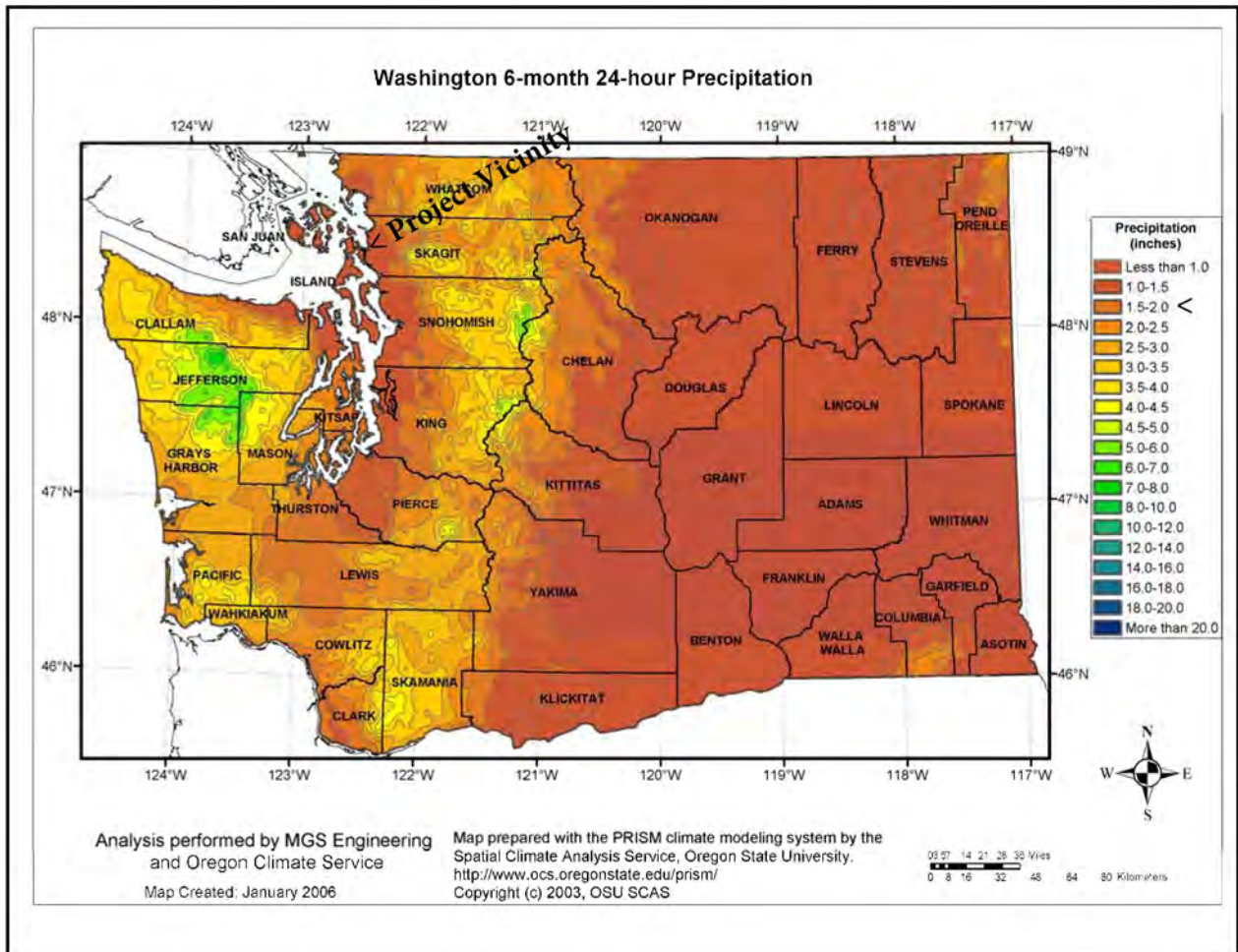


Appendix A-3.0d

Washington 24-hour Isopluvial Maps

Statewide update on January 2006

Also available on the Environmental Workbench in ArcView

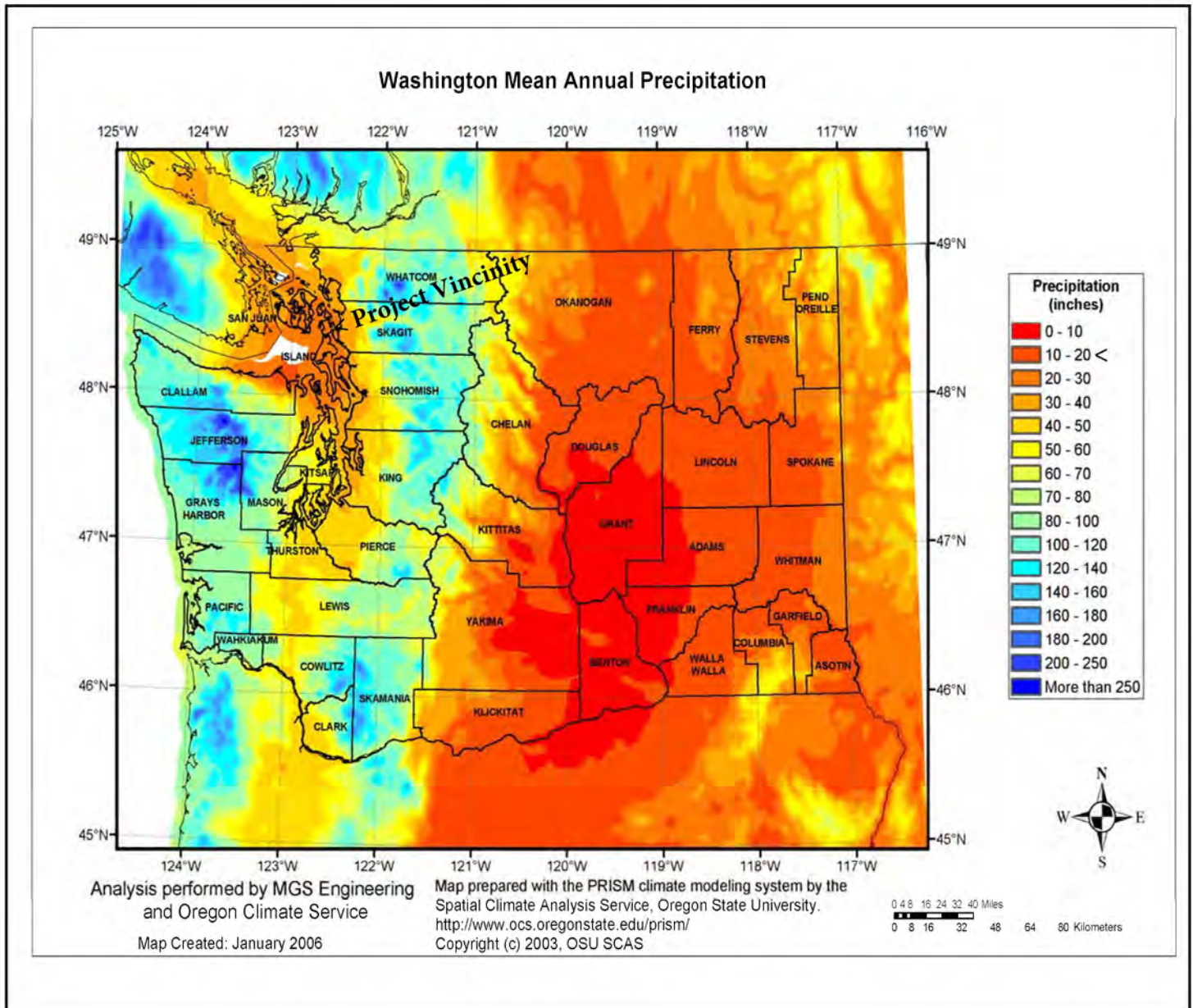


Appendix A-3.0e

Washington Mean Annual Precipitation (MAP)

Statewide update on January 2006

Also available on the Environmental Workbench in ArcView



Appendix A-3.0f

Pavement to CAVFS Width Ratio (PCR) Table

TimeStep	Precipitation Value	Pavement to CAVFS Width Ratio
15 min	Puget East 24	19.80
15 min	Puget East 28	17.42
15 min	Puget East 32	13.20
15 min	Puget East 36	11.77
15 min	Puget East 40	10.89
15 min	Puget East 44	9.68
15 min	Puget East 48	8.71
15 min	Puget East 52	7.51
15 min	Puget East 56	7.03
15 min	Puget East 60	6.31
1 hour	Puget East 70	6.60

TimeStep	Precipitation Value	Pavement to CAVFS Width Ratio
15 min	Puget West 32	11.46
15 min	Puget West 36	10.62
15 min	Puget West 40	9.90
15 min	Puget West 44	8.89
15 min	Puget West 48	7.92
15 min	Puget West 52	6.91
15 min	Puget West 56	5.97
15 min	Puget West 60	5.66
1 hour	Puget West 70	5.73
1 hour	Puget West 80	4.68
1 hour	Puget West 90	3.79

TimeStep	Precipitation Value	Pavement to CAVFS Width Ratio
15 min	Vancouver 38	10.89
15 min	Vancouver 40	10.89
15 min	Vancouver 44	10.13
15 min	Vancouver 48	9.08
15 min	Vancouver 52	8.22
15 min	Vancouver 56	7.03
15 min	Vancouver 60	7.38
1 hour	Vancouver 70	6.60
1 hour	Vancouver 80	5.73

average roadway width (ft)	min. CAVFS width (ft)
16	1.21
26	2.21
36	3.31
46	4.75
56	6.43
66	8.79

How to use this table.

For LID Feasibility, designer picks the time series in MGSFlood for the TDA. For the pavement width flowing to proposed CAVFS, divide the pavement width by the "Pavement to CAVFS width ratio" to get the required width of CAVFS needed to meet the LID standard. The length of the CAVFS should be as long as the section of pavement flowing to the CAVFS. The overall assumption is that the underlying soils and the CAVFS material have at least 0.3 inches per hour for the saturated hydraulic conductivity. The CAVFS is on 3:1 slopes.

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:20 AM
Report Generation Date: 06/27/2017 8:21 AM

Appendix A-3.1a

Input File Name: XL4998 47.04a MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA4 CAVFS 47.04A
Comments: Boring H-2P-16; 4.32 in/hr Average Hydraulic Conductivity , .675 in/hr Infiltration Rate. Both reflect a .1 correction factor applied.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.474	0.420
Area of Links that Include Precip/Evap (acres)	0.000	0.054
Total (acres)	0.474	0.474

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 4 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.056
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.056

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.418
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.418

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 4 New PGIS+Replaced -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.420

Subbasin Total	0.420

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04A

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 4.320
CAVFS Length (ft) : 303.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 0.675
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 Existing Imper	1.638
Subbasin: Subbasin 1	15.222
Link: New Copy Lnk1	0.000
Total:	16.860

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 New PGIS+Repla	0.000
Link: New CAVFS 47.04A	53.659
Total:	53.659

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.268 ac-ft/year, Post Developed: 0.852 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 3.77
Inflow Volume Including PPT-Evap (ac-ft): 3.77
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 3.77
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04A *****

Basic Wet Pond Volume (91% Exceedance): 1274. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1911. cu-ft

2-Year Discharge Rate : 0.005 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.05 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.03 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 10.07

Infiltration/Filtration Statistics-----
 Inflow Volume (ac-ft): 48.07
 Inflow Volume Including PPT-Evap (ac-ft): 54.76
 Total Runoff Infiltrated (ac-ft): 53.66, 98.00%
 Total Runoff Filtered (ac-ft): 0.88, 1.60%
 Primary Outflow To Downstream System (ac-ft): 1.12
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered)/Total Volume: 99.60%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
 Scenario Postdeveloped Compliance Link: New CAVFS 47.04A

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	1.322E-03	2-Year	5.326E-03
5-Year	2.596E-03	5-Year	6.027E-02
10-Year	3.791E-03	10-Year	9.334E-02
25-Year	5.148E-03	25-Year	0.127
50-Year	5.735E-03	50-Year	0.131
100-Year	6.119E-03	100-Year	0.132
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:22 AM
Report Generation Date: 06/27/2017 8:22 AM

Appendix A-3.1b

Input File Name: XL4998 47.04b MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA4 CAVFS 47.04B
Comments: Boring H-2P-16; 4.32 in/hr Average Hydraulic Conductivity , .675 in/hr Infiltration Rate. Both reflect a .1 correction factor applied.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.426	0.343
Area of Links that Include Precip/Evap (acres)	0.000	0.083
Total (acres)	0.426	0.426

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 4 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.086
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.086

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.340
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.340

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 4 New PGIS+Replaced -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.343

Subbasin Total	0.343

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04B

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 4.320
CAVFS Length (ft) : 467.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 0.675
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 Existing Imper	2.516
Subbasin: Subbasin 1	12.381
Link: New Copy Lnk1	0.000
Total:	14.897

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 New PGIS+Repla	0.000
Link: New CAVFS 47.04B	49.379
Total:	49.379

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.236 ac-ft/year, Post Developed: 0.784 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 5.79
Inflow Volume Including PPT-Evap (ac-ft): 5.79
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 5.79
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04B *****

Basic Wet Pond Volume (91% Exceedance): 1040. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1561. cu-ft

2-Year Discharge Rate : 0.002 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.04 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.02 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 5.69

Infiltration/Filtration Statistics-----
 Inflow Volume (ac-ft): 39.26
 Inflow Volume Including PPT-Evap (ac-ft): 49.84
 Total Runoff Infiltrated (ac-ft): 49.38, 99.07%
 Total Runoff Filtered (ac-ft): 0.51, 1.01%
 Primary Outflow To Downstream System (ac-ft): 0.52
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered)/Total Volume: 100.09%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
 Scenario Postdeveloped Compliance Link: New CAVFS 47.04B

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	2.030E-03	2-Year	1.961E-03
5-Year	3.987E-03	5-Year	5.373E-03
10-Year	5.821E-03	10-Year	6.540E-03
25-Year	7.906E-03	25-Year	1.029E-02
50-Year	8.807E-03	50-Year	7.597E-02
100-Year	9.398E-03	100-Year	8.948E-02
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

**MGS FLOOD
PROJECT REPORT**

Appendix A-3.1c

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:23 AM
Report Generation Date: 06/27/2017 8:23 AM

Input File Name: XL4998 47.04c MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA4 CAVFS 47.04C
Comments: Boring H-10P-16; 16.2 in/hr Average Hydraulic Conductivity and a 1.71 in/hr Infiltration Rate. Both reflect a .1 correction factor applied.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in 5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.296	0.266
Area of Links that Include Precip/Evap (acres)	0.000	0.030
Total (acres)	0.296	0.296

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 4 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.031
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.031

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.265
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000

Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.265

-----**SCENARIO: POSTDEVELOPED**

Number of Subbasins: 1

----- Subbasin : TDA 4 New PGIS+Replaced -----	
-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.266

Subbasin Total	0.266

***** **LINK DATA** *****

-----**SCENARIO: PREDEVELOPED**

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** **LINK DATA** *****

-----**SCENARIO: POSTDEVELOPED**

Number of Links: 1

Link Name: New CAVFS 47.04C

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 16.200
CAVFS Length (ft) : 168.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 1.710
Precipitation and Evaporation Applied to Surface of CAVFS

***** **FLOOD FREQUENCY AND DURATION STATISTICS** *****

-----**SCENARIO: PREDEVELOPED**

Number of Subbasins: 2

Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 Existing Imper	0.907
Subbasin: Subbasin 1	9.650
Link: New Copy Lnk1	0.000

Total:	10.557

Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 New PGIS+Repla	0.000
Link: New CAVFS 47.04C	33.669

Total:	33.669

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.168 ac-ft/year, Post Developed: 0.534 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 2.09
Inflow Volume Including PPT-Evap (ac-ft): 2.09
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 2.09
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04C *****

Basic Wet Pond Volume (91% Exceedance): 807. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1210. cu-ft

2-Year Discharge Rate : 0.001 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.03 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.02 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 4.50

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 30.45
Inflow Volume Including PPT-Evap (ac-ft): 34.13
Total Runoff Infiltrated (ac-ft): 33.67, 98.65%
Total Runoff Filtered (ac-ft): 0.45, 1.32%
Primary Outflow To Downstream System (ac-ft): 0.46
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 99.97%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
Scenario Postdeveloped Compliance Link: New CAVFS 47.04C

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	7.316E-04	2-Year	1.021E-03
5-Year	1.437E-03	5-Year	5.994E-03
10-Year	2.098E-03	10-Year	8.101E-03
25-Year	2.850E-03	25-Year	1.276E-02
50-Year	3.175E-03	50-Year	4.031E-02
100-Year	3.388E-03	100-Year	5.205E-02
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:24 AM
Report Generation Date: 06/27/2017 8:24 AM

Appendix A-3.1d

Input File Name: XL4998 47.04d MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA4 CAVFS 47.04D
Comments: Boring H-10P-16; 16.2 in/hr Average Hydraulic Conductivity and a 1.71 in/hr Infiltration Rate. Both reflect a .1 correction factor applied.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in 5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.407	0.388
Area of Links that Include Precip/Evap (acres)	0.000	0.018
Total (acres)	0.407	0.406

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 4 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.019
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.019

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.388
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000

Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.388

-----**SCENARIO: POSTDEVELOPED**
Number of Subbasins: 1

----- Subbasin : TDA 4 New PGIS+Replaced -----	
-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.388

Subbasin Total	0.388

***** **LINK DATA** *****

-----**SCENARIO: PREDEVELOPED**
Number of Links: 1

Link Name: New Copy Lnk1
Link Type: Copy
Downstream Link: None

***** **LINK DATA** *****

-----**SCENARIO: POSTDEVELOPED**
Number of Links: 1

Link Name: New CAVFS 47.04D
Link Type: Compost Amended Vegetated Filter Strip (CAVFS)
Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 16.200
CAVFS Length (ft) : 103.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 1.710
Precipitation and Evaporation Applied to Surface of CAVFS

***** **FLOOD FREQUENCY AND DURATION STATISTICS** *****

-----**SCENARIO: PREDEVELOPED**
Number of Subbasins: 2

Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 Existing Imper	0.556
Subbasin: Subbasin 1	14.129
Link: New Copy Lnk1	0.000

Total:	14.685

Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 New PGIS+Repla	0.000
Link: New CAVFS 47.04D	44.763

Total:	44.763

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.233 ac-ft/year, Post Developed: 0.711 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 1.28
Inflow Volume Including PPT-Evap (ac-ft): 1.28
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 1.28
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04D *****

Basic Wet Pond Volume (91% Exceedance): 1177. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1765. cu-ft

2-Year Discharge Rate : 0.033 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.05 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.03 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 10.40

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 44.41
Inflow Volume Including PPT-Evap (ac-ft): 46.56
Total Runoff Infiltrated (ac-ft): 44.76, 96.14%
Total Runoff Filtered (ac-ft): 1.21, 2.59%
Primary Outflow To Downstream System (ac-ft): 1.68
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 98.73%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
Scenario Postdeveloped Compliance Link: New CAVFS 47.04D

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	4.484E-04	2-Year	3.319E-02
5-Year	8.808E-04	5-Year	7.820E-02
10-Year	1.286E-03	10-Year	9.440E-02
25-Year	1.747E-03	25-Year	0.122
50-Year	1.946E-03	50-Year	0.146
100-Year	2.076E-03	100-Year	0.200
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:25 AM
Report Generation Date: 06/27/2017 8:26 AM

Appendix A-3.1e

Input File Name: XL4998 47.04e MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA1 CAVFS 47.04E
Comments: Boring H-10P-16; 16.2 in/hr Average Hydraulic Conductivity and a 1.71 in/hr Infiltration Rate. Both reflect a .1 correction factor applied.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in 5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	1.786	1.566
Area of Links that Include Precip/Evap (acres)	0.000	0.220
Total (acres)	1.786	1.786

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 1 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.227
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.227

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	1.559
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000

Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	1.559

-----**SCENARIO: POSTDEVELOPED**

Number of Subbasins: 1

----- Subbasin : TDA 1 New PGIS+Replaced -----	
-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	1.566

Subbasin Total	1.566

***** **LINK DATA** *****

-----**SCENARIO: PREDEVELOPED**

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** **LINK DATA** *****

-----**SCENARIO: POSTDEVELOPED**

Number of Links: 1

Link Name: New CAVFS 47.04E

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 16.200
CAVFS Length (ft) : 1979.000
CAVFS Width (ft) : 5.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 1.710
Precipitation and Evaporation Applied to Surface of CAVFS

***** **FLOOD FREQUENCY AND DURATION STATISTICS** *****

-----**SCENARIO: PREDEVELOPED**

Number of Subbasins: 2

Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 1 Existing Imper	6.640
Subbasin: Subbasin 1	56.772
Link: New Copy Lnk1	0.000
Total:	63.412

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 1 New PGIS+Repla	0.000
Link: New CAVFS 47.04E	202.950
Total:	202.950

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 1.007 ac-ft/year, Post Developed: 3.221 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 15.29
Inflow Volume Including PPT-Evap (ac-ft): 15.29
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 15.29
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04E *****

Basic Wet Pond Volume (91% Exceedance): 4750. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 7125. cu-ft

2-Year Discharge Rate : 0.007 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.19 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.11 cfs

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 179.24
Inflow Volume Including PPT-Evap (ac-ft): 206.65

Total Runoff Infiltrated (ac-ft): 202.95, 98.21%
Total Runoff Filtered (ac-ft): 3.74, 1.81%
Primary Outflow To Downstream System (ac-ft): 3.75
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 100.02%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
Scenario Postdeveloped Compliance Link: New CAVFS 47.04E

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)

2-Year	5.357E-03	2-Year	6.583E-03
5-Year	1.052E-02	5-Year	2.518E-02
10-Year	1.537E-02	10-Year	4.375E-02
25-Year	2.087E-02	25-Year	6.470E-02
50-Year	2.325E-02	50-Year	0.117
100-Year	2.481E-02	100-Year	0.236
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/28/2017 11:39 AM
Report Generation Date: 06/28/2017 11:39 AM

Appendix A-3.1f

Input File Name: XL4998 47.04f MGS Flood POND.fld
Project Name: XL4998 SR20 Sharpes Corner Intersection Improvements
Analysis Title: 47.04f Infiltration Pond - TDA 4
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.831	0.747
Area of Links that Include Precip/Evap (acres)	0.000	0.084
Total (acres)	0.831	0.831

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 5

----- Subbasin : TDA 4 Contribution Predeveloped Area -----

-----Area(Acres)-----	
Till Forest	0.380
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000
Subbasin Total	0.380

----- Subbasin : Pond Area -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.030
Outwash Forest	0.000
Outwash Pasture	0.000

Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.030

----- Subbasin : Flowthrough area above riser elev -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.030
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.030

----- Subbasin : CAVFS Footprint Area -----

-----Area(Acres) -----	
Till Forest	0.084
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.084

----- Subbasin : Retrofit -----

-----Area(Acres) -----	
Till Forest	0.307
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.307

-----**SCENARIO: POSTDEVELOPED**

Number of Subbasins: 4

----- Subbasin : CAVFSA DEV basin -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000

User 2	0.000
Impervious	0.420

Subbasin Total	0.420

----- Subbasin : CAVFSC DEV basin -----
-----Area(Acres) -----

Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.267

Subbasin Total	0.267

----- Subbasin : Pond Tract -----
-----Area(Acres) -----

Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.030

Subbasin Total	0.030

----- Subbasin : Flowthrough area above riser elev -----
-----Area(Acres) -----

Till Forest	0.000
Till Pasture	0.000
Till Grass	0.030
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.030

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED
Number of Links: 1

Link Name: New Copy Lnk1
Link Type: Copy
Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Link Name: Infiltration Pond 47.04f - TDA 4

Link Type: Structure

Downstream Link: None

Prismatic Pond Option Used

Pond Floor Elevation (ft) : 169.00
 Riser Crest Elevation (ft) : 172.49
 Max Pond Elevation (ft) : 172.50
 Storage Depth (ft) : 3.49
 Pond Bottom Length (ft) : 24.0
 Pond Bottom Width (ft) : 8.0
 Pond Side Slopes (ft/ft) : L1= 3.00 L2= 3.00 W1= 3.00 W2= 3.00
 Bottom Area (sq-ft) : 192.
 Area at Riser Crest El (sq-ft) : 1,301.
 (acres) : 0.030
 Volume at Riser Crest (cu-ft) : 2,349.
 (ac-ft) : 0.054
 Area at Max Elevation (sq-ft) : 1305.
 (acres) : 0.030
 Vol at Max Elevation (cu-ft) : 2,493.
 (ac-ft) : 0.057

Massmann Infiltration Option Used

Hydraulic Conductivity (in/hr) : 21.74
 Depth to Water Table (ft) : 100.00
 Bio-Fouling Potential : Low
 Maintenance : Average or Better

Riser Geometry

Riser Structure Type : Rectangular
 Riser Length (ft) : 5.00
 Riser Width (ft) : 5.00
 Common Length (ft) : 0.000
 Riser Crest Elevation : 172.49 ft

Hydraulic Structure Geometry

Number of Devices: 1

--- Device Number 1 ---

Device Type : Trapezoidal Broad Crested Weir (Independent of Riser)
 Invert Elevation (ft) : 171.50
 Length (ft) : 5.00
 Side Slope (Z) (ft/ft) : 3.00

Link Name: CAVFS 47.04A

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link Name: Infiltration Pond 47.04f - TDA 4

Compost Thickness (ft) : 1.000
 Compost Porosity (%) : 20.000
 Compost Hydraulic Conductivity (in/hr) : 4.320
 CAVFS Length (ft) : 303.000
 CAVFS Width (ft) : 8.000
 CAVFS Slope, Z (ft/ft) : 4.000
 Gravel Spreader Width (ft) : 2.000
 Gravel Hydraulic Conductivity (in/hr) : 2.000
 Gravel Porosity (%) : 30.000
 Soil Infiltration Rate (in/hr) : 0.680
 Precipitation and Evaporation Applied to Surface of CAVFS

Link Name: CAVFS 47.04C

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)
Downstream Link Name: Infiltration Pond 47.04f - TDA 4

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 16.200
CAVFS Length (ft) : 168.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 1.710
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 5
Number of Links: 1

***** Subbasin: TDA 4 Contribution Predeveloped Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	3.286E-03
5-Year	5.358E-03
10-Year	7.927E-03
25-Year	8.462E-03
50-Year	1.021E-02
100-Year	1.374E-02
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: Pond Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	8.708E-04
5-Year	1.618E-03
10-Year	2.474E-03
25-Year	4.959E-03
50-Year	6.324E-03
100-Year	7.779E-03
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: Flowthrough area above riser elev *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
2-Year	8.365E-04
5-Year	1.587E-03
10-Year	2.450E-03
25-Year	4.929E-03
50-Year	6.304E-03
100-Year	7.762E-03
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: CAVFS Footprint Area *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
=====	
2-Year	5.987E-04
5-Year	1.061E-03
10-Year	1.580E-03
25-Year	1.734E-03
50-Year	2.146E-03
100-Year	2.871E-03
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: Retrofit *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
=====	
2-Year	2.188E-03
5-Year	3.878E-03
10-Year	5.775E-03
25-Year	6.336E-03
50-Year	7.845E-03
100-Year	1.049E-02
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: New Copy Lnk1

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
=====	
2-Year	7.160E-03
5-Year	1.266E-02
10-Year	1.776E-02
25-Year	2.430E-02
50-Year	2.720E-02
100-Year	3.064E-02
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 4

Number of Links: 3

***** Subbasin: CAVFSA DEV basin *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs)	Flood Peak (cfs)
=====	
2-Year	0.122
5-Year	0.159
10-Year	0.202
25-Year	0.239
50-Year	0.291
100-Year	0.334
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: CAVFSC DEV basin *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)
=====

2-Year	7.745E-02
5-Year	0.101
10-Year	0.128
25-Year	0.152
50-Year	0.185
100-Year	0.213
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: Pond Tract *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)
=====

2-Year	8.702E-03
5-Year	1.139E-02
10-Year	1.441E-02
25-Year	1.708E-02
50-Year	2.081E-02
100-Year	2.389E-02
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Subbasin: Flowthrough area above riser elev *****

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)
=====

2-Year	8.365E-04
5-Year	1.587E-03
10-Year	2.450E-03
25-Year	4.929E-03
50-Year	6.304E-03
100-Year	7.762E-03
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: Infiltration Pond 47.04f - TDA 4 ***** Link Inflow Frequency Stats

Flood Frequency Data(cfs)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) Flood Peak (cfs)
=====

2-Year	1.687E-02
5-Year	0.118
10-Year	0.145
25-Year	0.205
50-Year	0.284
100-Year	0.377
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: Infiltration Pond 47.04f - TDA 4 ***** Link WSEL Stats

WSEL Frequency Data(ft)
(Recurrence Interval Computed Using Gringorten Plotting Position)
Tr (yrs) WSEL Peak (ft)
=====

1.05-Year	169.003

1.11-Year	169.003
1.25-Year	169.003
2.00-Year	169.006
3.33-Year	169.203
5-Year	169.372
10-Year	169.701
25-Year	170.205
50-Year	170.391
100-Year	170.400

***** Link: CAVFS 47.04A

***** Link Inflow Frequency Stats

Flood Frequency Data(cfs)

(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	0.122
5-Year	0.159
10-Year	0.202
25-Year	0.239
50-Year	0.291
100-Year	0.334
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: CAVFS 47.04A

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)

(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	5.954E-03
5-Year	9.909E-02
10-Year	0.121
25-Year	0.161
50-Year	0.192
100-Year	0.239
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: CAVFS 47.04C

***** Link Inflow Frequency Stats

Flood Frequency Data(cfs)

(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	7.745E-02
5-Year	0.101
10-Year	0.128
25-Year	0.152
50-Year	0.185
100-Year	0.213
200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

***** Link: CAVFS 47.04C

***** Link Outflow 1 Frequency Stats

Flood Frequency Data(cfs)

(Recurrence Interval Computed Using Gringorten Plotting Position)

Tr (yrs) Flood Peak (cfs)

=====	
2-Year	3.001E-03
5-Year	8.970E-03
10-Year	1.083E-02
25-Year	5.679E-02
50-Year	8.388E-02

100-Year 0.121
200-Year **
** Record too Short to Compute Peak Discharge for These Recurrence Intervals

*****Groundwater Recharge Summary *****
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 4 Contribution P	13.723
Subbasin: Pond Area	0.867
Subbasin: Flowthrough area abo	0.867
Subbasin: CAVFS Footprint Area	3.033
Subbasin: Retrofit	11.086
Link: New Copy Lnk1	0.000

Total:	29.576

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: CAVFSA DEV basin	0.000
Subbasin: CAVFSC DEV basin	0.000
Subbasin: Pond Tract	0.000
Subbasin: Flowthrough area abo	0.867
Link: Infiltration Pond 47	6.414
Link: CAVFS 47.04A	54.583
Link: CAVFS 47.04C	34.413

Total:	96.277

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.469 ac-ft/year, Post Developed: 1.528 ac-ft/year

*****Water Quality Facility Data *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 25.47
Inflow Volume Including PPT-Evap (ac-ft): 25.47
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 25.47
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 3

***** Link: Infiltration Pond 47.04f - TDA 4 *****

Basic Wet Pond Volume (91% Exceedance): 428. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 643. cu-ft

Time to Infiltrate 91% Treatment Volume, (Hours): 1.54

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 6.41
Inflow Volume Including PPT-Evap (ac-ft): 6.41
Total Runoff Infiltrated (ac-ft): 6.41, 100.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 0.00
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 100.00%

***** Link: CAVFS 47.04A

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 48.99
Inflow Volume Including PPT-Evap (ac-ft): 55.69
Total Runoff Infiltrated (ac-ft): 54.58, 98.01%
Total Runoff Filtered (ac-ft): 0.97, 1.75%
Primary Outflow To Downstream System (ac-ft): 1.27
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 99.76%

***** Link: CAVFS 47.04C

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 31.15
Inflow Volume Including PPT-Evap (ac-ft): 34.84
Total Runoff Infiltrated (ac-ft): 34.41, 98.78%
Total Runoff Filtered (ac-ft): 0.48, 1.38%
Primary Outflow To Downstream System (ac-ft): 0.50
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 100.17%

*****Compliance Point Results*****

Scenario Predeveloped Compliance Link: New Copy Lnk1
Scenario Postdeveloped Compliance Link: Infiltration Pond 47.04f - TDA 4

*** Point of Compliance Flow Frequency Data ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	7.160E-03	2-Year	5.588E-08
5-Year	1.266E-02	5-Year	3.749E-06
10-Year	1.776E-02	10-Year	7.012E-06
25-Year	2.430E-02	25-Year	1.211E-05
50-Year	2.720E-02	50-Year	1.391E-05
100-Year	3.064E-02	100-Year	1.399E-05
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

**** Flow Duration Performance ****

Excursion at Predeveloped 50%Q2 (Must be Less Than 0%):	0.0%	PASS	
Maximum Excursion from 50%Q2 to Q2 (Must be Less Than 0%):	0.0%	PASS	PASS
Maximum Excursion from Q2 to Q50 (Must be less than 10%):	0.0%	PASS	
Percent Excursion from Q2 to Q50 (Must be less than 50%):	0.0%	PASS	

MEETS ALL FLOW DURATION DESIGN CRITERIA: PASS

**** LID Duration Performance ****

Excursion at Predeveloped 8%Q2 (Must be Less Than 0%):	0.0%	PASS
Maximum Excursion from 8%Q2 to 50%Q2 (Must be Less Than 0%):	0.0%	PASS

MEETS ALL LID DURATION DESIGN CRITERIA: PASS

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:27 AM
Report Generation Date: 06/27/2017 8:27 AM

Appendix A-3.1g

Input File Name: XL4998 47.04g MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA1 CAVFS 47.04G
Comments: Hydraulic Conductivity was set at 2.0 in/hr and an Infiltration Rate of .5 in/hr. Both are significantly lower values than any test location data provided by the Soils Report and Recommendations.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.555	0.502
Area of Links that Include Precip/Evap (acres)	0.000	0.053
Total (acres)	0.555	0.555

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 1 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.055
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.055

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.500
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.500

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 1 New PGIS+Replaced -----	
-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.502

Subbasin Total	0.502

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04G

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft)	: 1.000
Compost Porosity (%)	: 20.000
Compost Hydraulic Conductivity (in/hr)	: 2.000
CAVFS Length (ft)	: 300.000
CAVFS Width (ft)	: 8.000
CAVFS Slope, Z (ft/ft)	: 4.000
Gravel Spreader Width (ft)	: 2.000
Gravel Hydraulic Conductivity (in/hr)	: 2.000
Gravel Porosity (%)	: 30.000
Soil Infiltration Rate (in/hr)	: 0.500
Precipitation and Evaporation Applied to Surface of CAVFS	

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 1 Existing Imper	1.609
Subbasin: Subbasin 1	18.208
Link: New Copy Lnk1	0.000
Total:	19.817

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)

Subbasin: TDA 1 New PGIS+Repla	0.000
Link: New CAVFS 47.04G	61.682
Total:	61.682

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.315 ac-ft/year, Post Developed: 0.979 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 3.70
Inflow Volume Including PPT-Evap (ac-ft): 3.70
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 3.70
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04G *****

Basic Wet Pond Volume (91% Exceedance): 1523. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 2284. cu-ft

2-Year Discharge Rate : 0.057 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.06 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.04 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 16.22

Infiltration/Filtration Statistics-----
 Inflow Volume (ac-ft): 57.46
 Inflow Volume Including PPT-Evap (ac-ft): 64.01
 Total Runoff Infiltrated (ac-ft): 61.68, 96.36%
 Total Runoff Filtered (ac-ft): 1.24, 1.94%
 Primary Outflow To Downstream System (ac-ft): 2.46
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered)/Total Volume: 98.30%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
 Scenario Postdeveloped Compliance Link: New CAVFS 47.04G

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	1.298E-03	2-Year	5.723E-02
5-Year	2.550E-03	5-Year	0.119
10-Year	3.723E-03	10-Year	0.140
25-Year	5.056E-03	25-Year	0.165
50-Year	5.632E-03	50-Year	0.199
100-Year	6.010E-03	100-Year	0.292
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:28 AM
Report Generation Date: 06/27/2017 8:28 AM

Appendix A-3.1h

Input File Name: XL4998 47.04h MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA3 CAVFS 47.04H
Comments: Hydraulic Conductivity was set at 2.0 in/hr and an Infiltration Rate of .5 in/hr. Both are significantly lower values than any test location data provided by the Soils Report and Recommendations.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60

Extended Precipitation Time Series Selected
Climatic Region Number: 10

Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.670	0.599
Area of Links that Include Precip/Evap (acres)	0.000	0.071
Total (acres)	0.670	0.670

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 3 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.097
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.097

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.573
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.573

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 3 New PGIS+Replaced -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.599

Subbasin Total	0.599

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04H

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 2.000
CAVFS Length (ft) : 399.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 0.500
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation
Model Element Recharge Amount (ac-ft)

Subbasin: TDA 3 Existing Imper 2.837
Subbasin: Subbasin 1 20.866
Link: New Copy Lnk1 0.000

Total: 23.704

Total Post Developed Recharge During Simulation
Model Element Recharge Amount (ac-ft)

Subbasin: TDA 3 New PGIS+Repla 0.000
Link: New CAVFS 47.04H 75.102

Total: 75.102

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.376 ac-ft/year, Post Developed: 1.192 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 6.53
Inflow Volume Including PPT-Evap (ac-ft): 6.53
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 6.53
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04H *****

Basic Wet Pond Volume (91% Exceedance): 1817. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 2725. cu-ft

2-Year Discharge Rate : 0.062 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.07 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.04 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 14.64

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 68.56
 Inflow Volume Including PPT-Evap (ac-ft): 77.33
 Total Runoff Infiltrated (ac-ft): 75.10, 97.12%
 Total Runoff Filtered (ac-ft): 1.32, 1.70%
 Primary Outflow To Downstream System (ac-ft): 2.36
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered)/Total Volume: 98.83%

*****Compliance Point Results*****

Scenario Predeveloped Compliance Link: New Copy Lnk1
 Scenario Postdeveloped Compliance Link: New CAVFS 47.04H

*** Point of Compliance Flow Frequency Data ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	2.289E-03	2-Year	6.232E-02
5-Year	4.497E-03	5-Year	0.139
10-Year	6.566E-03	10-Year	0.166
25-Year	8.917E-03	25-Year	0.196
50-Year	9.933E-03	50-Year	0.202
100-Year	1.060E-02	100-Year	0.203
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:29 AM
Report Generation Date: 06/27/2017 8:29 AM

Appendix A-3.1i

Input File Name: XL4998 47.04i MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA 2 &3 CAVFS 47.04i
Comments: Hydraulic Conductivity was set at 2.0 in/hr and an Infiltration Rate of .5 in/hr. Both are significantly lower values than any test location data provided by the Soils Report and Recommendations.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60
Extended Precipitation Time Series Selected
Climatic Region Number: 10
Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750
HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.438	0.384
Area of Links that Include Precip/Evap (acres)	0.000	0.054
Total (acres)	0.438	0.438

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 2&3 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.054
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.054

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.384
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.384

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 2 & 3 New PGIS+Replaced -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.384

Subbasin Total	0.384

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04l

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 2.000
CAVFS Length (ft) : 305.000
CAVFS Width (ft) : 8.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 0.500
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)
Subbasin: TDA 2&3 Existing Imp	1.580
Subbasin: Subbasin 1	13.984
Link: New Copy Lnk1	0.000
Total:	15.563

Total Post Developed Recharge During Simulation	
Model Element	Recharge Amount (ac-ft)
Subbasin: TDA 2 & 3 New PGIS+R	0.000
Link: New CAVFS 47.04I	49.712
Total:	49.712

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.247 ac-ft/year, Post Developed: 0.789 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 3.64
Inflow Volume Including PPT-Evap (ac-ft): 3.64
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 3.64
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04I *****

Basic Wet Pond Volume (91% Exceedance): 1165. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1747. cu-ft

2-Year Discharge Rate : 0.003 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.05 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.03 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 12.43

Infiltration/Filtration Statistics-----
Inflow Volume (ac-ft): 43.95
Inflow Volume Including PPT-Evap (ac-ft): 50.71
Total Runoff Infiltrated (ac-ft): 49.71, 98.04%
Total Runoff Filtered (ac-ft): 0.70, 1.38%
Primary Outflow To Downstream System (ac-ft): 1.09
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 99.42%

*******Compliance Point Results*******

Scenario Predeveloped Compliance Link: New Copy Lnk1
Scenario Postdeveloped Compliance Link: New CAVFS 47.04l

*** **Point of Compliance Flow Frequency Data** ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	1.274E-03	2-Year	3.383E-03
5-Year	2.503E-03	5-Year	6.261E-02
10-Year	3.655E-03	10-Year	0.105
25-Year	4.964E-03	25-Year	0.124
50-Year	5.530E-03	50-Year	0.128
100-Year	5.901E-03	100-Year	0.128
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD PROJECT REPORT

Program Version: MGSFlood 4.38
Program License Number: 200210003
Project Simulation Performed on: 06/27/2017 8:30 AM
Report Generation Date: 06/27/2017 8:30 AM

Appendix A-3.1j

Input File Name: XL4998 47.04j MGS Flood CAVFS.fld
Project Name: 476124.2812SR 20 Sharpes Corner Vicinity - Improvements
Analysis Title: TDA2 CAVFS 47.04J
Comments: Hydraulic Conductivity was set at 2.0 in/hr and an Infiltration Rate of .5 in/hr. Both are significantly lower values than any test location data provided by the Soils Report and Recommendations.

PRECIPITATION INPUT

Computational Time Step (Minutes): 60

Extended Precipitation Time Series Selected
Climatic Region Number: 10

Full Period of Record Available used for Routing
Precipitation Station : 96002805 Puget East 28 in_5min 10/01/1940-10/01/2003
Evaporation Station : 961028 Puget East 28 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

***** Default HSPF Parameters Used (Not Modified by User) *****

***** WATERSHED DEFINITION *****

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.449	0.420
Area of Links that Include Precip/Evap (acres)	0.000	0.029
Total (acres)	0.449	0.449

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2

----- Subbasin : TDA 2 Existing Impervious -----

-----Area(Acres)-----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.030
Outwash Forest	0.030
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.060

----- Subbasin : Subbasin 1 -----

-----Area(Acres)-----	
Till Forest	0.389
Till Pasture	0.000
Till Grass	0.000

Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.000

Subbasin Total	0.389

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1

----- Subbasin : TDA 2 New PGIS+Replaced -----

-----Area(Acres) -----	
Till Forest	0.000
Till Pasture	0.000
Till Grass	0.000
Outwash Forest	0.000
Outwash Pasture	0.000
Outwash Grass	0.000
Wetland	0.000
Green Roof	0.000
User 2	0.000
Impervious	0.420

Subbasin Total	0.420

***** LINK DATA *****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

Link Name: New Copy Lnk1

Link Type: Copy

Downstream Link: None

***** LINK DATA *****

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

Link Name: New CAVFS 47.04J

Link Type: Compost Amended Vegetated Filter Strip (CAVFS)

Downstream Link: None

Compost Thickness (ft) : 1.000
Compost Porosity (%) : 20.000
Compost Hydraulic Conductivity (in/hr) : 2.500
CAVFS Length (ft) : 262.000
CAVFS Width (ft) : 5.000
CAVFS Slope, Z (ft/ft) : 4.000
Gravel Spreader Width (ft) : 2.000
Gravel Hydraulic Conductivity (in/hr) : 2.000
Gravel Porosity (%) : 30.000
Soil Infiltration Rate (in/hr) : 0.600
Precipitation and Evaporation Applied to Surface of CAVFS

*****FLOOD FREQUENCY AND DURATION STATISTICS*****

-----SCENARIO: PREDEVELOPED

Number of Subbasins: 2
Number of Links: 1

-----SCENARIO: POSTDEVELOPED

Number of Subbasins: 1
Number of Links: 1

*****Groundwater Recharge Summary*****

Recharge is computed as input to PerInd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation
Model Element Recharge Amount (ac-ft)

Subbasin: TDA 2 Existing Imper 2.351
Subbasin: Subbasin 1 14.166
Link: New Copy Lnk1 0.000

Total: 16.517

Total Post Developed Recharge During Simulation
Model Element Recharge Amount (ac-ft)

Subbasin: TDA 2 New PGIS+Repla 0.000
Link: New CAVFS 47.04J 47.665

Total: 47.665

Total Predevelopment Recharge is Less than Post Developed
Average Recharge Per Year, (Number of Years= 63)
Predeveloped: 0.262 ac-ft/year, Post Developed: 0.757 ac-ft/year

*****Water Quality Facility Data*****

-----SCENARIO: PREDEVELOPED

Number of Links: 1

***** Link: New Copy Lnk1 *****

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 2.02
Inflow Volume Including PPT-Evap (ac-ft): 2.02
Total Runoff Infiltrated (ac-ft): 0.00, 0.00%
Total Runoff Filtered (ac-ft): 0.00, 0.00%
Primary Outflow To Downstream System (ac-ft): 2.02
Secondary Outflow To Downstream System (ac-ft): 0.00
Percent Treated (Infiltrated+Filtered)/Total Volume: 0.00%

-----SCENARIO: POSTDEVELOPED

Number of Links: 1

***** Link: New CAVFS 47.04J *****

Basic Wet Pond Volume (91% Exceedance): 1274. cu-ft
Computed Large Wet Pond Volume, 1.5*Basic Volume: 1911. cu-ft

2-Year Discharge Rate : 0.061 cfs

15-Minute Timestep, Water Quality Treatment Design Discharge
On-line Design Discharge Rate (91% Exceedance): 0.05 cfs
Off-line Design Discharge Rate (91% Exceedance): 0.03 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 20.38

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 48.07
 Inflow Volume Including PPT-Evap (ac-ft): 51.57
 Total Runoff Infiltrated (ac-ft): 47.67, 92.43%
 Total Runoff Filtered (ac-ft): 2.06, 3.99%
 Primary Outflow To Downstream System (ac-ft): 4.08
 Secondary Outflow To Downstream System (ac-ft): 0.00
 Percent Treated (Infiltrated+Filtered)/Total Volume: 96.42%

*****Compliance Point Results *****

Scenario Predeveloped Compliance Link: New Copy Lnk1
 Scenario Postdeveloped Compliance Link: New CAVFS 47.04J

*** Point of Compliance Flow Frequency Data ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	7.080E-04	2-Year	6.140E-02
5-Year	1.391E-03	5-Year	0.104
10-Year	2.031E-03	10-Year	0.122
25-Year	2.758E-03	25-Year	0.143
50-Year	3.072E-03	50-Year	0.173
100-Year	3.278E-03	100-Year	0.240
200-Year	**	200-Year	**

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

Off-line Design Discharge Rate (91% Exceedance): 0.03 cfs

Time to Infiltrate 91% Treatment Volume, (Hours): 31.47

Infiltration/Filtration Statistics-----

Inflow Volume (ac-ft): 145.96

Inflow Volume Including PPT-Evap (ac-ft): 156.36

Total Runoff Infiltrated (ac-ft): 136.35, 87.20%

Total Runoff Filtered (ac-ft): 6.89, 4.41%

Primary Outflow To Downstream System (ac-ft): 20.31

Secondary Outflow To Downstream System (ac-ft): 0.00

Percent Treated (Infiltrated+Filtered)/Total Volume: 91.61%

*****Compliance Point Results *****

Scenario Predeveloped Compliance Link: New Copy Lnk1

Scenario Postdeveloped Compliance Link: New CAVFS 47.04J

*** Point of Compliance Flow Frequency Data ***

Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	1.940E-03	2-Year	0.129
5-Year	3.822E-03	5-Year	0.174
10-Year	5.082E-03	10-Year	0.199
25-Year	7.420E-03	25-Year	0.237
50-Year	9.477E-03	50-Year	0.292
100-Year	9.594E-03	100-Year	0.333
200-Year	9.942E-03	200-Year	0.384

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

Appendix A-3.1k

MGSFlood Input Sheet for TDA 4 -
Project: XL4998 SR20 Sharpes Corner Intersection Improvements
Description: Infiltration Pond 47.04f

Version 5.1
Designed By: Chad Calhoun
Checked By: Alex Nguyen, Le Ngu

What kind of flow control facility is this?

Is this your first iteration? See the bottom of this spreadsheet for an explanation of why two iterations are needed.

What type of flow control modeling scenario does this follow?

Do any of the following situations occur in the TDA?

Are there any partial reversion or full reversion areas in the TDA?

List All Areas and Development in the TDA for the Postdeveloped Condition

Existing	Ac.	Postdeveloped	Ac.
Forest	0.00	Forest	0.000
Pasture	0.00	Pasture	0.000
Grass	0.83	Grass	0.144
Sat. Soils	0.00	Sat. Soils	0.000
Impervious	1.74	Impervious	2.427
	2.57		2.57

The Existing condition refers to the existing land cover observed prior to the start of the project.
Sat. Soil = Saturated Soils
For the first iteration, do not account for the land cover changes associated with the detention BMP footprint. The land cover for this footprint area should be represented as though the BMP will not exist when filling out Step 1.

Land Cover Conversions and Mitigated Areas for Flow Control

0.380 Acres	Forest to Impervious
0.307 Acres	Forest to Impervious
0.084 Acres	Forest to Grass
0.030 Acres	Grass to Impervious

0.80 Acres

Brief Description of Land Cover Conversion

New impervious forest to impervious
Retrofit area - forest to impervious and gets treated by CAVFS
CAVFS area - project office did flow control for this area
Infiltration Pond Area

Mitigated (difference)

Predeveloped	Ac.	Postdeveloped	Ac.
Forest	0.771	Forest	0.000
Pasture	0.000	Pasture	0.000
Grass	0.030	Grass	0.084
Sat. Soils	0.000	Sat. Soils	0.000
Impervious	0.000	Impervious	0.717
	0.801	=	0.801

Non-Mitigated (unchanged area)

Predeveloped	Ac.	Postdeveloped	Ac.
Forest	0.000	Forest	0.000
Pasture	0.000	Pasture	0.000
Grass	0.060	Grass	0.060
Sat. Soils	0.000	Sat. Soils	0.000
Impervious	1.710	Impervious	1.710
	1.770	=	1.770

Area Physically Transported to Detention Facility	
Postdeveloped	Ac.
Forest	
Pasture	
Grass	0.114
Sat. Soils	
Impervious	0.717

Bypass Area		Flow-Through Area	
Ac.		Ac.	
		0.030	Grass Flow-through Area

Modeled (Input for MGSFlood)

Predeveloped	Ac.	Flow-Through	Ac.	Postdeveloped	Ac.	Bypass	Ac.	Flow-Through	Ac.
Forest	0.771	Forest		Forest	0.000	Forest		Forest	
Pasture	0.000	Pasture		Pasture	0.000	Pasture		Pasture	
Grass	0.030	Grass	0.030	Grass	0.084	Grass		Grass	0.030
Sat. Soils	0.000	Sat. Soils		Sat. Soils	0.000	Sat. Soils		Sat. Soils	
Impervious	0.000	Impervious		Impervious	0.717	Impervious		Impervious	
	0.801	+	0.030	=	0.801			+	0.030

Was the detention BMP footprint represented in the above MGSFlood inputs?

See below for 2nd modeling iteration requirement which includes the detention BMP footprint.

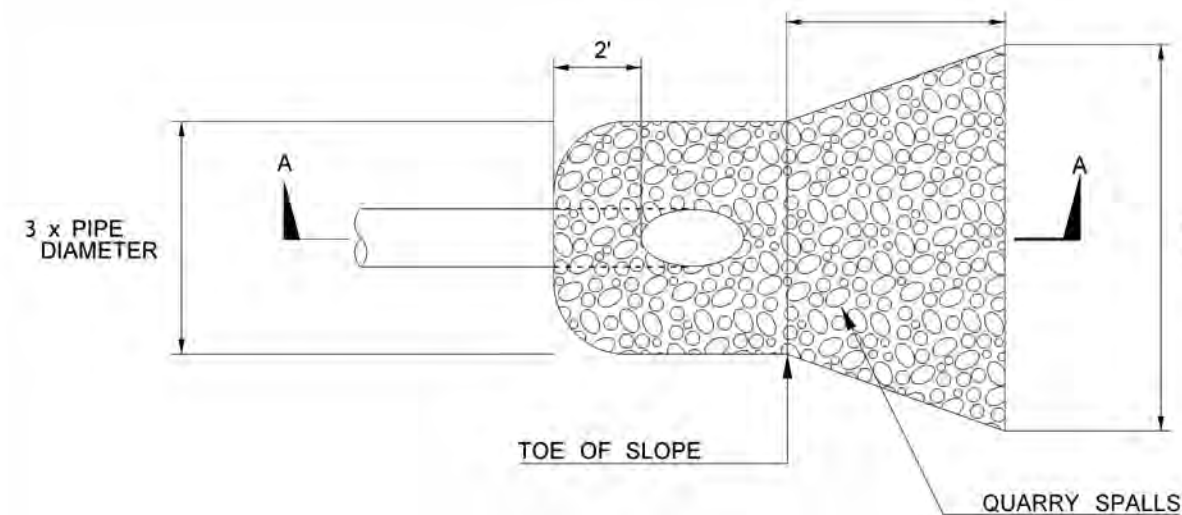
Choose N/A ----->

LEAVE BLANK ----->
LEAVE BLANK ----->

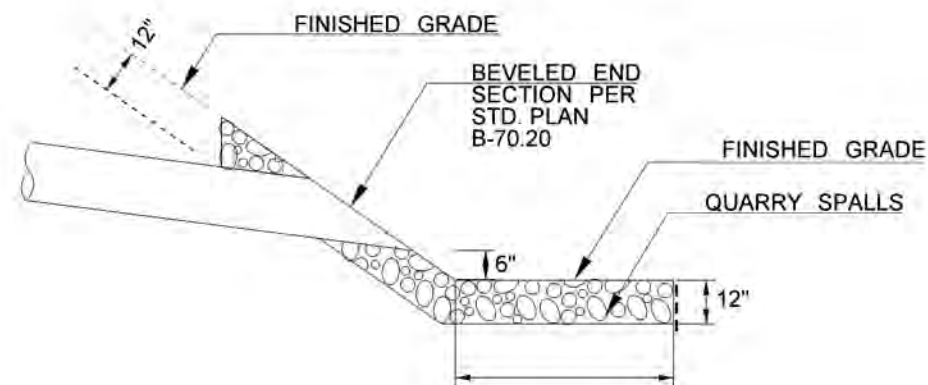
The designer should produce at least two iterations of this spreadsheet. The intent of the first iteration is to estimate the size of the detention BMP footprint and determine if the design meets flow control standards. The second iteration would create a separate subbasin to account for the BMP footprint and associated land cover conversions produced from the first model run. The resulting MGSFlood inputs from the second iteration would be used to determine if the BMP footprint is still large enough and if it still meets flow control standards.

This is your first iteration. Please rename this TAB as Iteration #1. Copy this completed tab and rename the copied tab as Iteration #2 to start the second iteration adding in the detention BMP footprint land cover changes.

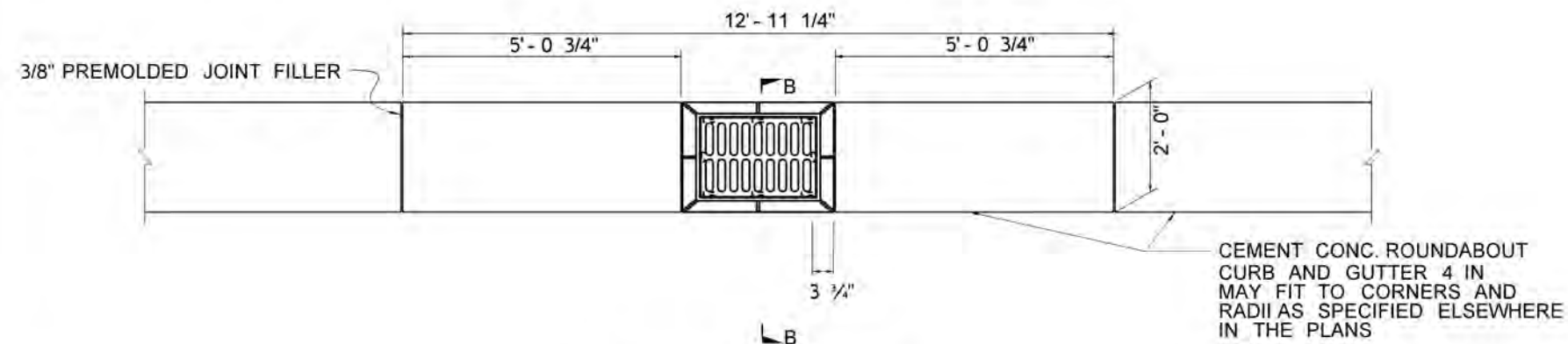
Appendix A-3.3



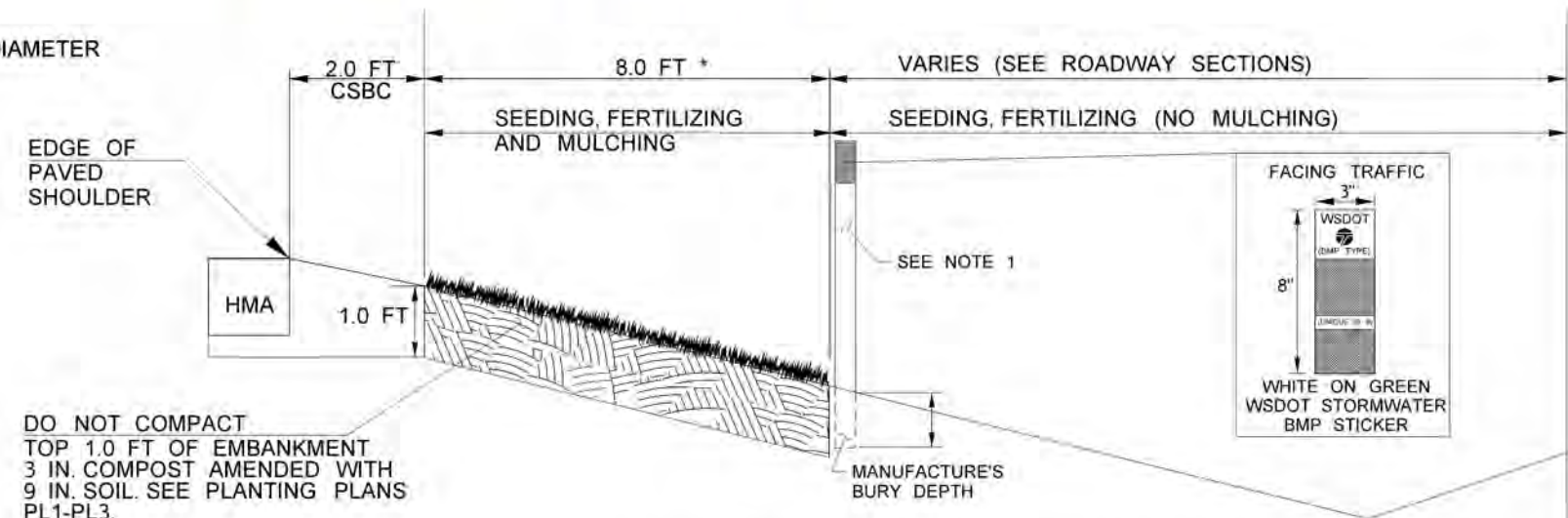
PLAN VIEW - QUARRY SPALLS PLACEMENT
AT PIPE OUTFALL



DETAIL VIEW - QUARRY SPALLS PLACEMENT
AT PIPE OUTFALL
SECTION A-A



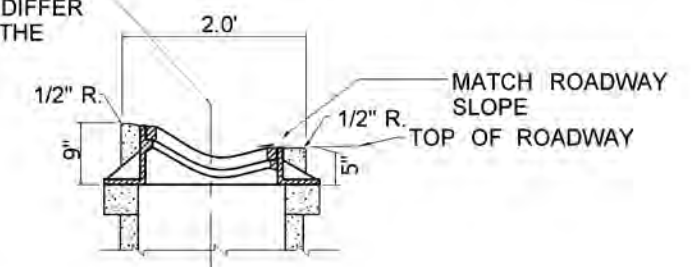
PLAN VIEW - ROLLED INLET



DETAIL VIEW - COMPOST AMENDED VEGETATED FILTER STRIP (CAVFS)

* 5.0 FT CAVFS WIDTH AT THE FOLLOWING LOCATIONS:
Y 10+95.44 (121.68 RT) TO Y 13+34.04 (39.11 RT)
Y 39+18.71 (44.52 LT) TO Y 59+01.27 (39.82 LT)

THE CENTERLINE OF THE
DRAINAGE STRUCTURE MAY DIFFER
FROM THE CENTERLINE OF THE
FRAME AND GRATE.



DETAIL VIEW - ROLLED INLET
SECTION B-B

GENERAL NOTES:

- 1) BROWN NON-REFLECTIVE FLEXIBLE GUIDEPOSTS PLACED AT START, MIDDLE AND END OF BMP.

NOT TO SCALE

FILE NAME		T:\412354\XL4998_Sharpe\CAD\ContractPlans\XL4998_PS_DD.dgn																		Plot 1	
TIME		8:38:43 AM						REGION NO.		STATE		FED.AID PROJ.NO.								PLAN REF NO	
DATE		7/31/2017						10		WASH										DD1	
PLOTTED BY		calhouc						JOB NUMBER				LOCATION NO.								SHEET	
DESIGNED BY		C. CALHOUN						17A020												63	
ENTERED BY		C. CALHOUN						CONTRACT NO.												OF	
CHECKED BY		S. SULLIVAN																		191	
PROJ. ENGR.		G. NG																		SHEETS	
REGIONAL ADM.		L. ENG		REVISION		DATE		BY													

Appendix A-3.4

INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

Tc =	5.00
C =	0.90
I =	2.62
m =	6.43
n =	0.56
Allowable Zd =	5.00

Project Name **SR 20 Sharpes Corner Vicinity Improvements**
Project #: **XL4998**
S.R.: **20**
Designed By: **Chad Calhoun**
Date: **7/13/2016**
Updated: **3/17/2017**

[illegible]

***FOR LAST GRATE ON RUN OF GUTTER, IF SPREADSHEET SHOWS A VALUE FOR Vside, CHECK Vside AND Qbp (COLUMN S) FOR COMPLIANCE. OTHERWISE, CHECK Vcontinuous AND Qbp (COLUMN L) FOR COMPLIANCE.

PLEASE REPORT ANY PROBLEMS TO WSDOT HQ HYDRAULICS OFFICE. SPREADSHEET IS PROTECTED BUT DOES NOT REQUIRE A PASSWORD TO UNPROTECT.

INLET SPACING - CURB AND GUTTER SPREADSHEET (ENGLISH UNITS)

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[illegible]

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[illegible]

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[illegible]

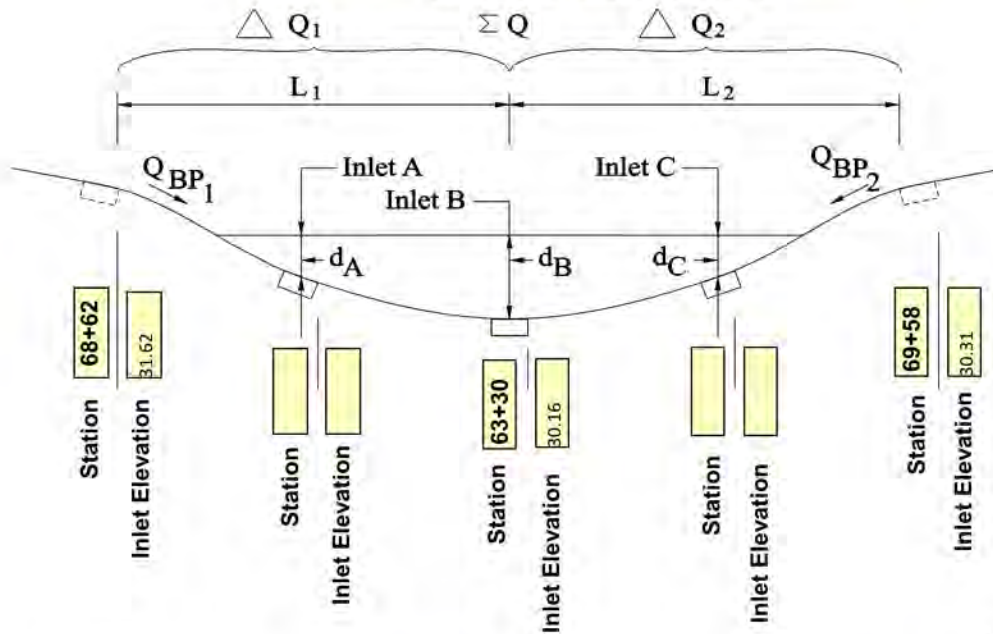
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Appendix A-3.5

SAG INLET DESIGN WORKSHEET

Combination inlet at low point



Transverse Slope	S_T	0.020	ft/ft	Shoulder Width	4.00	ft
Allowable	Z_d	10.00	ft	Lane Width	16.00	ft
Allowable	d_B	0.2	ft	$(d_A = d_C = 0.1 \text{ ft allowable})$		
Time of Concentration	T_c	5.0	min			
50 yr. rainfall coefficients	m	8.75				
	n	0.564				
Rainfall Intensity	$I_{50\text{-yr}}$	3.53	in/hr	(for 5 minute duration)		
Distance between last inlet and low point	L_1	68.25	ft	L_2	34.40	ft
Width of catchment area	W_1	20.00	ft	W_2	20.00	ft
Bypass from last inlet	Q_{BP1}^4	0.00	cfs	Q_{BP2}^4	0.00	cfs
Discharge of catchment area	Q_1	0.11	cfs	Q_2	0.05	cfs

$$Q_{\text{Total}} = Q_{BP1} + Q_1 + Q_{BP2} + Q_2$$

$$Q_{\text{Total}} = 0.00 + 0.11 + 0.00 + 0.05 = 0.16 \text{ cfs}$$

Combination¹ or Grate Inlet for sag P_R (C/G) → **G**

Effective Perimeter of Grate Inlets (reduced by 50% for plugging)

P_A	Flank	0	ft
P_B		1.94	ft
P_C	Flank	0	ft

Width	0	Length	0
Width	1.31	Length	1.25
Width	0	Length	0

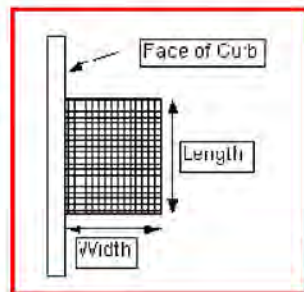
$$\Sigma Q = Q_A + Q_B + Q_C$$

$$^2 \Sigma Q = C_{WA} P_A (0.5d_B)^{1.5} + C_{WB} P_B d_B^{1.5} + C_{WC} P_C (0.5d_B)^{1.5} = 0.52 \text{ cfs}$$

$$d_B = \left(\frac{\Sigma Q}{C_{WA} P_A 0.3536 + C_{WB} P_B + C_{WC} P_C 0.3536} \right)^{2/3} = 0.09 \text{ ft}$$

If $d_B <$ allowable d_B , the design is complete.

If $d_B >$ allowable d_B , additional inlets must be added³ and the process repeated.



Capacity is adequate, design is complete.

Check calculated d_B against allowable d_B .

Notes:

¹ If using a combination inlet for the sag, the flank grate inlets are not required except in a depressed area (See Hydraulics Manual).

² Formulas based on weir flow. See Hydraulic Manual 5-5.2.

³ To add more than one inlet in the sag or flanks just increase the width and length values to the sum of all values. Inlets can be different sizes. See Figure 5-5 in Hydraulics Manual for grate dimensions.

⁴ Q_{BP1} and Q_{BP2} come from the inlet spreadsheet.

STORM SEWER DESIGN (English Units)

This spreadsheet accomplishes a storm sewer design using the rational method. Enter the data in the non-shaded areas only. Please use one spreadsheet per stormsewer run.

Project Name: SR 20 Sharpes Corner Vicinity Improvements

Designed By: Enter Here

Project Office: Enter Here

 $m = 7.75$

7.75

n =

Design Storm Event = 25

Pavement thickness (ft) = 0.8

Pipe Thickness (inches) = 1.8

[illegible]

See WSDOT Hydraulic Manual 6-5 for explanation of columns. <http://www.wsdot.wa.gov/eesc/design/hydraulics/>

Notes: Column 12 represents inflow from a storm sewer line, branch, an offsite source that flows into the trunk line being analyzed. The conservative assumption is that the flow enters the storm sewer run at the upstream end of the run being analyzed.

For pipe cover calculation, $\text{Pipe cover} = (\text{Ground or Rim Elevation} - \text{Pipe invert elevation}) - (\text{pavement thickness}) - (\text{top of pipe thickness}) - (\text{pipe diameter})$
 The pipe thickness is based on the pipe diameter per WSDOT Manual Concrete for Shallow Pipe Cover Installations Fill Height Table 8-11.2
 Please specify the largest pipe thickness of the storm sewer run being analyzed.

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WARNING: START YOUR STORMSEWER RUN ON ROW 12. DO NOT SKIP ANY ROWS IN BETWEEN. USE ONE SHEET PER STORMSEWER RUN

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Project Name: SR 20 Sharpes Corner Vicinity Improvements

Designed By: Enter Here

Project Office: Enter Here

$$m = 7.75$$
$$n = 0.562$$

Design Storm Event = 25

Pavement thickness (ft) = 0.8

Pipe Thickness (inches) = 1.8

Location														Discharge										Drain Design										Drain Profile										Remarks	
Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum (acre)	CA Tc across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)	Upstr. Ground Elev. (ft)	Downstr. Ground Elev. (ft)	Upstr. Pipe Cover (ft)	Downstr. Pipe Cover (ft)	Upstr. Pipe Cover Check (ft)	Downstr. Pipe Cover Check (ft)	Remarks														
1	2	3	4	5	6	7	8	8a	9	10	11	12	13	14	14a	15	16	17	17a	17b	18	19	20	21	22	23	24	25	26	27	28														
DR3-05	A 51+06.64 LT	A 50+27.51 RT	Highway	0.05	0.90	0.05	0.05	5.0	5.0	3.14	0.14	0.00	0.14	12	0.013	0.0076	3.97	3.11	VELOCITY OK	ADEQUATE PIPE CAPACITY	130.75	1.00	23.00	22.00	30.31	24.87	5.36	0.92	More than 2 ft of cover	Low Cover - See Notes at Bottom															
DR3-07	A 50+27.51 RT	A 49+68.61 RT	Highway	0.05	0.90	0.05	0.09	5.0	5.0	3.14	0.28	3.84	4.12	24	0.013	0.0034	4.19	13.17	VELOCITY OK	ADEQUATE PIPE CAPACITY	58.91	0.20	21.46	21.26	24.87	21.26	0.46	-2.95	Not Enough Cover - Need to Revise Pipe Elevations	Not Enough Cover - Need to Revise Pipe Elevations	Ok, daylights to ditch														
																								</																					

See WSDOT Hydraulic Manual 6-5 for explanation of columns. <http://www.wsdot.wa.gov/eesc/design/hydraulics/>

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[illegible]

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Location			Discharge											Drain Design											Drain Profile											Remarks
Drain Located On	From Sta.	To Sta.	Source of Drainage	Drainage Area A (acre)	Runoff Coeff. C	CA (acre)	Sum (acre)	CA	Tc across Area (minutes)	Total Tc = Col. 8a + Tc across pipe length (minutes)	Rainfall Intensity (in/hr)	Runoff (cfs)	Contrib. Inflow (cfs)	Total Flow (cfs)	Pipe Dia. (in)	Manning roughness coefficient "n"	Pipe Slope (ft/ft)	Velocity Of Flow (ft/s)	Pipe Capacity (cfs)	Pipe Velocity Check (Desirable Minimum 3 ft/sec; Desirable Maximum 10 ft/sec for Column 16)	Pipe Capacity Check (Column 13 vs. Column 17)	Pipe Length*** (ft)	Elevation Change (ft)	Upstr. Invert Elev. (ft)	Downstr. Invert Elev. (ft)	Upstr. Ground Elev. (ft)	Downstr. Ground Elev. (ft)	Upstr. Pipe Cover (ft)	Downstr. Pipe Cover (ft)	Upstr. Pipe Cover Check (ft)	Downstr. Pipe Cover Check (ft)					
1	2	3	4	5	6	7	8	8a	9	10	11	12	13	14	14a	15	16	17	17a	17b	18	19	20	21	22	23	24	25	26	27	28					
DR3-9	X 11+01.38 RT	11+71.48 RT	Highway	0.05	0.90	0.05	0.05	5.0	5.0	3.14	0.14	0.00	0.14	12	0.013	0.0227	6.83	5.36	VELOCITY OK	ADEQUATE PIPE CAPACITY	88.28	2.00	25.00	23.00	30.30	27.53	3.35	2.58	More than 2 ft of cover	More than 2 ft of cover						
DR3-15	X 11+71.48 RT	X 12+94.85 RT	Highway	0.05	0.90	0.05	0.09	5.0	5.0	3.14	0.28	0.00	0.28	18	0.013	0.0050	4.20	7.42	VELOCITY OK	ADEQUATE PIPE CAPACITY	127.03	0.64	23.00	22.36	27.53	23.06	2.08	-1.75	More than 2 ft of cover	Not Enough Cover - Need to Revise Pipe Elevations	OK, DAYLIGHTS TO DITCH OUTSIDE ROADWAY PRISM					

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[illegible]

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Designed By: Enter Here

Project Office: Enter Here

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[illegible]

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Appendix A-3.8

Open Channel Flow

4-2.2.1 Hand Calculations

The solution for velocity in an open channel must conform to the following formula:

$$V = \frac{1.486}{n} R^{2/3} \sqrt{S} \text{ (English Units)}$$

$$V = \frac{1}{n} R^{2/3} \sqrt{S} \text{ (Metric Units)}$$

$$\frac{1.486}{0.09} (.9702)^{2/3} \sqrt{.25 \cdot .055} = 7.77 \text{ ft/s}$$

$$= 3.645$$

$$2' D =$$

$$62.66 \text{ ft/s}$$

$$1.2' D = 3157 \text{ ft/s}$$

$$4-6 \text{ inches}$$

$$\text{Good stand - any } (0.09 - .05) \text{ Gross}$$

Where:

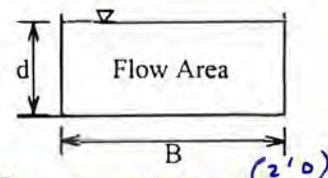
V = Mean velocity in channel, ft/s (m/s)

n = Manning's roughness coefficient (see Appendix 4-1)

for 2-6 fps = Depth of flow ≤ 0.7 foot

S = Channel slope - steady and uniform flows occurs, ft/ft (m/m)

R = Hydraulic radius, ft (m)



$$R = A/WP \quad 16/16.492 = .9702 \quad (4-3)$$

A = Flow Area of the cross section of water, ft² (m²)

See Figure 4-2.2.1 for additional area equations

WP = Wetted perimeter, ft (m)

$$WP = d + B + d \quad (4-4)$$

See Figure 4-2.2.1 for additional WP equations

The hydraulic radius is the ratio of flow area to the wetted perimeter where the wetted perimeter is the length of channel cross section that is in contact with the water. For full flow circular pipes, the hydraulic radius is one-fourth the diameter of the pipe. In relatively flat, shallow channels, where $B > 10d$, the wetted perimeter can be approximated by the width of the channel. As a result, the hydraulic radius can be approximated as the depth of water, $R \approx d$.

$$R = \frac{A}{WP} = \frac{Bd}{B + 2d} = \frac{Bd}{B} = d$$

When the depth of flow is known, the mathematical solution is simple. The section properties area (A) and wetted perimeter (WP) can be determined and put into the equation to find velocity (V).

The flow rate, or discharge can then be found by equation 4-1:

$$Q = VA$$

$$(3.645)(16) =$$

$$58.32$$

$$1.2' D =$$

$$60.720 \text{ cfs}$$

$$60.720 \text{ cfs}$$

$$15.8$$

$$15.154 \text{ cfs}$$

$$Q = 3.94 \text{ cfs}$$

$$@ .7' D$$

Open Channel Flow

More frequently, the designer knows the discharge but the depth of flow in the channel must be determined. Since Manning's Equation cannot solve for the depth of a trapezoidal channel directly, a method of successive approximations must be used. The designer must estimate the depth, determine the section properties, and finally solve for the discharge. If the discharge so derived is too high, the designer must then revise the estimated depth downward and recalculate the discharge. This process is repeated until the correct discharge is found within sufficient accuracy (3 to 5 percent). This method can be time consuming. It is recommended that a programmable calculator or computer be used to aid in the computations.

Regardless of whether the depth is known or needs to be calculated, the designer must verify that the normal depth of the channel is either greater than or less than the critical depth of the channel as described in section 4-4 of this Chapter.

4-2.2.1.1 Examples - Manning's Equation using Hand Calculations

For the following hand calculation examples using Manning equations, designers should use Figure 4-2.2.1, Geometric Elements of Channel Sections.

Example 1

A trapezoidal channel with 1.75:1 side slopes and a 6.5 ft bottom width is flowing 4 ft deep. The channel has a bottom slope of 0.004 ft/ft for a distance of several hundred feet. What is the discharge of the riprap lined channel?

Since this is a small channel with riprap, the roughness coefficient of 0.040 is chosen from Appendix 4-1.

$$\begin{aligned} A &= 16 \text{ ft}^2 \\ WP &= 15.57 \text{ or } 16.492 \text{ ft} \\ R &= 0.9702 \text{ ft} \\ V &= 3.645 \text{ ft/s} \\ Q &= 58.32 \text{ cfs} \\ &[\text{MAX CAPACITY}] \end{aligned}$$

$$A = (b + ZD)D = [6.5 \text{ ft} + 1.75(4 \text{ ft})]4 \text{ ft} = 54 \text{ ft}^2 \quad (4-5)$$

$$WP = b + 2D\sqrt{1 + Z^2} = 6.5 \text{ ft} + 2(4)\sqrt{1 + 1.75^2} = 22.6 \text{ ft} \quad (4-4)$$

$$R = A/WP = 54 \text{ ft}^2 / 22.6 \text{ ft} = 2.4 \text{ ft} \quad (4-3)$$

$$V = \frac{1.486}{n} R^{2/3} \sqrt{S} = \frac{1.486}{0.04} (2.4)^{2/3} \sqrt{0.004} = 4.2 \text{ ft/s} \quad (4-2)$$

$$Q = VA = 4.2 \text{ ft/s}(54 \text{ ft}^2) = 226.8 \text{ cfs} \quad (4-1)$$

Example 2

How deep would the channel described above flow if the discharge is 600 cfs?

The designer needs to assume various depths and solve for Q using equation 4-1. It may be helpful to draw a graph to aid in choosing the next depth. Once a Q both

below and above the given discharge, in this case 600 cfs, is determined the depth can be found using interpolation as shown below.

$$Q = VA \quad (4-1)$$

Next substitute equation 4-2 in for the velocity and the appropriate area from Figure 4-2.2.1.

$$Q = ((b + ZD)D) \times \left(\frac{1}{n} R^{2/3} \sqrt{S} \right)$$

Assumed D	Calculated Q
4 ft	226.8 cfs
6.6 ft	655.1 cfs
6.2 ft	581.0 cfs
6.4 ft	611.8 cfs

Interpolate for depth (d) at discharge 600 cfs:

1. Locate two discharge points, one above and one below 600 cfs, and note the depth.

$$Q = 581.0 \text{ cfs} \quad d = 6.2 \text{ ft}$$

$$Q = 611.8 \text{ cfs} \quad d = 6.4 \text{ ft}$$

2. When interpolation is used, it is assumed that there is a linear relationship between the points. In other words if a straight line was drawn, all 3 points (or discharge values Q) could be located on that line. If there is an unknown coordinate for one of the points, it can be found by finding the slope of the line, as shown below:

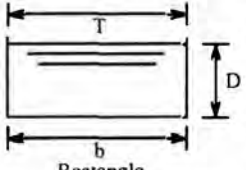
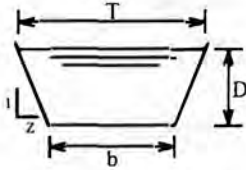
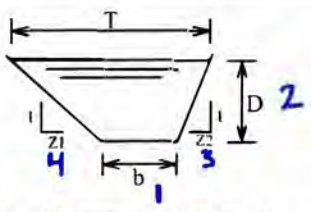
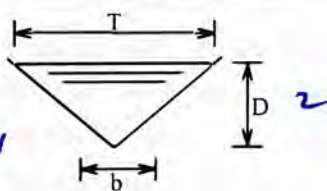
$$\frac{(6.4 \text{ ft} - 6.2 \text{ ft})}{\left(611.8 \frac{\text{ft}^3}{\text{s}} - 581.0 \frac{\text{ft}^3}{\text{s}} \right)} = 0.00649 \frac{\text{ft}}{\frac{\text{ft}^3}{\text{s}}}$$

3. Once the slope is known, the depth can be determined at 600 cfs:

$$\left(600 \frac{\text{ft}^3}{\text{s}} - 581.0 \frac{\text{ft}^3}{\text{s}} \right) \times 0.00649 \frac{\text{ft}}{\frac{\text{ft}^3}{\text{s}}} = 0.12$$

$$d = 6.2 \text{ ft} + 0.12 \text{ ft} = 6.32 \text{ ft}$$

4. Finally, the depth should be verified by rerunning the analysis at $d = 6.32 \text{ ft}$ to verify Q is 600 cfs. Calculations accurate to ± 3 percent are sufficient.

Cross	Area, A (Equation 4-5)	Wetted Perimeter, WP (Equation 4-4)
 Rectangle	BD	B+2D
 Trapezoid (Equal side slopes)	$(b+ZD)D$	$b + 2D\sqrt{1+Z^2}$
 Trapezoid (unequal side slopes)	$\frac{D^2}{2}(Z_1 + Z_2) + Db$ $= 16$	$b + D(\sqrt{1+Z_1^2} + \sqrt{1+Z_2^2})$ $= 15.57$
 Triangle	ZD^2 $= 16$	$2D\sqrt{1+Z^2}$ $= 16.492$

Reference: VT Chow "Open Channel Hydraulics" for a more complete table of geometric elements.

Geometric Elements of Channel Sections

Figure 4-2.2.1

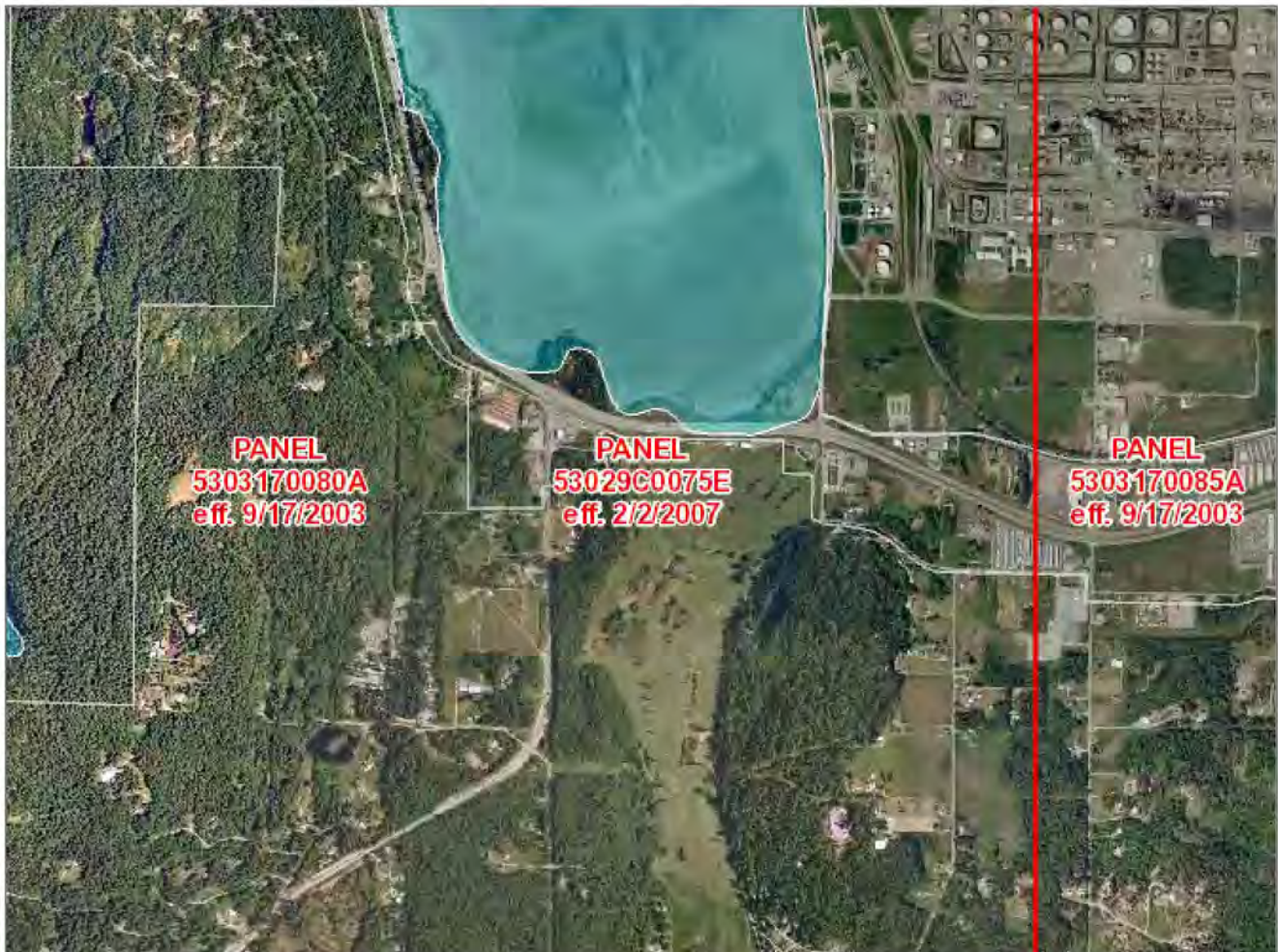
4-2.2.2 Field Slope Measurements

By definition, slope is rise over run (or fall) per unit length along the channel centerline or thalweg. Slope is the vertical drop in the river channel divided by the horizontal distance measured along the thalweg of a specific reach. The vertical drop should be measured from the water surface at the top-of-riffle (end of pool) to the next top-of-riffle to get an accurate representation of the slope in that reach.

Appendix A-3.11

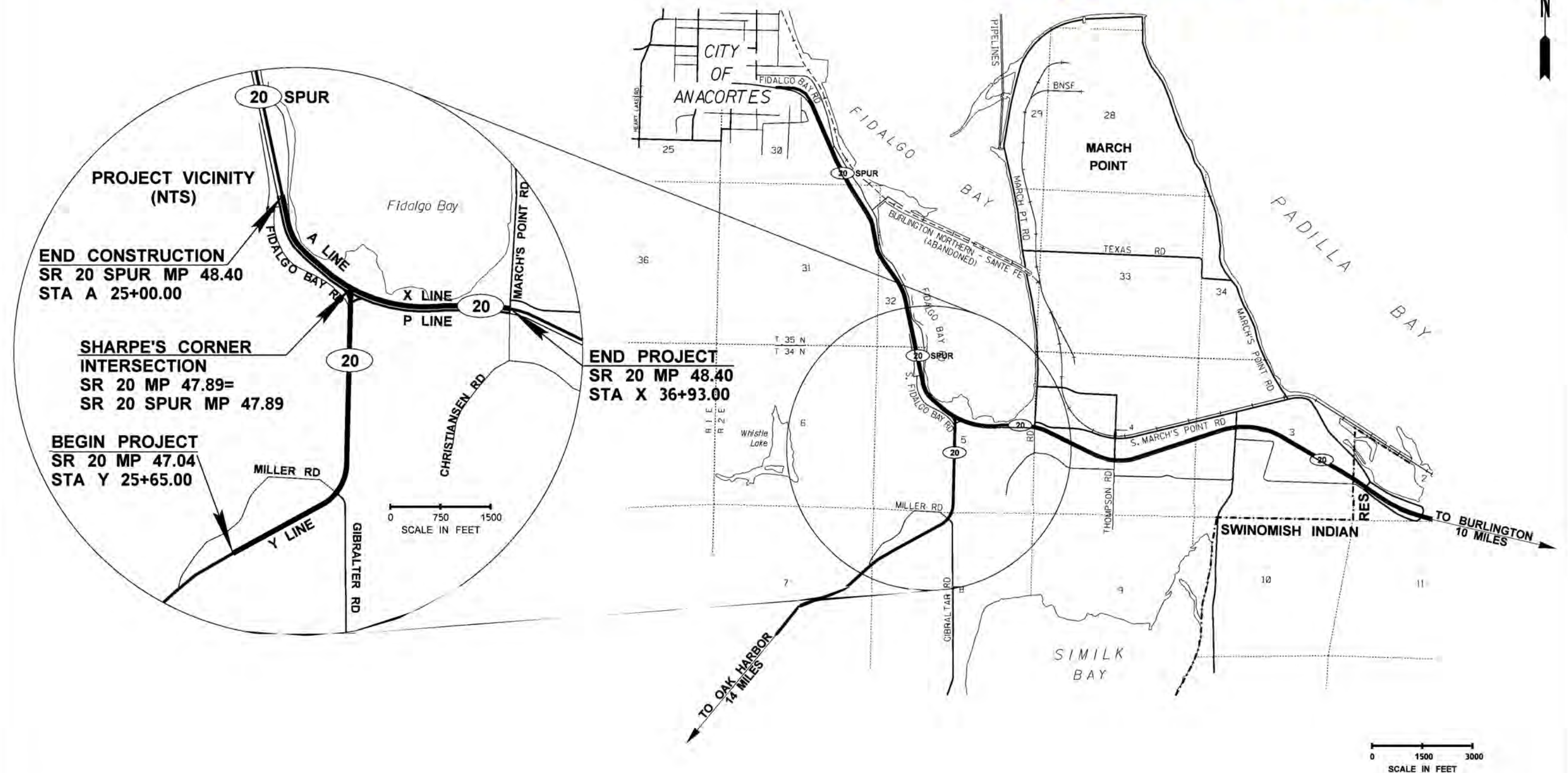
FEMA's National Flood Hazard Layer (Official)

Data from Flood Insurance Rate Maps (FIRMs) where available digitally. Try <http://bit.ly/1bPpUjq> (Unofficial) if this map is down



scott.mcafee@fema.dhs.gov | National Geospatial-Intelligence Agency (NGA); Delta State University; Esri

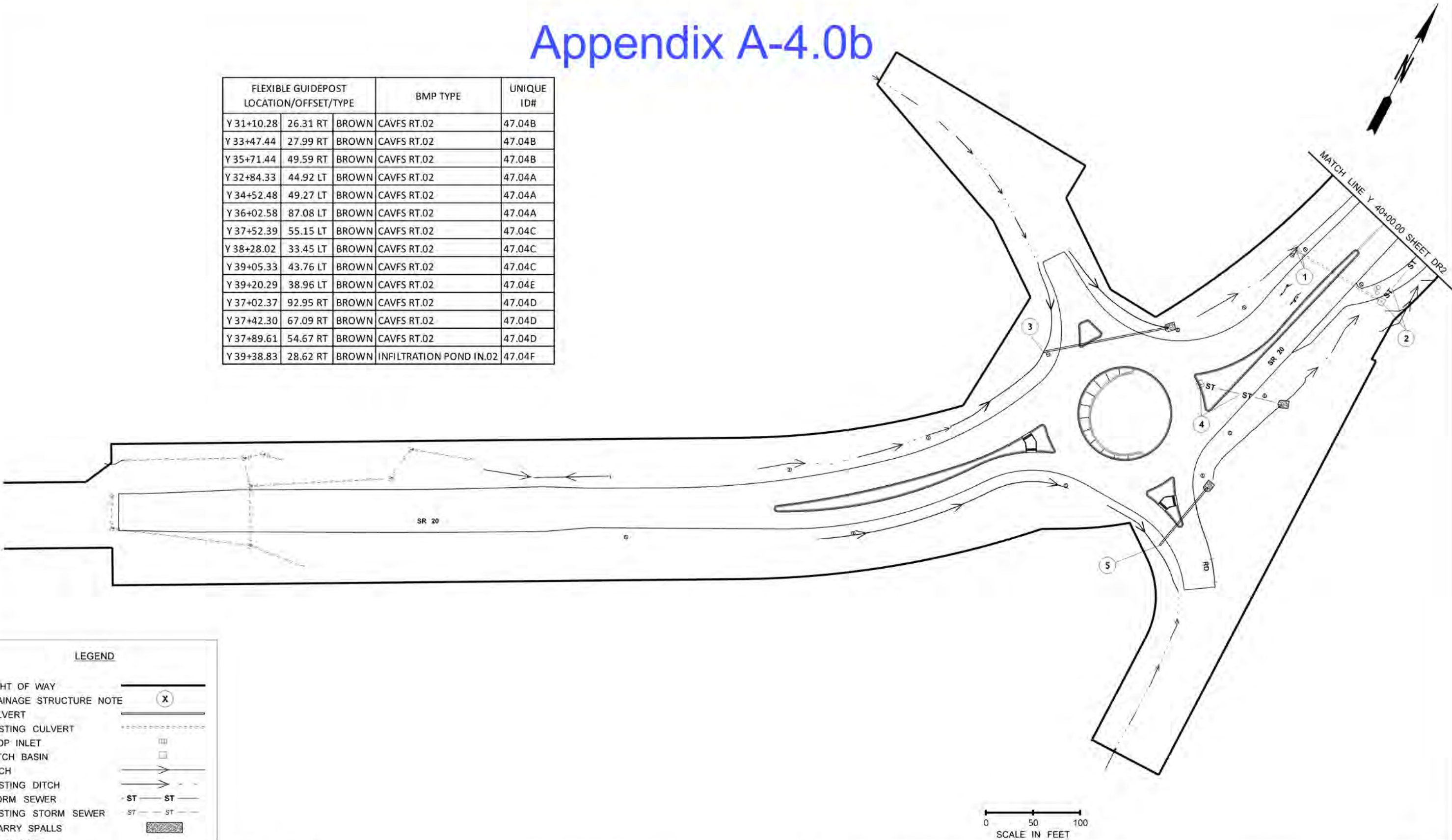
Appendix A-4.0a



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DATE 8/25/2016						10 WASH				VM1	
PLOTTED BY russejo						JOB NUMBER				SHEET	
DESIGNED BY M. LAMAY										2	
ENTERED BY M. LAMAY										OF	
CHECKED BY M. LAMAY						CONTRACT NO.		LOCATION NO.		?	
PROJ. ENGR. J. KORESKI										SHEETS	
REGIONAL ADM. L. ENG		REVISION		DATE		BY					

Appendix A-4.0b

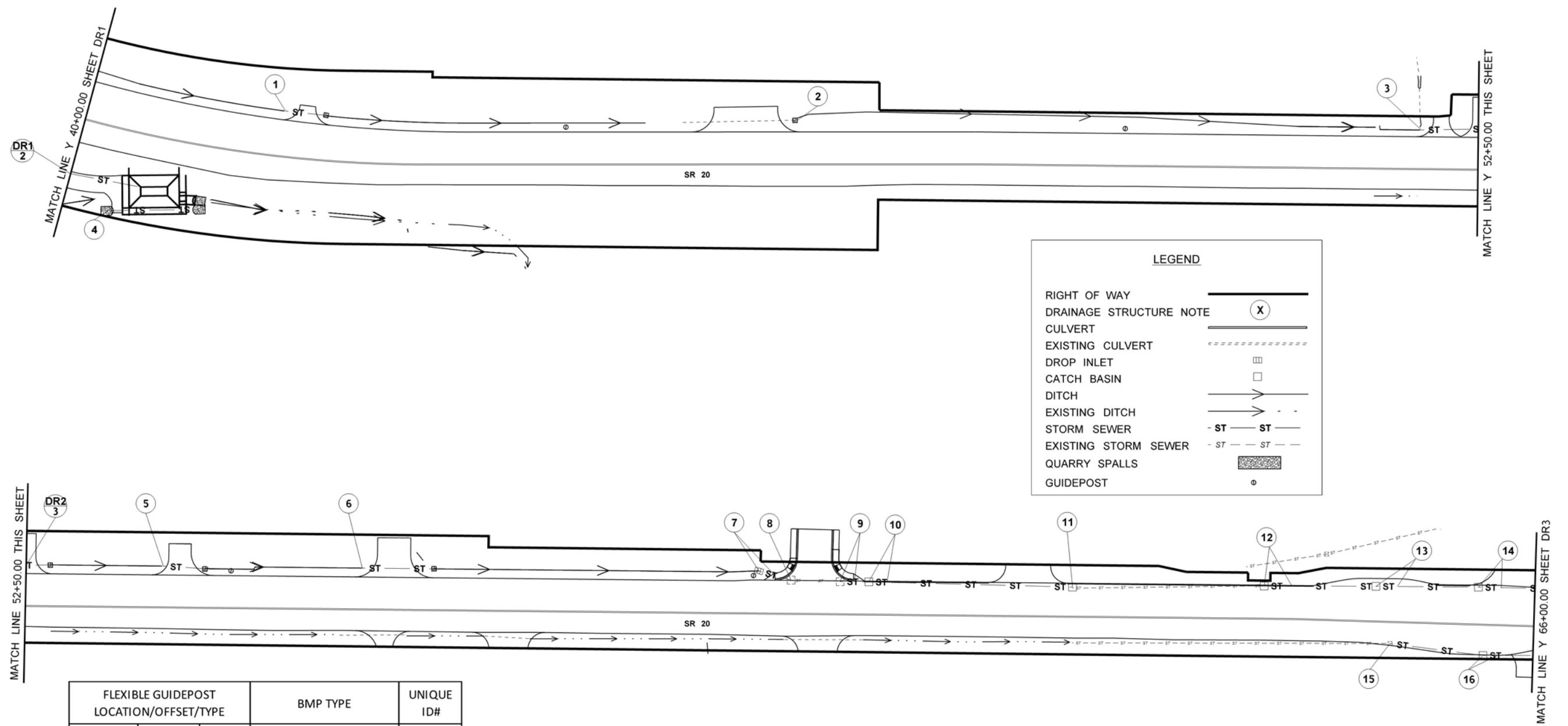
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Y 33+47.44	27.99	RT	BROWN CAVFS RT.02	47.04B
Y 35+71.44	49.59	RT	BROWN CAVFS RT.02	47.04B
Y 32+84.33	44.92	LT	BROWN CAVFS RT.02	47.04A
Y 34+52.48	49.27	LT	BROWN CAVFS RT.02	47.04A
Y 36+02.58	87.08	LT	BROWN CAVFS RT.02	47.04A
Y 37+52.39	55.15	LT	BROWN CAVFS RT.02	47.04C
Y 38+28.02	33.45	LT	BROWN CAVFS RT.02	47.04C
Y 39+05.33	43.76	LT	BROWN CAVFS RT.02	47.04C
Y 39+20.29	38.96	LT	BROWN CAVFS RT.02	47.04E
Y 37+02.37	92.95	RT	BROWN CAVFS RT.02	47.04D
Y 37+42.30	67.09	RT	BROWN CAVFS RT.02	47.04D
Y 37+89.61	54.67	RT	BROWN CAVFS RT.02	47.04D
Y 39+38.83	28.62	RT	BROWN INFILTRATION POND IN.02	47.04F



LEGEND

RIGHT OF WAY	—
DRAINAGE STRUCTURE NOTE	(X)
CULVERT	—
EXISTING CULVERT	- - -
DROP INLET	□
CATCH BASIN	□
DITCH	—>
EXISTING DITCH	- - ->
STORM SEWER	-ST- ST-
EXISTING STORM SEWER	-ST- -ST-
QUARRY SPALLS	▨
GUIDEPOST	⊙

FILE NAME T:\412354\XL4998_Sharpe\ContractPlans\XL4998_PS_DR.dgn		REGION NO. 10		STATE WASH	FED.AID PROJ.NO.			SR 20 SHARPES CORNER VICINITY IMPROVEMENTS DRAINAGE PLAN	Plot 1
TIME 8:28:51 AM	DATE 7/31/2017	JOB NUMBER 17A020		CONTRACT NO.	LOCATION NO.				PLAN REF NO DR1
PLOTTED BY calhouc	DESIGNED BY C. CALHOUN	ENTERED BY C. CALHOUN	CHECKED BY S. SULLIVAN	PROJ. ENGR. G. NG	REGIONAL ADM. L. ENG	REVISION	DATE	BY	SHEET 52 OF 191 SHEETS



LEGEND

RIGHT OF WAY

DRAINAGE STRUCTURE NOTE

CULVERT

EXISTING CULVERT

DROP INLET

CATCH BASIN

DITCH

EXISTING DITCH

STORM SEWER

EXISTING STORM SEWER

QUARRY SPALLS

GUIDEPOST

X

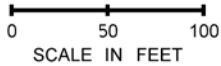
ST

ST

ST

ST

FLEXIBLE GUIDEPOST LOCATION/OFFSET/TYPE			BMP TYPE	UNIQUE ID#
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Y 49+33.93	33.39 LT	BROWN	CAVFS RT.02	47.04E
Y 54.33.56	33.39 LT	BROWN	CAVFS RT.02	47.04E
Y 59+01.18	33.90 LT	BROWN	CAVFS RT.02	47.04E



FILE NAME

T:\412354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_DR.dgn

TIME

8:28:58 AM

DATE

7/31/2017

PLOTTED BY

calhouc

DESIGNED BY

C. CALHOUN

ENTERED BY

C. CALHOUN

CHECKED BY

S. SULLIVAN

PROJ. ENGR.

G. NG

REGIONAL ADM.

L. ENG

REVISION

DATE

BY

REGION NO.

10

STATE

WASH

JOB NUMBER

17A020

CONTRACT NO.

FED.AID PROJ.NO.

LOCATION NO.

P.E. STAMP BOX

DATE

GABRIEL C. NG

STATE OF WASHINGTON

REGISTERED PROFESSIONAL ENGINEER

43602

P.E. STAMP BOX

DATE

Washington State

Department of Transportation

SR 20

SHARPES CORNER VICINITY

IMPROVEMENTS

DRAINAGE PLAN

Plot 2

PLAN REF NO

DR2

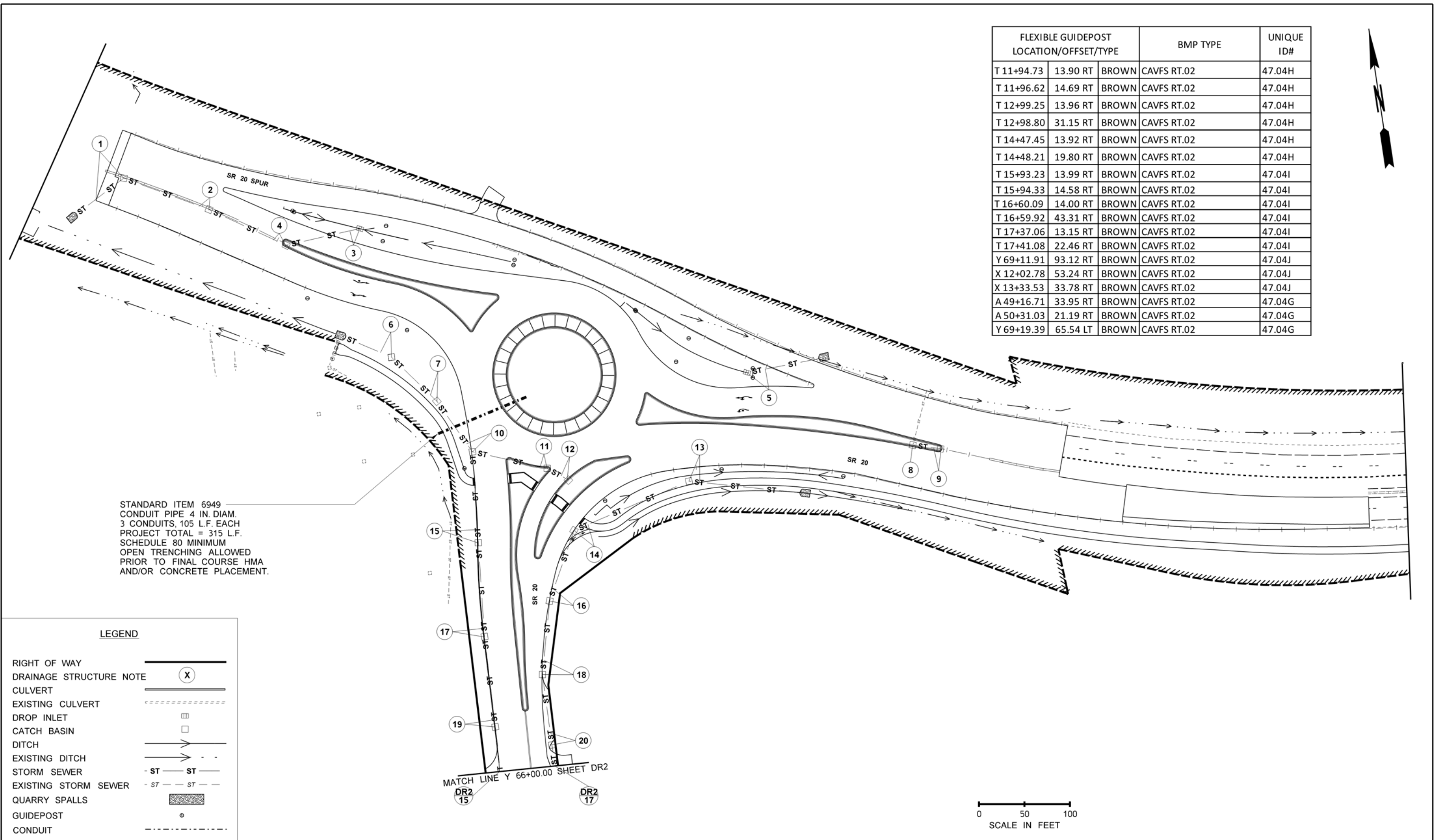
SHEET

53

OF

191

SHEETS



FLEXIBLE GUIDEPOST LOCATION/OFFSET/TYPE			BMP TYPE	UNIQUE ID#
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T 11+96.62	14.69 RT	BROWN	CAVFS RT.02	47.04H
T 12+99.25	13.96 RT	BROWN	CAVFS RT.02	47.04H
T 12+98.80	31.15 RT	BROWN	CAVFS RT.02	47.04H
T 14+47.45	13.92 RT	BROWN	CAVFS RT.02	47.04H
T 14+48.21	19.80 RT	BROWN	CAVFS RT.02	47.04H
T 15+93.23	13.99 RT	BROWN	CAVFS RT.02	47.04I
T 15+94.33	14.58 RT	BROWN	CAVFS RT.02	47.04I
T 16+60.09	14.00 RT	BROWN	CAVFS RT.02	47.04I
T 16+59.92	43.31 RT	BROWN	CAVFS RT.02	47.04I
T 17+37.06	13.15 RT	BROWN	CAVFS RT.02	47.04I
T 17+41.08	22.46 RT	BROWN	CAVFS RT.02	47.04I
Y 69+11.91	93.12 RT	BROWN	CAVFS RT.02	47.04J
X 12+02.78	53.24 RT	BROWN	CAVFS RT.02	47.04J
X 13+33.53	33.78 RT	BROWN	CAVFS RT.02	47.04J
A 49+16.71	33.95 RT	BROWN	CAVFS RT.02	47.04G
A 50+31.03	21.19 RT	BROWN	CAVFS RT.02	47.04G
Y 69+19.39	65.54 LT	BROWN	CAVFS RT.02	47.04G

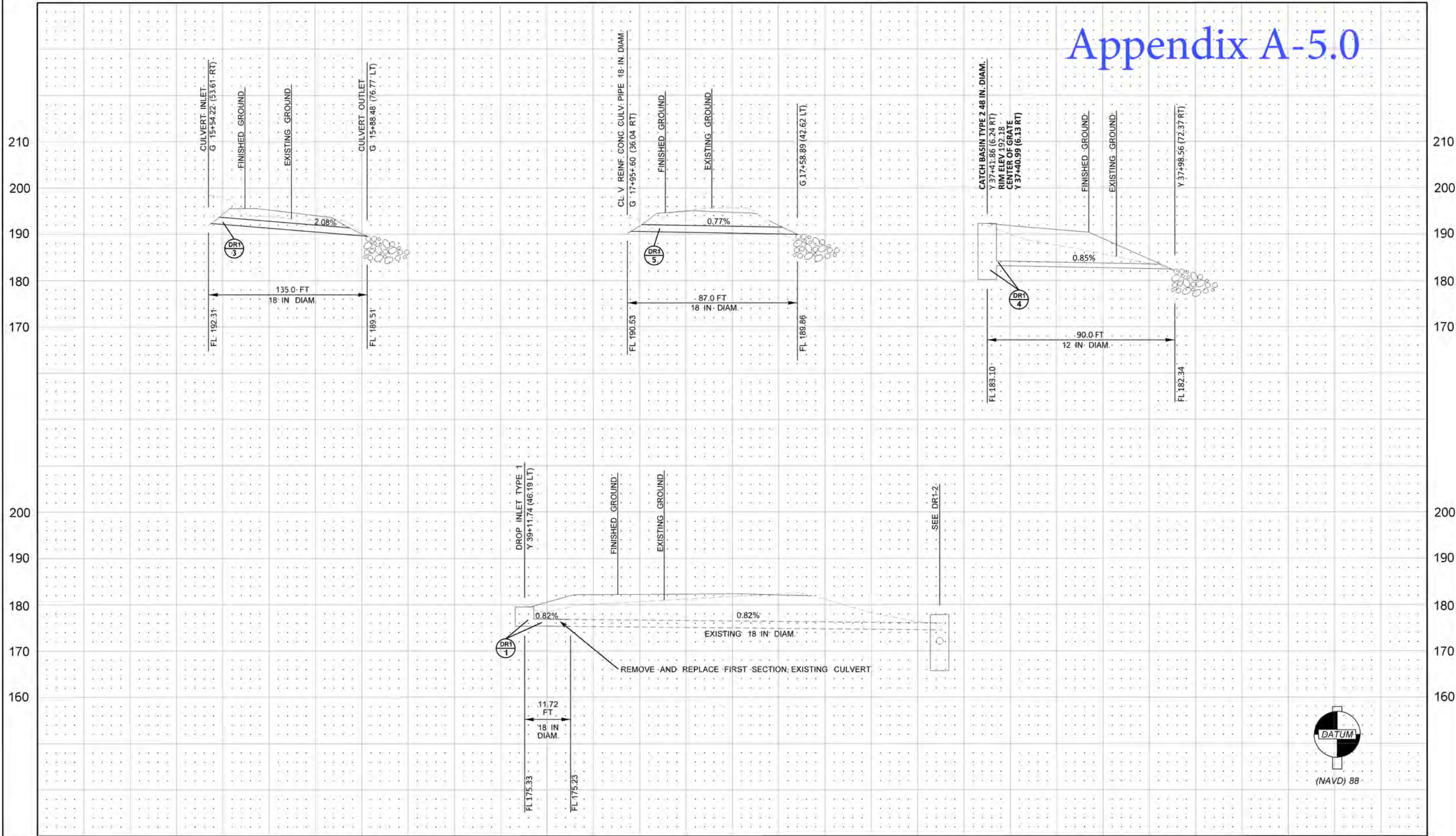
STANDARD ITEM 6949
CONDUIT PIPE 4 IN. DIAM.
3 CONDUITS, 105 L.F. EACH
PROJECT TOTAL = 315 L.F.
SCHEDULE 80 MINIMUM
OPEN TRENCHING ALLOWED
PRIOR TO FINAL COURSE HMA
AND/OR CONCRETE PLACEMENT.

LEGEND

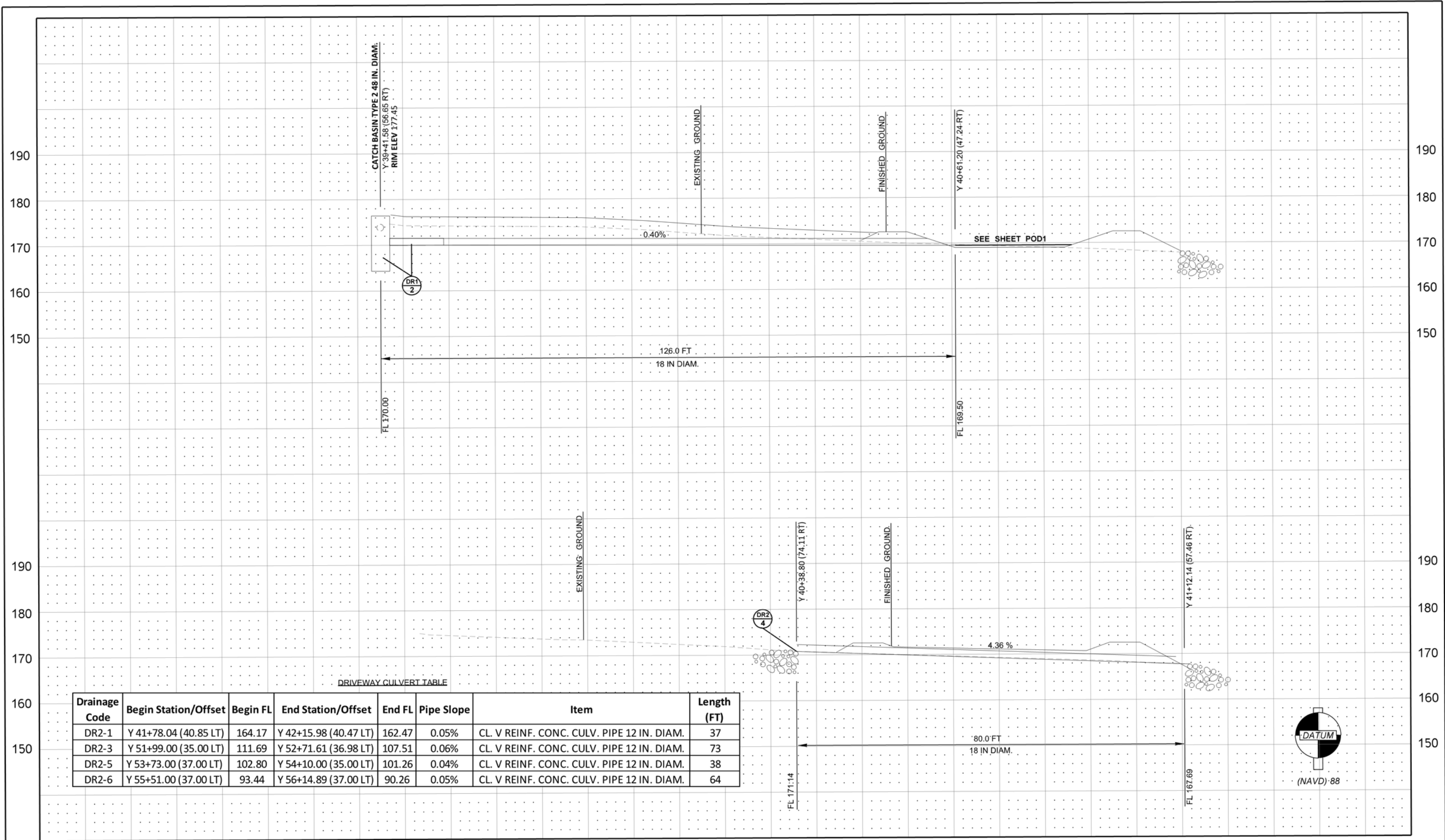
RIGHT OF WAY	
DRAINAGE STRUCTURE NOTE	
CULVERT	
EXISTING CULVERT	
DROP INLET	
CATCH BASIN	
DITCH	
EXISTING DITCH	
STORM SEWER	
EXISTING STORM SEWER	
QUARRY SPALLS	
GUIDEPOST	
CONDUIT	

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TIME 8:29:03 AM	DATE 7/31/2017	JOB NUMBER 17A020		CONTRACT NO.	LOCATION NO.				PLAN REF NO DR3
PLOTTED BY calhouc	DESIGNED BY C. CALHOUN	ENTERED BY C. CALHOUN	CHECKED BY S. SULLIVAN	PROJ. ENGR. G. NG	REGIONAL ADM. L. ENG	REVISION	DATE	BY	SHEET 54 OF 191 SHEETS

Appendix A-5.0

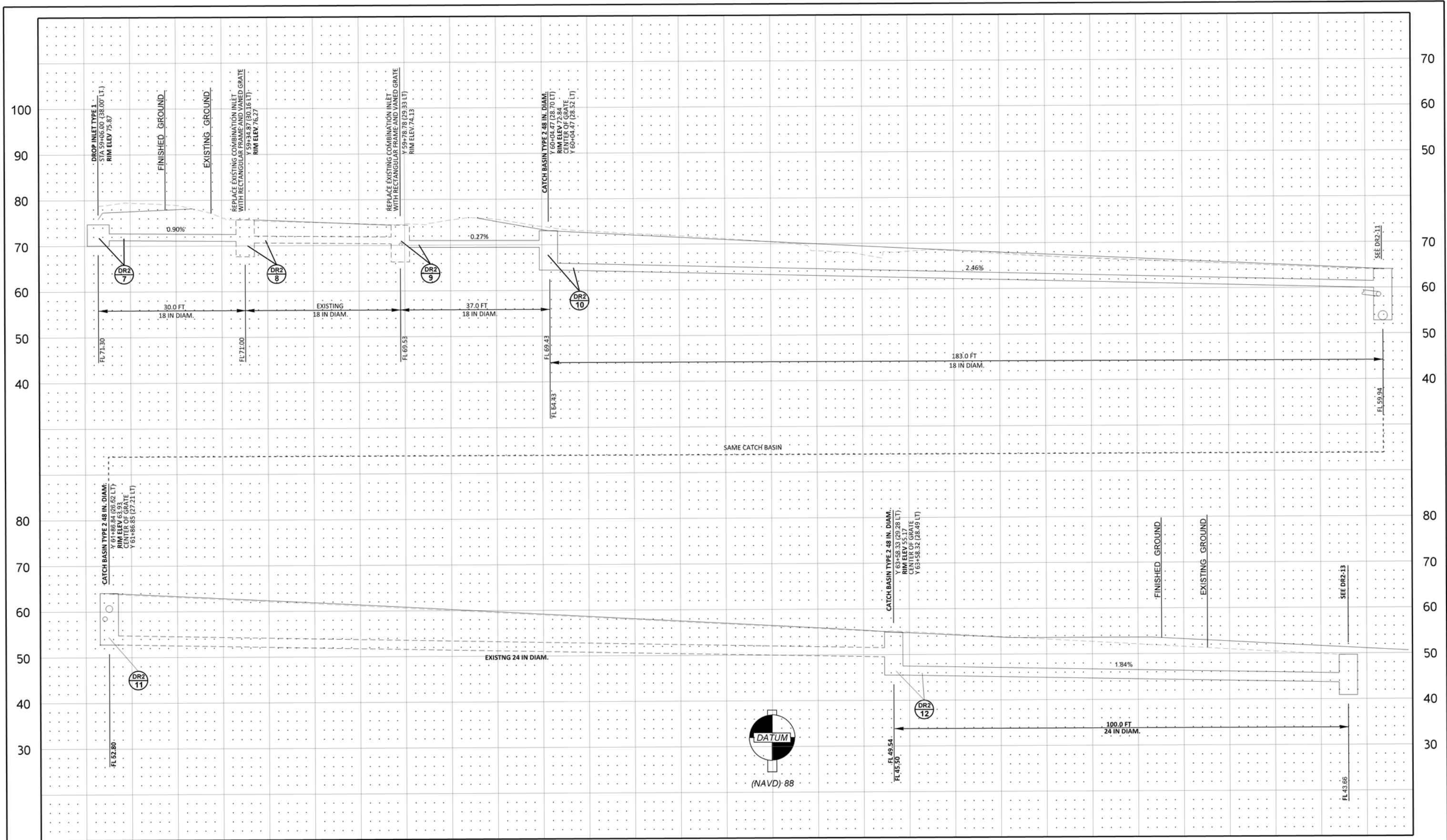


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TIME 7:58:27 AM	DATE 8/1/2017	JOB NUMBER 17A020		CONTRACT NO.	LOCATION NO.				PLAN REF. NO. DP1
DESIGNED BY C. CALHOUN	ENTERED BY C. CALHOUN	CHECKED BY S. SULLIVAN	PROJ. ENGR. G. NG	REGIONAL ADM. L. ENG	REVISION	DATE	BY	SHEET 55 OF 191 SHEETS	

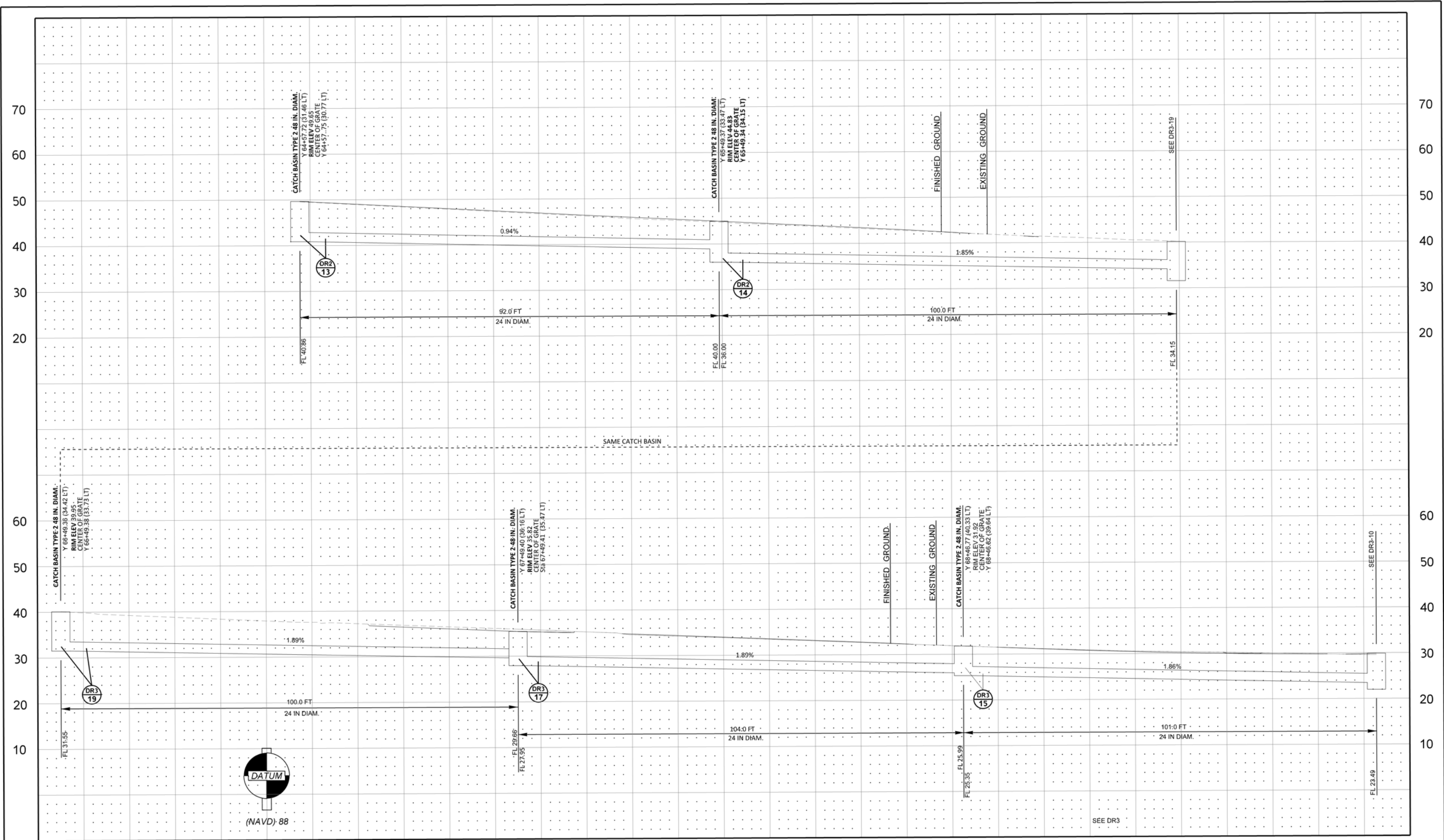


Drainage Code	Begin Station/Offset	Begin FL	End Station/Offset	End FL	Pipe Slope	Item	Length (FT)
DR2-1	Y 41+78.04 (40.85 LT)	164.17	Y 42+15.98 (40.47 LT)	162.47	0.05%	CL. V REINF. CONC. CULV. PIPE 12 IN. DIAM.	37
DR2-3	Y 51+99.00 (35.00 LT)	111.69	Y 52+71.61 (36.98 LT)	107.51	0.06%	CL. V REINF. CONC. CULV. PIPE 12 IN. DIAM.	73
DR2-5	Y 53+73.00 (37.00 LT)	102.80	Y 54+10.00 (35.00 LT)	101.26	0.04%	CL. V REINF. CONC. CULV. PIPE 12 IN. DIAM.	38
DR2-6	Y 55+51.00 (37.00 LT)	93.44	Y 56+14.89 (37.00 LT)	90.26	0.05%	CL. V REINF. CONC. CULV. PIPE 12 IN. DIAM.	64

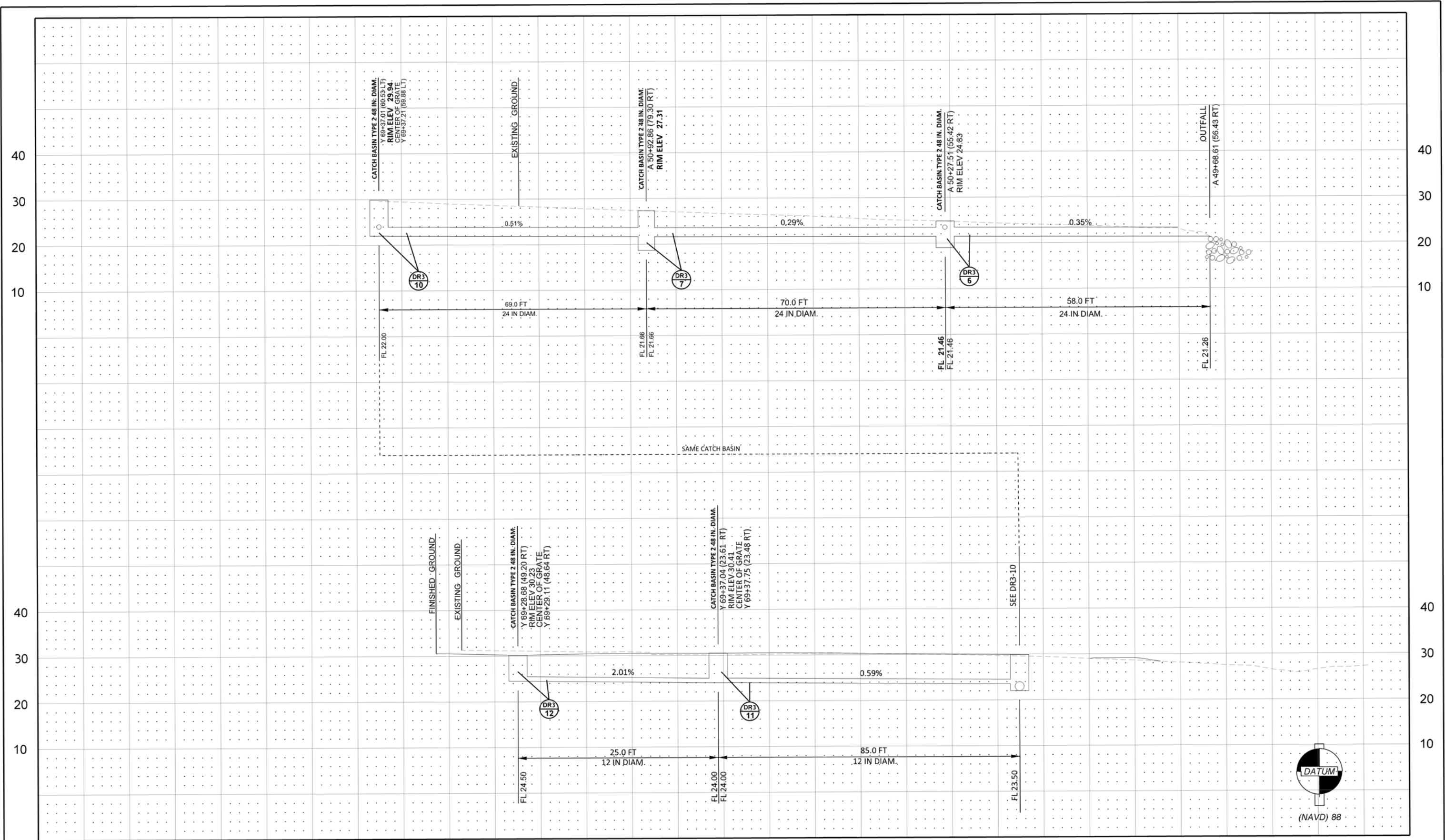
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TIME 7:58:34 AM		DATE 8/1/2017		DESIGNED BY C. CALHOUN		ENTERED BY C. CALHOUN		CHECKED BY S. SULLIVAN		PROJ. ENGR. G. NG		REGIONAL ADM. L. ENG		REVISION		DATE		BY	



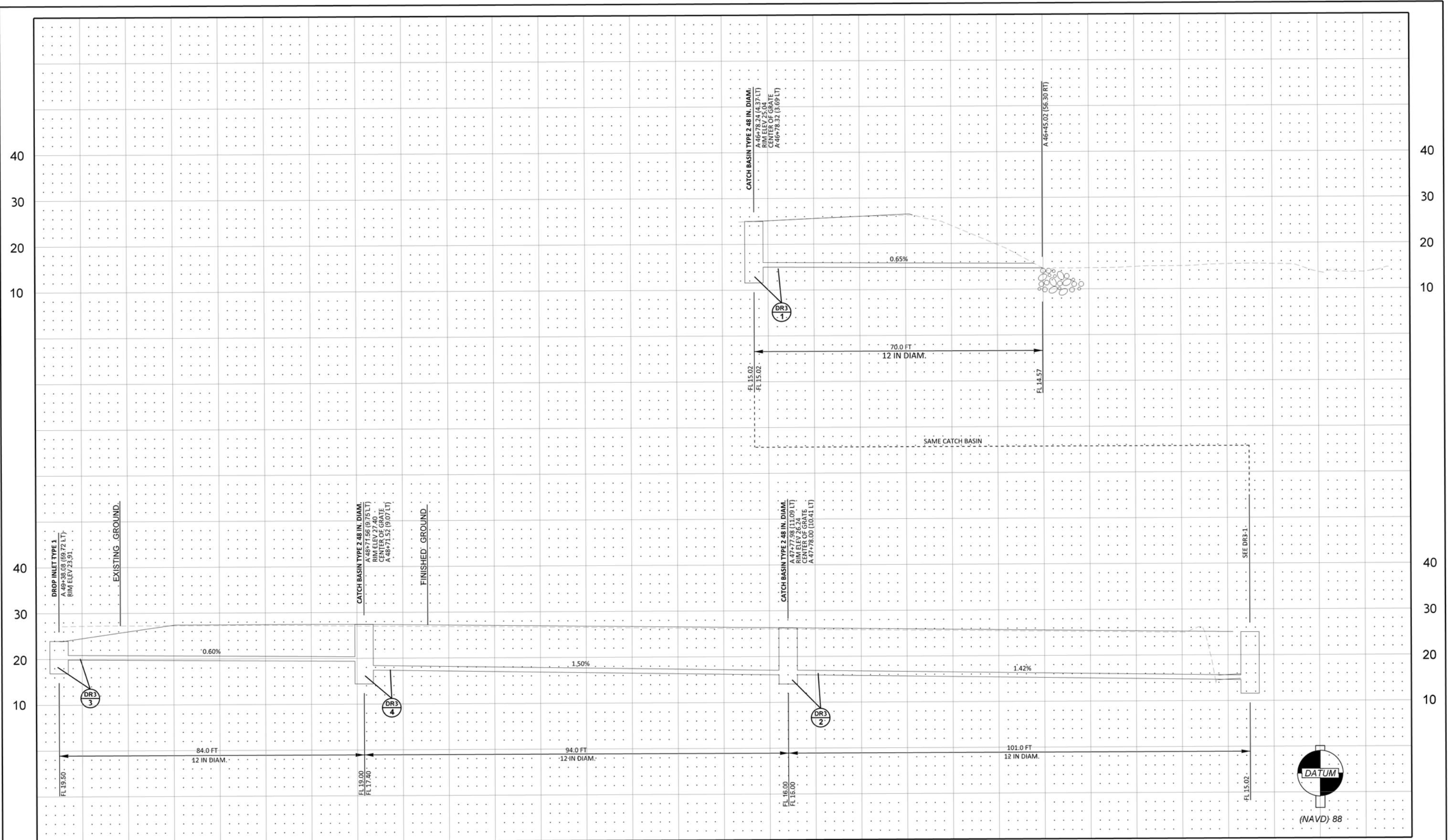
FILE NAME T:\412354\XL4998_Sharpe\CAD\ContractPlans\XL4998_PS_DP.dgn																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											



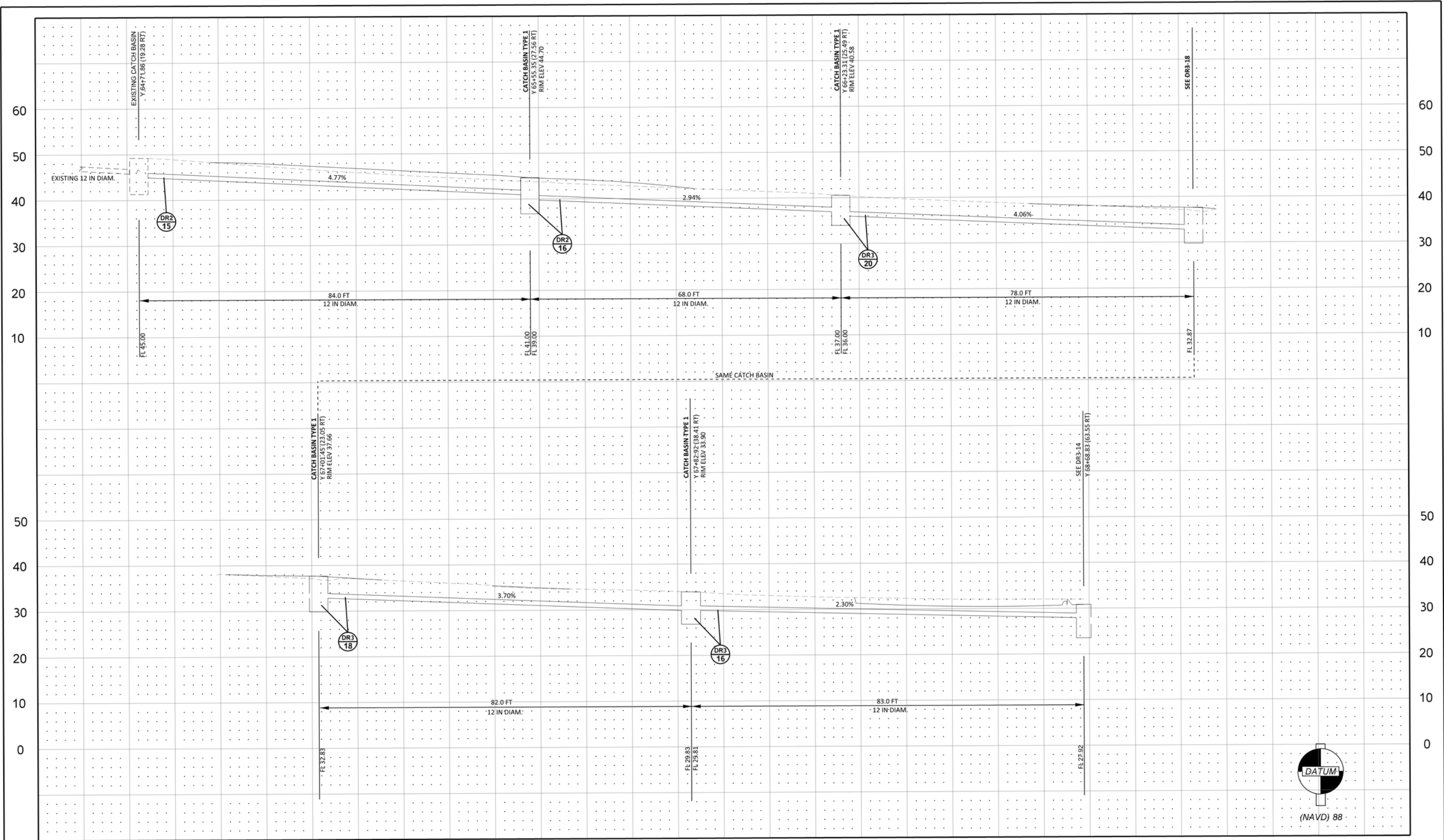
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TIME 7:58:46 AM		DATE 8/1/2017		PLOTTED BY shartoi		DESIGNED BY C. CALHOUN		ENTERED BY C. CALHOUN		CHECKED BY S. SULLIVAN		PROJ. ENGR. G. NG		REGIONAL ADM. L. ENG		REVISION		DATE		BY		CONTRACT NO. 17A020		LOCATION NO.	



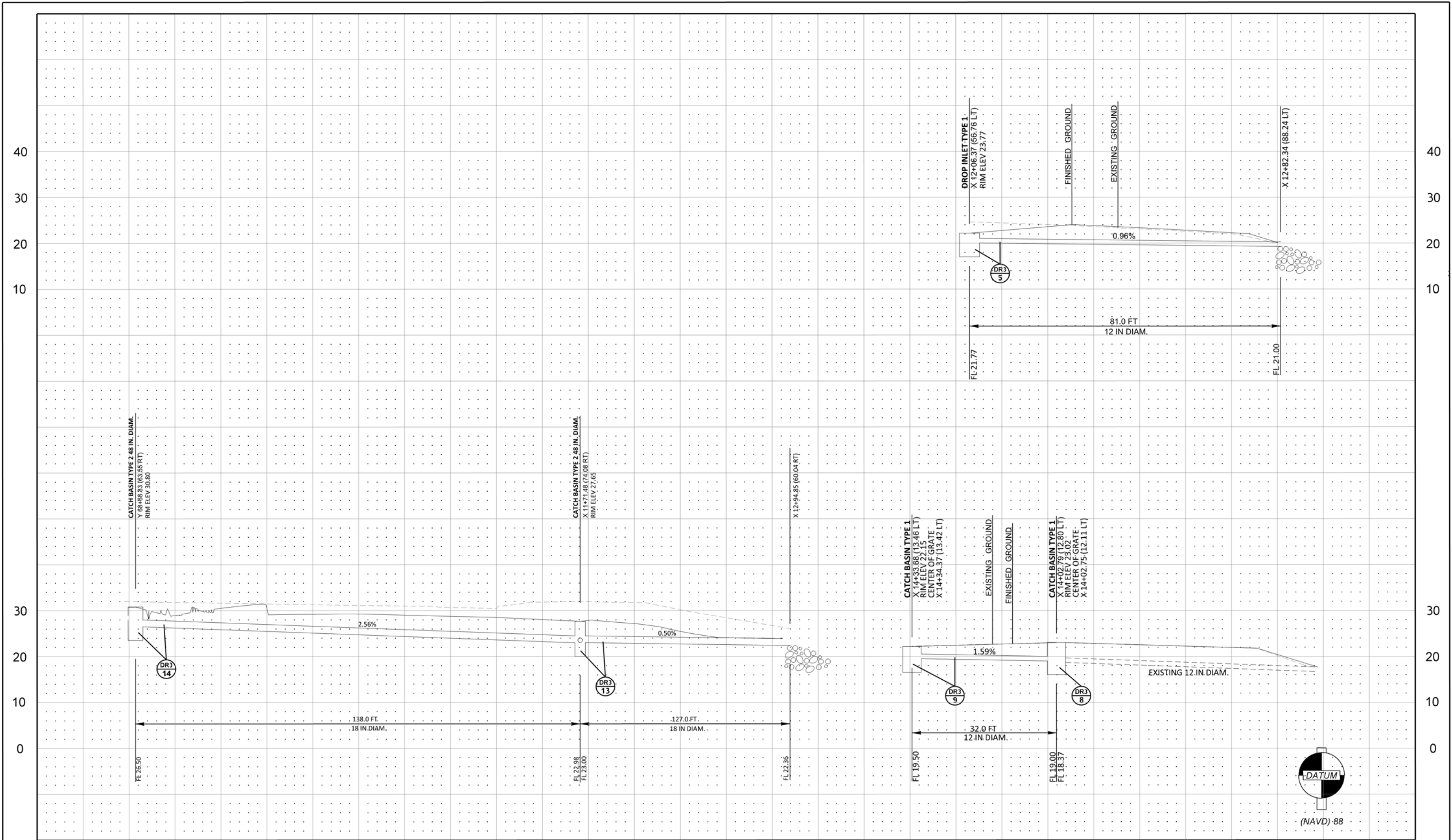
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TIME 7:58:51 AM		DATE 8/1/2017		JOB NUMBER 17A020		CONTRACT NO.		LOCATION NO.								PLAN REF. NO. DP5	
PLOTTED BY shartoi																SHEET 59 OF 191 SHEETS	
DESIGNED BY C. CALHOUN																	
ENTERED BY C. CALHOUN																	
CHECKED BY S. SULLIVAN																	
PROJ. ENGR. G. NG																	
REGIONAL ADM. L. ENG		REVISION		DATE		BY											



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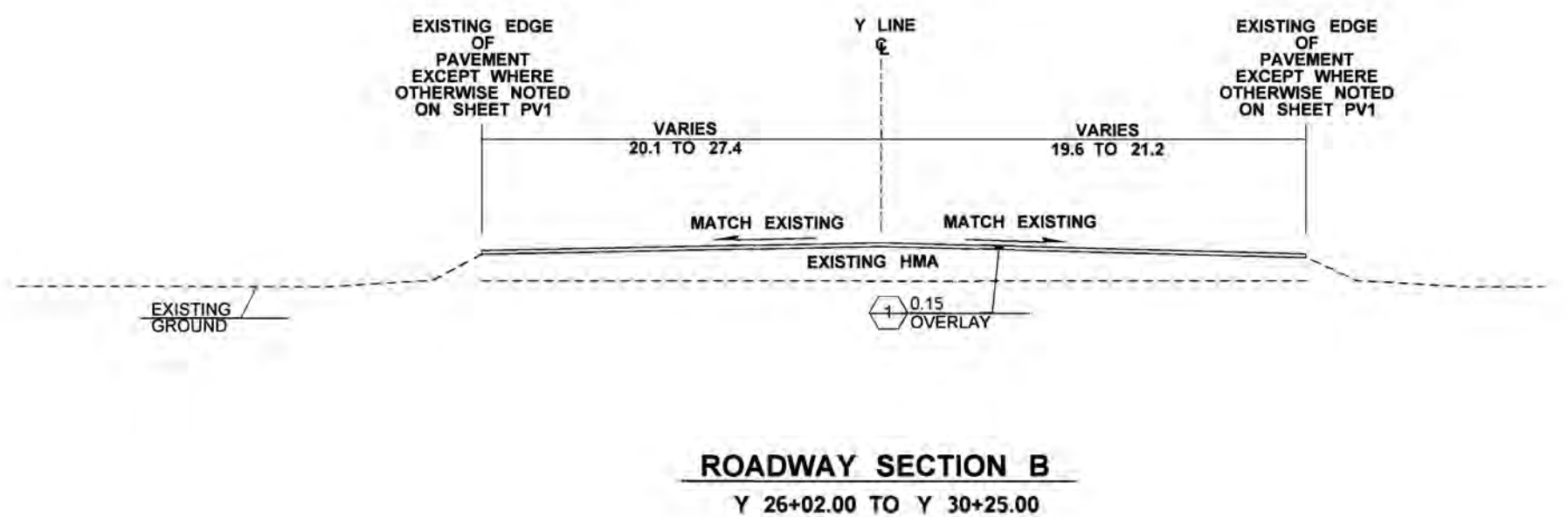
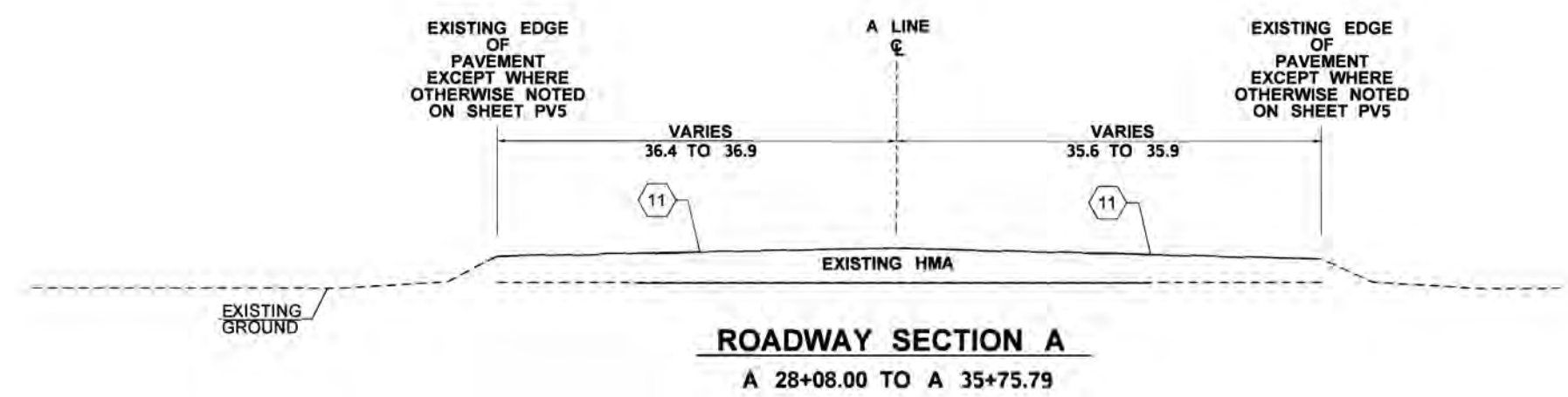


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TIME 7:59:05 AM		DATE 8/1/2017		PLOTTED BY shartoi		DESIGNED BY C. CALHOUN		ENTERED BY C. CALHOUN		CHECKED BY S. SULLIVAN		PROJ. ENGR. G. NG		REGIONAL ADM. L. ENG		REVISION		DATE		BY	
JOB NUMBER 17A020		CONTRACT NO.		LOCATION NO.		DATE		P.E. STAMP BOX		DATE		P.E. STAMP BOX		DATE		P.E. STAMP BOX		DATE		P.E. STAMP BOX	



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TIME 7:59:11 AM		JOB NUMBER 17A020		CONTRACT NO.	LOCATION NO.				PLAN REF. NO. DP8
DATE 8/1/2017									SHEET 62 OF 191 SHEETS
PLOTTED BY shartoi									
DESIGNED BY C. CALHOUN									
ENTERED BY C. CALHOUN									
CHECKED BY S. SULLIVAN									
PROJ. ENGR. G. NG									
REGIONAL ADM. L. ENG	REVISION	DATE	BY			P.E. STAMP BOX	P.E. STAMP BOX		

Appendix A-6.0a



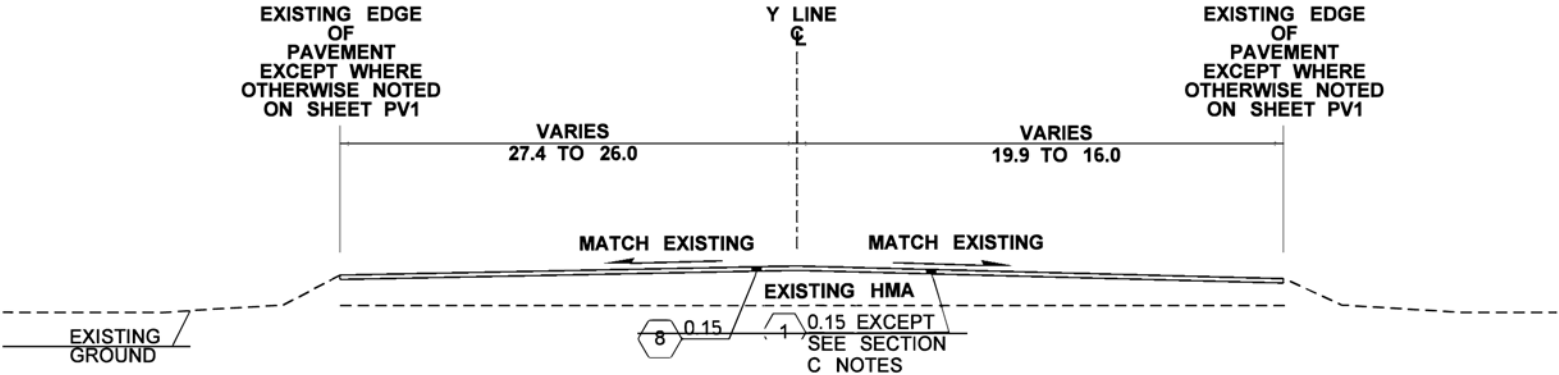
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- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
- 6 ROADWAY EXCAVATION INCL HAUL
- 7 EMBANKMENT COMPACTION
- 8 PLANING BITUMINOUS PAVEMENT
- 9 COMMERCIAL HMA
- 10 PERVIOUS BASE COURSE
- 11 ASPHALT FOR FOG SEAL
- 12 PRECAST DUAL FACED SLOPED MOUNTABLE CURB
- 13 PERVIOUS HOT MIX ASPHALT

GENERAL NOTES:

- 1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED AND COURSES SHALL NOT EXCEED THE DEPTHS DEFINED IN THE STANDARD SPECIFICATIONS.
- 2. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
- 3. GP = GRADE AND PIVOT POINT. ROADWAY SECTIONS THAT INCLUDE GP DO NOT USE VERTICAL ALIGNMENT PROFILES OR SUPERELEVATION DIAGRAMS. FOR THOSE ROADWAY SECTIONS, THE ELEVATION, SUPERELEVATION, AND HORIZONTAL LOCATION ARE CONTROLLED BY THE PAVING CONTROL (PVC) SHEETS.
- 4. SEE PV SHEETS FOR CURB TYPE AND LOCATION.
- 5. SEE PV SHEETS FOR BARRIER AND GUARDRAIL TYPES AND LOCATIONS.

FILE NAME T:\412354\XL4998 Sharpes\ICAD\ContractPlans\XL4998_PS_RS.dgn																								Plot 1	
TIME 10:07:10 AM										REGION NO. STATE		FED.AID PROJ.NO.										PLAN REF NO			
DATE 5/2/2017										10 WASH												RS1			
PLOTTED BY shartoi										JOB NUMBER												SHEET			
DESIGNED BY C. PILLAR																						7			
ENTERED BY C. PILLAR																						OF			
CHECKED BY J. KORESKI																						170			
PROJ. ENGR. G. NG												CONTRACT NO.		LOCATION NO.								SHEETS			
REGIONAL ADM. L. ENG																									
				REVISION				DATE		BY															

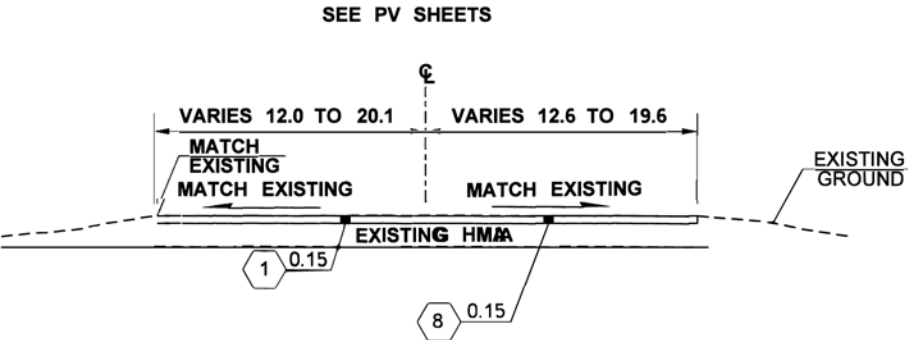


SECTION C NOTES
DEPTH VARIES 0.15 TO 0.38. USE WITH BUTT JOINT DETAIL ON SHEET PVD6.

ROADWAY SECTION C
Y 30+25.00 TO Y 30+71.05

GENERAL NOTES:

1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED AND COURSES SHALL NOT EXCEED THE DEPTHS DEFINED IN THE STANDARD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
3. GP = GRADE AND PIVOT POINT. ROADWAY SECTIONS THAT INCLUDE GP DO NOT USE VERTICAL ALIGNMENT PROFILES OR SUPERELEVATION DIAGRAMS. FOR THOSE ROADWAY SECTIONS, THE ELEVATION, SUPERELEVATION, AND HORIZONTAL LOCATION ARE CONTROLLED BY THE PAVING CONTROL (PVC) SHEETS.
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THIS SECTION IS USED WITH BUTT JOINT DETAIL ON SHEET PVD6

ROADWAY SECTION D

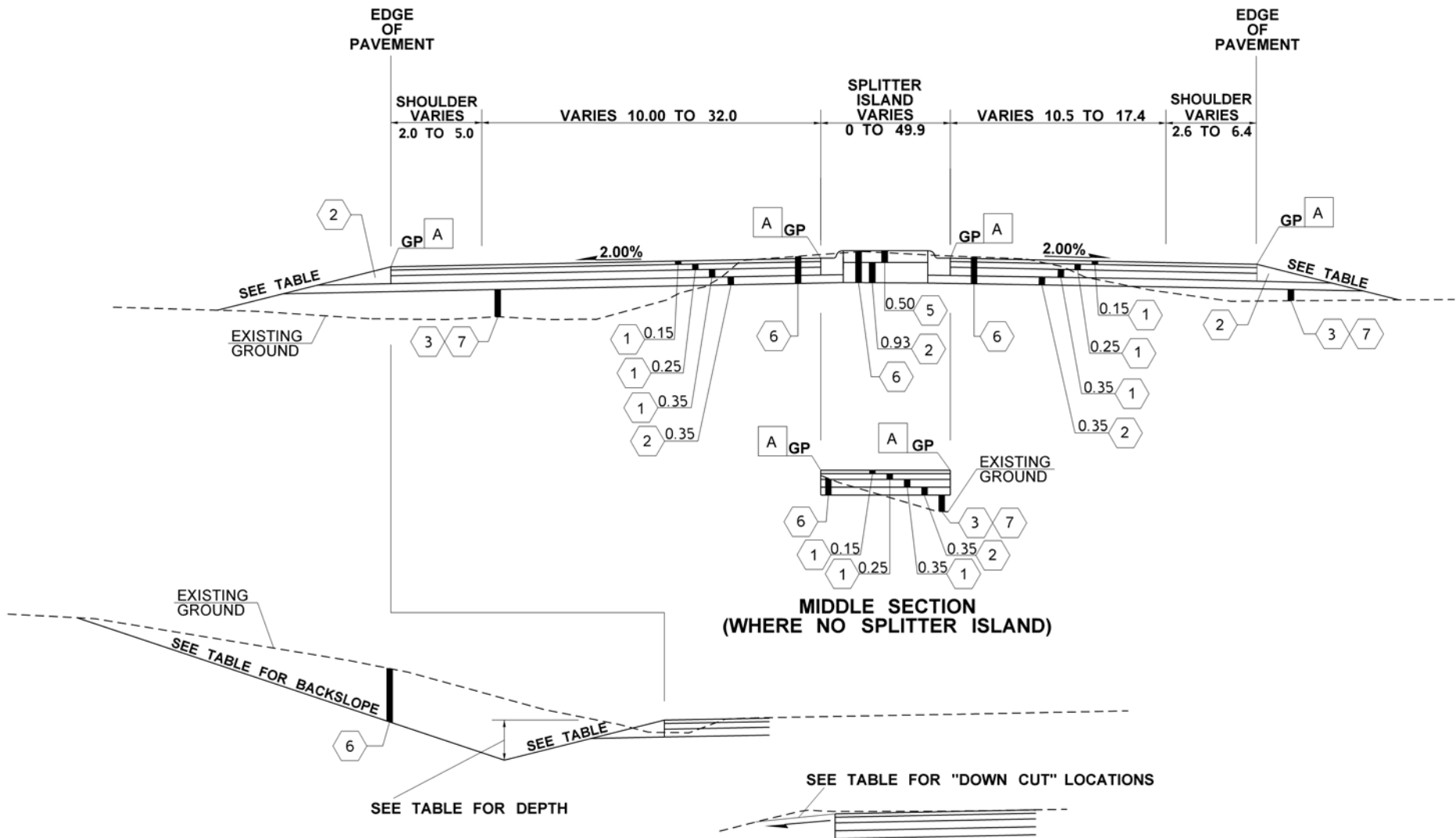
A 41+26.93* TO A 46+74.25* (EASTBOUND ONLY)
A 46+56.95* TO A 46+74.25* (WESTBOUND ONLY)
G 14+57.71 TO G 14+67.81
G 18+54.67 TO G 18+67.00
X 15+69.48* TO X 15+79.58*
X 19+08.17* TO X 19+18.17*
Y 25+71.47* TO Y 26+02.00* (OVERLAY, DEPTH VARIES)
Y 41+35.00* TO Y 41+45.00*
Y 66+53.25* TO Y 66+63.25*

*WIDTHS NOT SHOWN ABOVE. SEE PV SHEETS FOR WIDTH LIMITS AT THESE LOCATIONS.

LEGEND

1	HMA CL. 1/2 IN. PG 64-22
2	CRUSHED SURFACING BASE COURSE
3	SELECT BORROW INCL. HAUL
4	CEMENT CONC. SIDEWALK
5	TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
6	ROADWAY EXCAVATION INCL. HAUL
7	EMBANKMENT COMPACTION
8	PLANING BITUMINOUS PAVEMENT
9	COMMERCIAL HMA
10	PERVIOUS BASE COURSE
11	ASPHALT FOR FOG SEAL
12	PRECAST DUAL FACED SLOPED MOUNTABLE CURB
13	PERVIOUS HOT MIX ASPHALT

FILE NAME T:\412354\XL4998 Sharpes\CAD\ContractPlans\XL4998 PS RS.dgn																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			



CONSTRUCTION NOTES:

A SEE SHEET PVC SHEETS FOR ELEVATION.

GENERAL NOTES:

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ROADWAY SECTION E
(CONNECTING LEGS OF ROUNDABOUT)

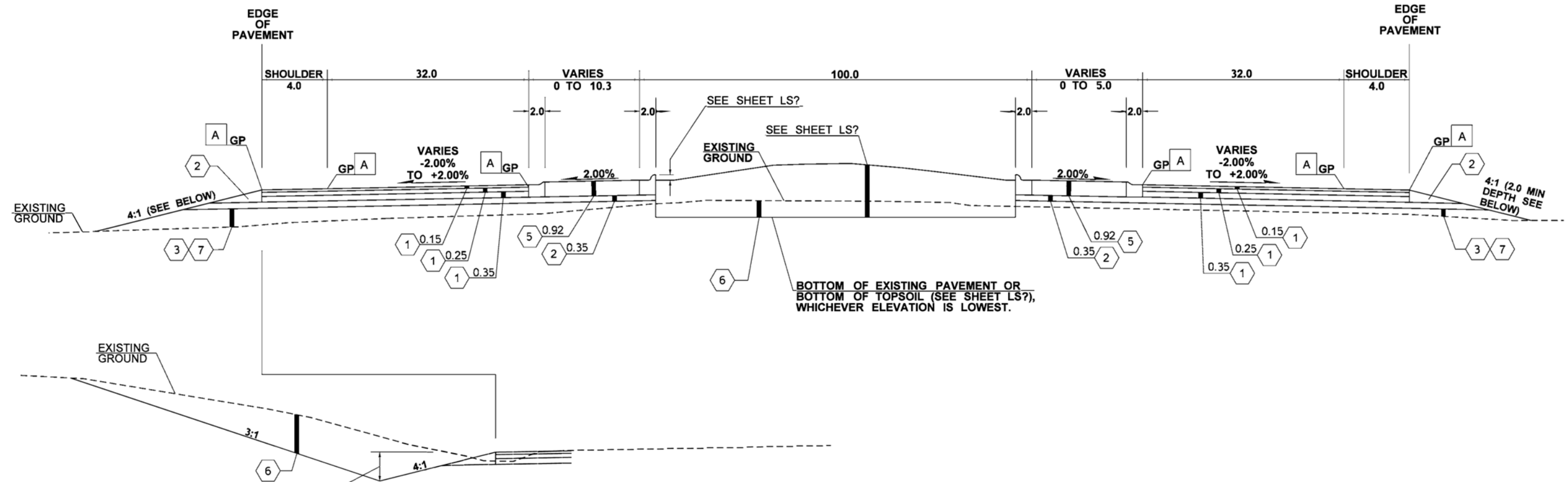
G 14+67.81 TO G 15+68.82
G 17+32.61 TO G 18+54.67
Y 30+71.05 TO Y 35+74.78
Y 37+38.89 TO Y 39+58.05

SLOPE TABLE							
STATION		OFFSET	FORESLOPE		BACKSLOPE	DEPTH	
FROM	TO		FROM	TO		FROM	TO
G 14+67.81	G 14+86.70	LEFT	MATCH	4:1	2:1	MATCH	1.49
G 14+86.70	G 15+68.82	LEFT	4:1	4:1	2:1	1.49	3.36
G 14+67.81	G 14+71.26	RIGHT	MATCH	4:1	2:1	MATCH	1.44
G 14+71.26	G 15+54.22	RIGHT	4:1	4:1	2:1	1.44	4.00
G 15+54.22	G 15+68.82	RIGHT	4:1	4:1	2:1	4.00	4.00
G 17+32.61	G 17+63.00	LEFT	4:1	4:1	---	---	---
G 17+63.00	G 18+52.00	LEFT	10:1 DOWN CUT	10:1 DOWN CUT	---	---	---
G 18+52.00	G 18+54.67	LEFT	4:1	4:1	---	---	---
G 17+32.61	G 17+62.51	RIGHT	4:1	4:1	2:1	2.0	2.0
G 17+62.51	G 17+98.19	RIGHT	4:1	3:1	2:1	2.0	4.35
G 17+98.19	G 18+43.26	RIGHT	3:1	3:1	2:1	4.35	3.39
G 18+43.26	G 18+54.67	RIGHT	3:1	MATCH	2:1	3.39	MATCH
Y 30+71.05	Y 34+79.00	LEFT	4:1	4:1	---	---	---
Y 34+79.00	Y 35+06.64	LEFT	4:1	4:1	3:1	3.0	3.0
Y 35+06.64	Y 35+29.38	LEFT	4:1	4:1	3:1	3.0	4.0
Y 35+29.38	Y 35+74.78	LEFT	4:1	4:1	3:1	4.0	4.0
Y 30+71.05	Y 30+74.50	RIGHT	4:1	4:1	---	---	---
Y 30+74.50	Y 33+11.50	RIGHT	20:1 DOWN CUT	20:1 DOWN CUT	---	---	---
Y 33+11.50	Y 35+72.65	RIGHT	4:1	4:1	3:1	3.0	3.0
Y 35+72.65	Y 35+74.78	RIGHT	20:1 DOWN CUT	20:1 DOWN CUT	---	---	---
Y 37+38.89	Y 37+43.68	LEFT	4:1	4:1	2:1	3.3	3.3
Y 37+43.68	Y 39+58.05	LEFT	4:1	4:1	---	---	---
Y 37+38.89	Y 39+32.10	RIGHT	4:1	4:1	---	---	---
Y 39+32.10	Y 39+58.05	RIGHT	10:1 DOWN CUT	10:1 DOWN CUT	---	---	---

LEGEND

- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
- 6 ROADWAY EXCAVATION INCL. HAUL
- 7 EMBANKMENT COMPACTION
- 8 PLANING BITUMINOUS PAVEMENT
- 9 COMMERCIAL HMA
- 10 PERVIOUS BASE COURSE
- 11 ASPHALT FOR FOG SEAL
- 12 PRECAST DUAL FACED SLOPED MOUNTABLE CURB
- 13 PERVIOUS HOT MIX ASPHALT

FILE NAME T:\412354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_RS.dgn		REGION NO. STATE		FED.AID PROJ.NO.				SR 20 SHARPES CORNER VICINITY IMPROVEMENTS	Plot 3 PLAN REF NO RS3
TIME 10:07:22 AM		10	WASH						
DATE 5/2/2017									
PLOTTED BY shartoi									
DESIGNED BY C. PILLAR									
ENTERED BY C. PILLAR									
CHECKED BY J. KORESKI									
PROJ. ENGR. G. NG									
REGIONAL ADM. L. ENG	REVISION	DATE	BY					ROADWAY SECTIONS	SHEET 9 OF 170 SHEETS



2.0 MINIMUM FORESLOPE DEPTH USING ONLY FILL SECTION WHERE POSSIBLE. OTHERWISE USE DITCH / CUT SECTION (AS SHOWN) TO ACHIEVE IT.

ALL SIDE SLOPES SHOWN ON THIS ROADWAY SECTION (E) APPEAR ONLY AT THE CONNECTIONS TO ROADWAY SECTION D. VARY TO MATCH AT THE CONNECTIONS.

ROADWAY SECTION F

G 15+68.82 TO G 17+32.61
Y 35+74.78 TO Y 37+38.89

CONSTRUCTION NOTES:

A SEE SHEET PVC SHEETS FOR ELEVATION.

GENERAL NOTES:

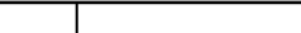
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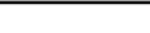
LEGEND

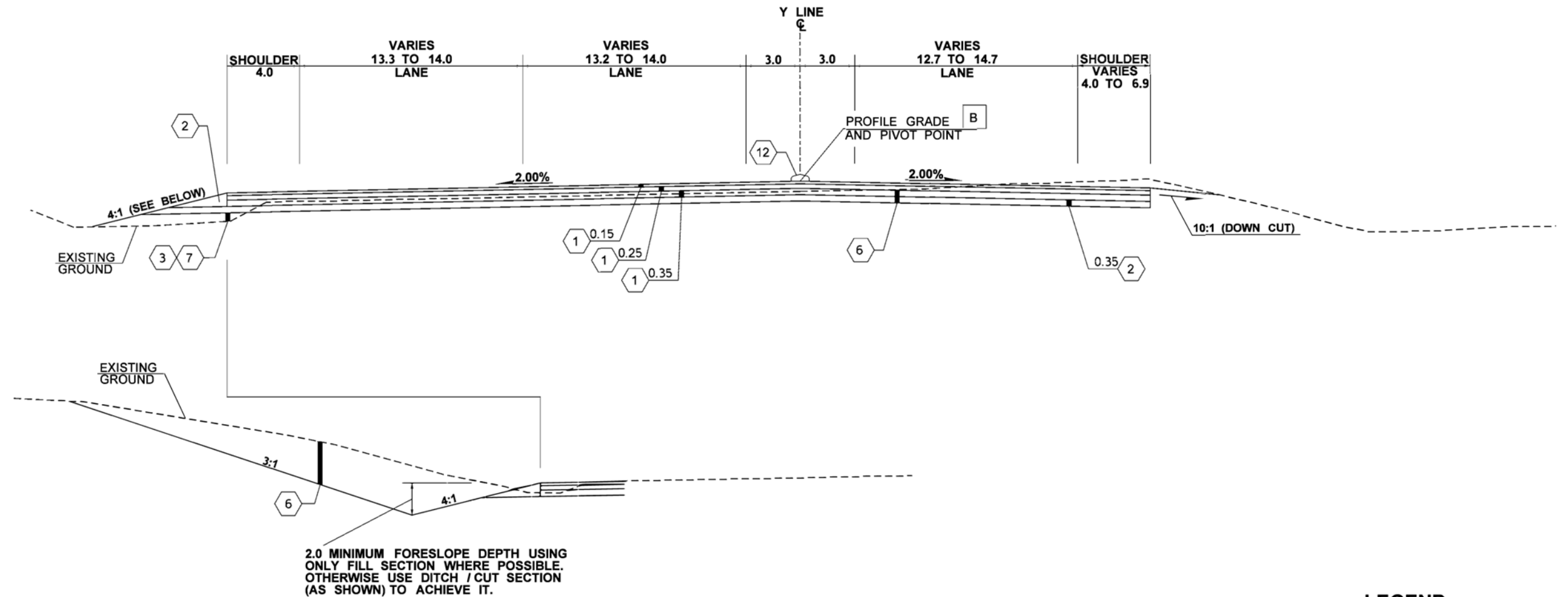
- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL. HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
- 6 ROADWAY EXCAVATION INCL. HAUL
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- 8 PLANING BITUMINOUS PAVEMENT
- 9 COMMERCIAL HMA
- 10 PERVIOUS BASE COURSE
- 11 ASPHALT FOR FOG SEAL
- 12 PRECAST DUAL FACED SLOPED MOUNTABLE CURB
- 13 PERVIOUS HOT MIX ASPHALT

FILE NAME T:\412354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_RS.dgn										Plot 4	
TIME	10:07:27 AM				REGION NO.	STATE	FED.AID PROJ.NO.			PLAN REF NO	
DATE	5/2/2017				10	WASH				RS4	
PLOTTED BY	shartoi				JOB NUMBER		LOCATION NO.			SHEET 10 OF 170 SHEETS	
DESIGNED BY	C. PILLAR										
ENTERED BY	C. PILLAR				CONTRACT NO.						
CHECKED BY	J. KORESKE										
PROJ. ENGR.	G. NG										
REGIONAL ADM.	L. ENG				REVISION		DATE	BY			

	DATE	
P.E. STAMP BOX		

	DATE
P.E. STAMP BOX	

	SR 20 SHARPES CORNER VICINITY IMPROVEMENTS
Washington State Department of Transportation	ROADWAY SECTIONS



LEGEND

- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL. HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
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CONSTRUCTION NOTES:

B MATCH EXISTING ELEVATION FROM 40+49.12 TO 41+35.00.

GENERAL NOTES:

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ROADWAY SECTION G

Y 39+58.05 TO Y 41+35.00

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C	3.0 EXCEPT VARIES 3.0 TO 4.0 BETWEEN Y 63+19.22 AND Y 66+63.25. SEE SHEET PV2 AND PV3.
D	2.00% EXCEPT MATCH ADJACENT SUPERELEVATION (e) FROM Y 41+35.00 TO Y 44+00.00.
E	Y-LINE DISTANCE FROM EXISTING ROADWAY CROWN VARIES LEFT AND RIGHT.

DEPTH* / SLOPE TABLE				
STATION		MIN DEPTH		FORESLOPE
FROM	TO	FROM	TO	
Y 41+35.00	Y 51+45.00	2.0	2.0	4:1
Y 51+45.00	Y 51+59.00	2.0	1.5	4:1
Y 51+59.00	Y 52+27.00	1.5	1.5	4:1
Y 52+27.00	Y 54+10.00	2.0	2.0	4:1
Y 54+10.00	Y 54+55.00	1.5	1.5	4:1
Y 54+55.00	Y 59+07.00	2.0	2.0	4:1
Y 59+07.00	Y 59+31.00	1.4	1.4	4:1
Y 59+31.00	Y 59+40.00	2.0	2.0	4:1
Y 59+40.00	Y 59+79.50	N/A	N/A	4:1
Y 59+79.50	Y 60+57.50	N/A	N/A	4:1 (UP) CUT
Y 60+57.50	Y 60+88.50	N/A	N/A	4:1
Y 60+88.50	Y 61+02.50	N/A	N/A	4:1 (UP) CUT
Y 61+02.50	Y 61+75.50	N/A	N/A	4:1
Y 61+75.50	Y 62+37.50	N/A	N/A	4:1 (UP) CUT
Y 62+37.50	Y 62+45.50	N/A	N/A	4:1
Y 62+45.50	Y 62+58.50	N/A	N/A	4:1 (UP) CUT
Y 62+58.50	Y 62+92.50	N/A	N/A	4:1
Y 62+92.50	Y 63+41.00	N/A	N/A	3:1
Y 64+05.00	Y 64+67.50	N/A	N/A	4:1
Y 64+67.50	Y 65+23.50	N/A	N/A	10:1 (UP) CUT
Y 65+23.50	Y 65+70.00	N/A	N/A	4:1

* IF DEPTH TRANSITION LENGTH NOT GIVEN, USE 10 FT

GENERAL NOTES:

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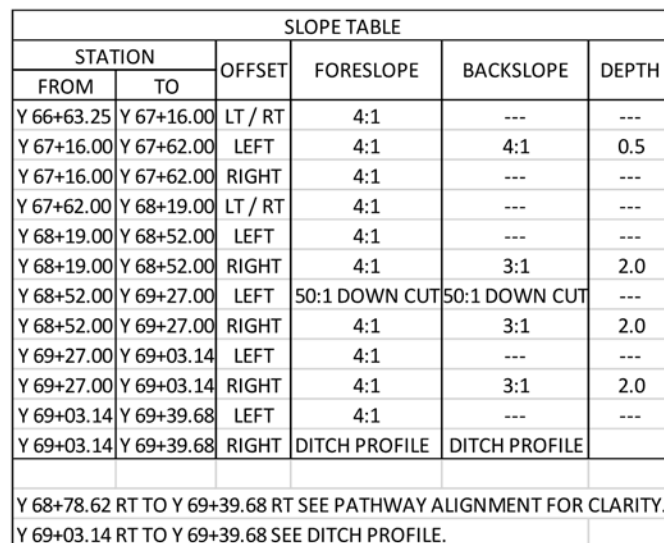
ROADWAY SECTION H

Y 41+35.00 TO Y 66+63.25

LEGEND

1	HMA CL. 1/2 IN. PG 64-22
2	CRUSHED SURFACING BASE COURSE
3	SELECT BORROW INCL. HAUL
4	CEMENT CONC. SIDEWALK
5	TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
6	ROADWAY EXCAVATION INCL. HAUL
7	EMBANKMENT COMPACTION
8	PLANING BITUMINOUS PAVEMENT
9	COMMERCIAL HMA
10	PERVIOUS BASE COURSE
11	ASPHALT FOR FOG SEAL
12	PRECAST DUAL FACED SLOPED MOUNTABLE CURB
13	PERVIOUS HOT MIX ASPHALT

[illegible]



LEGEND

- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL. HAUL
- 4 CEMENT CONC. SIDEWALK
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CONSTRUCTION NOTES:

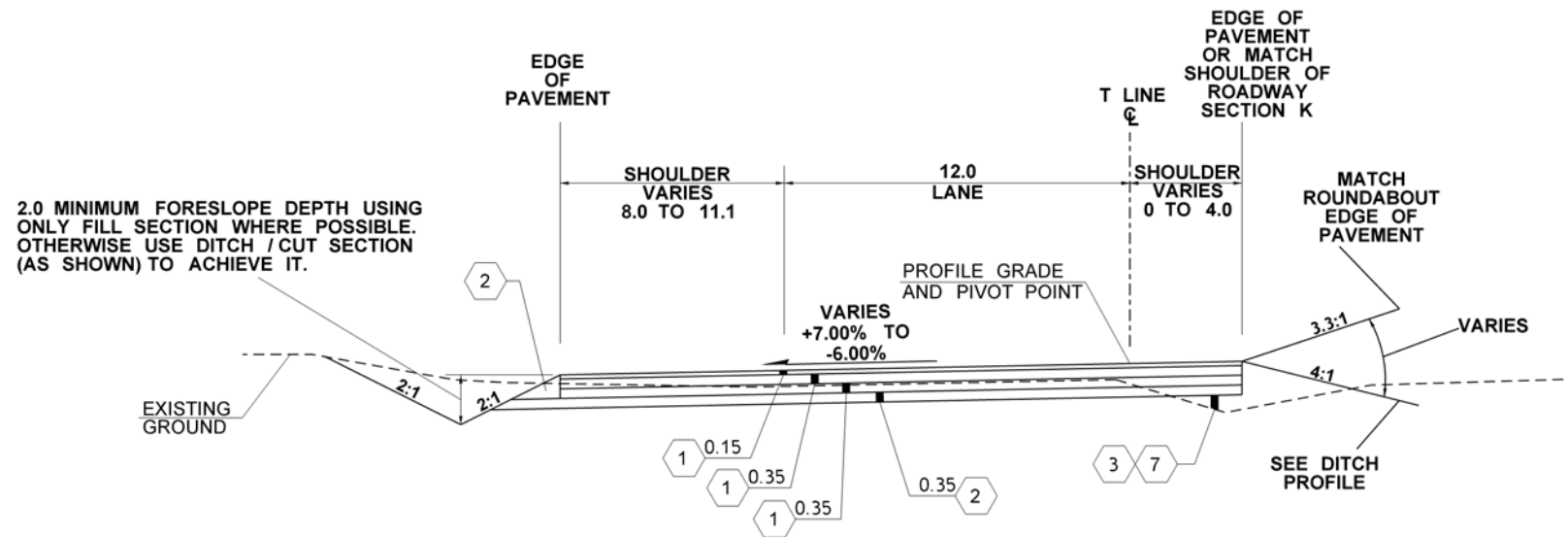
A SEE SHEET PVC SHEETS FOR ELEVATION.

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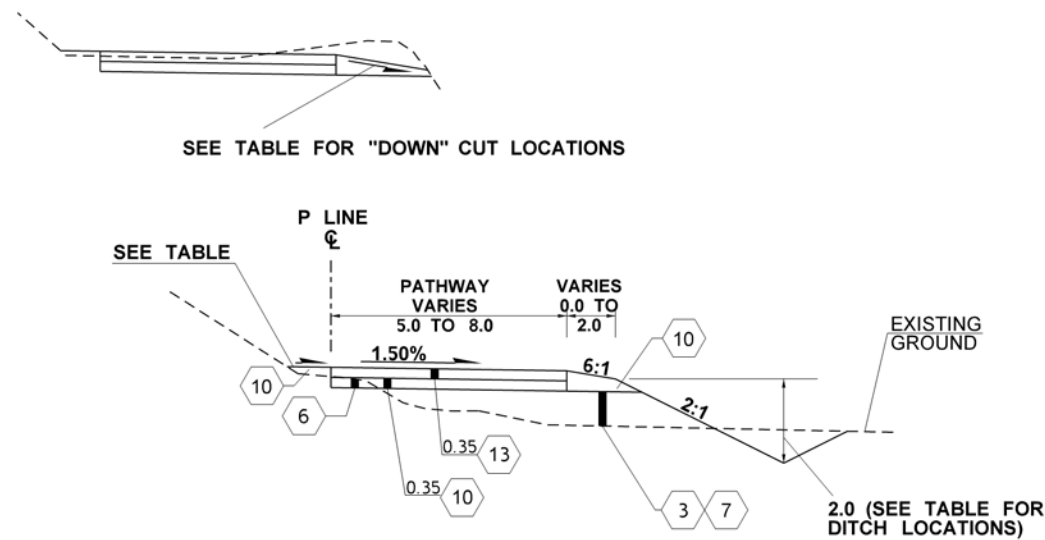
[illegible]

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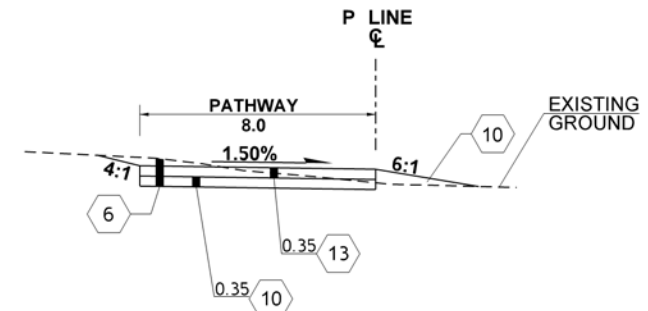


ROADWAY SECTION K
T 10+00.00 TO T 20+89.01
NORTH BYPASS LANE

SLOPE TABLE					
STATION		SLOPE		RIGHT DITCH	
FROM	TO	LEFT	RIGHT		
P 10+00.00	P 10+41.00	VARY TO MATCH DITCH	2:1	YES	
P 10+41.00	P 13+27.00	MATCH DITCH ALIGNMENT	2:1	YES	
P 13+27.00	P 13+77.50	CATCH AT ROAD EDGE OF PAVEMENT	2:1	YES	
P 13+77.50	P 15+05.50	CATCH AT ROAD EDGE OF PAVEMENT	2:1	NO	
P 15+05.50	P 15+40.50	CATCH AT ROAD EDGE OF PAVEMENT	6:1 (DOWN)	NO	
P 15+40.50	P 17+55.00	CATCH AT ROAD EDGE OF PAVEMENT	2:1	NO	
P 17+55.00	P 18+38.00	50:1	2:1	NO	
P 18+38.00	P 19+24.50	50:1	2:1	YES	
P 19+24.50	P 21+95.00	50:1	2:1	NO	
P 21+95.00	P 22+20.00	2:1 (UP) CUT	2:1	NO	
P 22+20.00	P 31+18.50	50:1	2:1	NO	
P 31+18.50	P 31+71.50	50:1	6:1 (DOWN)	NO	
P 31+71.50	P 34+64.5	50:1	2:1	NO	
P 34+64.50	P 34+77.00	50:1	2:1	YES	
P 34+77.00	P 34+84.00	6:1 (UP) CUT	2:1	YES	
P 34+84.00	P 35+25.00	50:1	2:1	YES	
P 35+24.00	P 35+30.00	6:1 (UP) CUT	2:1	YES	
P 35+30.00	P 35+65.70	50:1	2:1	YES	



ROADWAY SECTION L
P 10+00.00 TO P 35+65.70
PATHWAY BETWEEN SHARPES CORNER AND MARCHES POINT RD



CUT (4:1) / FILL (6:1) SHOWN ABOVE MAY APPLY ON EITHER SIDE (SEE CUT / FILL LINES)

ROADWAY SECTION M
P 40+00.00 TO P 42+20.14
PATHWAY CONNECTION TO SOUTH FIDALGO BAY ROAD

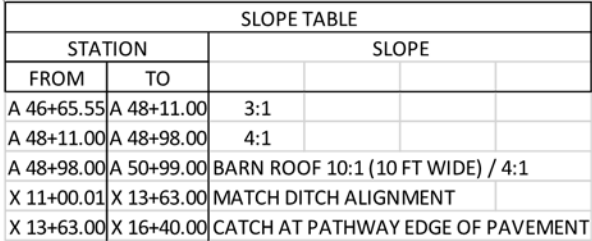
GENERAL NOTES:

1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED AND COURSES SHALL NOT EXCEED THE DEPTHS DEFINED IN THE STANDARD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
3. GP = GRADE AND PIVOT POINT. ROADWAY SECTIONS THAT INCLUDE GP DO NOT USE VERTICAL ALIGNMENT PROFILES OR SUPERELEVATION DIAGRAMS. FOR THOSE ROADWAY SECTIONS, THE ELEVATION, SUPERELEVATION, AND HORIZONTAL LOCATION ARE CONTROLLED BY THE PAVING CONTROL (PVC) SHEETS.
4. SEE PV SHEETS FOR CURB TYPE AND LOCATION.
5. SEE PV SHEETS FOR BARRIER AND GUARDRAIL TYPES AND LOCATIONS.

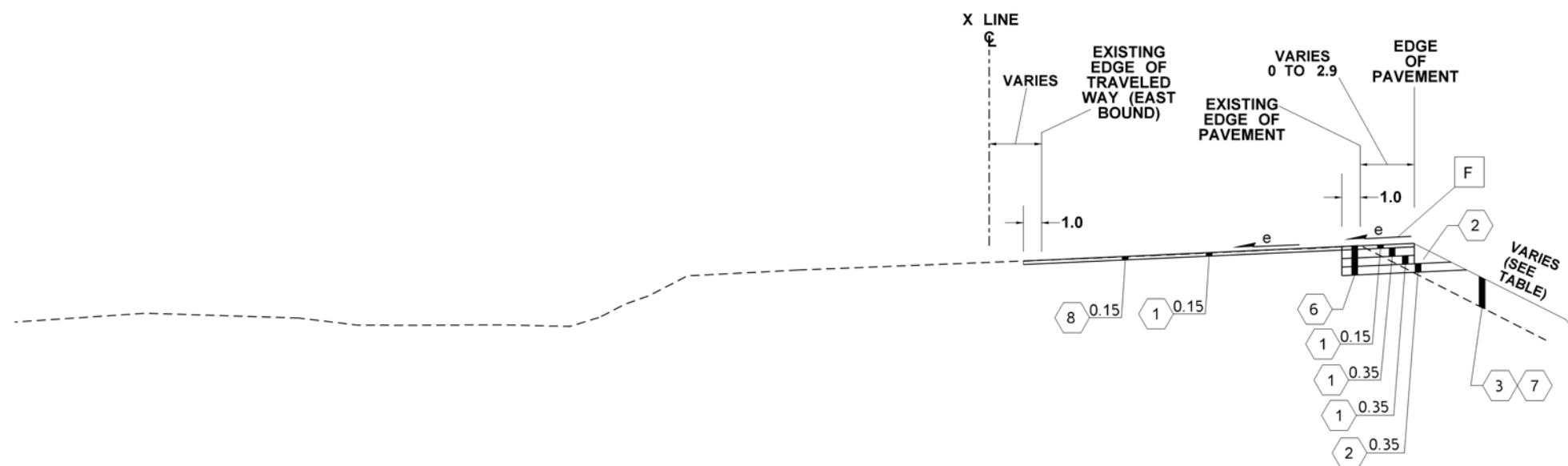
LEGEND

- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL. HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
- 6 ROADWAY EXCAVATION INCL. HAUL
- 7 EMBANKMENT COMPACTION
- 8 PLANING BITUMINOUS PAVEMENT
- 9 COMMERCIAL HMA
- 10 PERVIOUS BASE COURSE
- 11 ASPHALT FOR FOG SEAL
- 12 PRECAST DUAL FACED SLOPED MOUNTABLE CURB
- 13 PERVIOUS HOT MIX ASPHALT

FILE NAME T:\412354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_RS.dgn												 Washington State Department of Transportation		SR 20 SHARPES CORNER VICINITY IMPROVEMENTS ROADWAY SECTIONS		Plot 9
TIME 10:07:57 AM				REGION NO. 10	STATE WASH	FED.AID PROJ.NO.	PLAN REF NO RS9									
DATE 5/2/2017				JOB NUMBER												
PLOTTED BY shartoi																
DESIGNED BY C. PILLAR																
ENTERED BY C. PILLAR																
CHECKED BY J. KORESKI																
PROJ. ENGR. G. NG						CONTRACT NO.		LOCATION NO.								
REGIONAL ADM. L. ENG				REVISION		DATE	BY									



FILE NAME T:\42354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_RS.dgn																Plot 10	
TIME	10:08:02 AM					REGION NO.	STATE	FED.AID PROJ.NO.				SR 20 SHARPES CORNER VICINITY IMPROVEMENTS		PLAN REF NO			
DATE	5/2/2017					10	WASH							RS10			
PLOTTED BY	shartoi					JOB NUMBER						ROADWAY SECTIONS		SHEET 16 OF 170 SHEETS			
DESIGNED BY	C. PILLAR																
ENTERED BY	C. PILLAR																
CHECKED BY	J. KORESKE					CONTRACT NO.		LOCATION NO.									
PROJ. ENGR.	G. NG																
REGIONAL ADM.	L. ENG																
REVISION					DATE	BY											
						P.E. STAMP BOX		DATE		P.E. STAMP BOX							



SLOPE TABLE					
STATION		SLOPE			
FROM	TO				
X 16+40.00	X 17+82.00	CATCH AT PATHWAY EDGE OF PAVEMENT			
X 17+82.00	X 19+08.17	2:1			

ROADWAY SECTION O
(EAST CONNECTING LEG OF ROUNDABOUT)
X 16+40.00 TO X 19+08.17

CONSTRUCTION NOTES:

F MATCH ADJACENT SUPERELEVATION (e)

GENERAL NOTES:

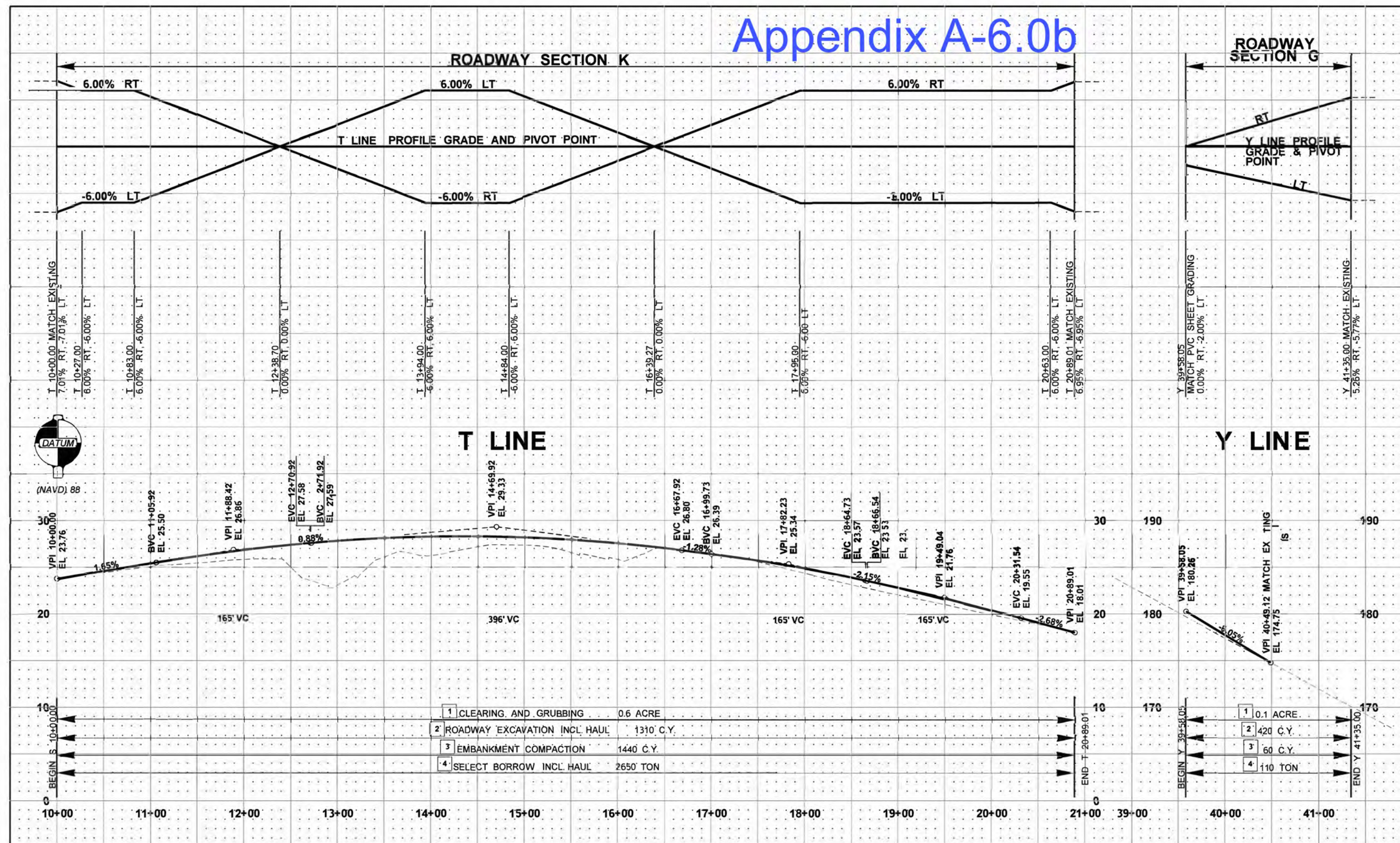
1. ALL SURFACING AND PAVING DEPTHS ARE COMPACTED AND COURSES SHALL NOT EXCEED THE DEPTHS DEFINED IN THE STANDARD SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
3. GP = GRADE AND PIVOT POINT. ROADWAY SECTIONS THAT INCLUDE GP DO NOT USE VERTICAL ALIGNMENT PROFILES OR SUPERELEVATION DIAGRAMS. FOR THOSE ROADWAY SECTIONS, THE ELEVATION, SUPERELEVATION, AND HORIZONTAL LOCATION ARE CONTROLLED BY THE PAVING CONTROL (PVC) SHEETS.
4. SEE PV SHEETS FOR CURB TYPE AND LOCATION.
5. SEE PV SHEETS FOR BARRIER AND GUARDRAIL TYPES AND LOCATIONS.

LEGEND

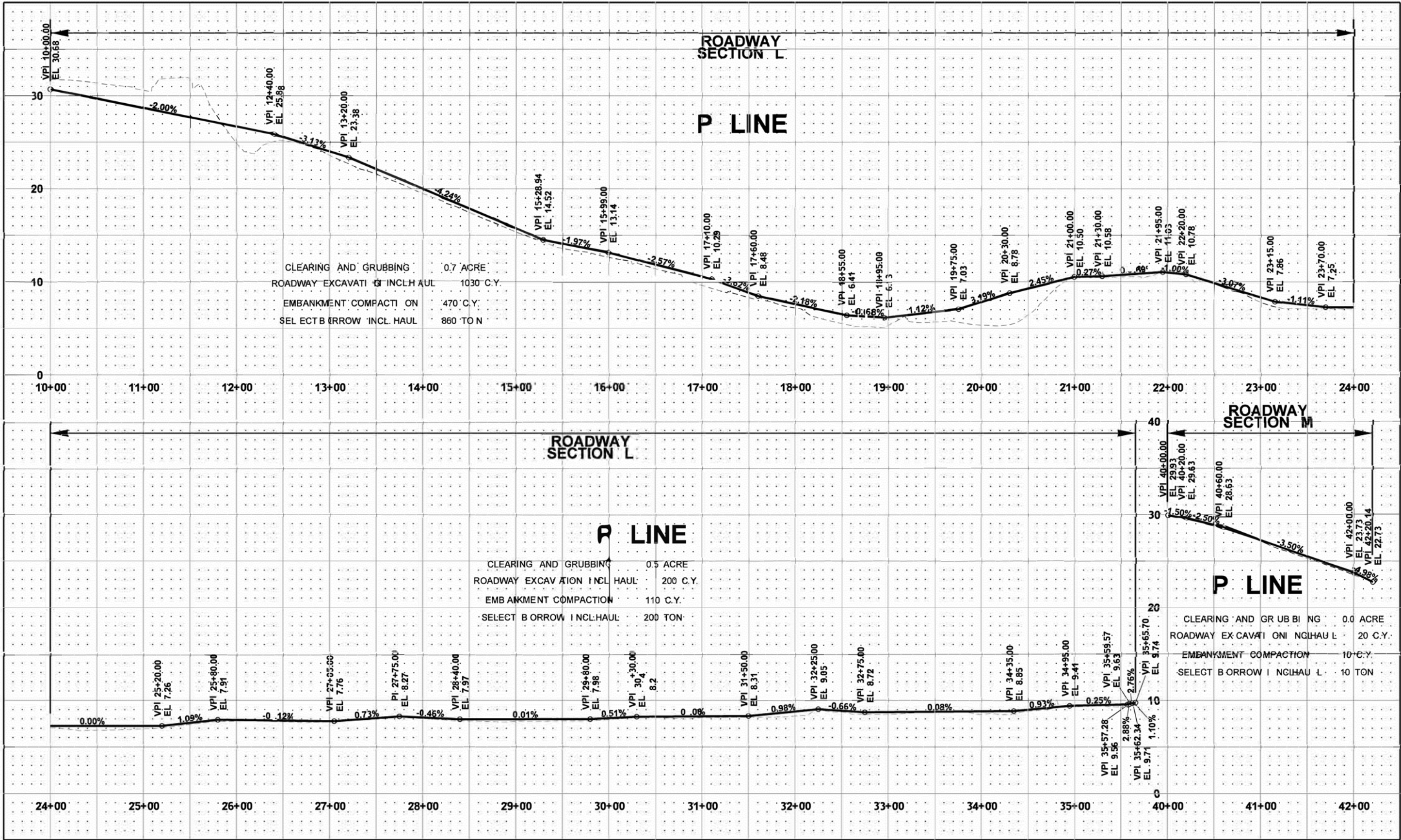
- 1 HMA CL. 1/2 IN. PG 64-22
- 2 CRUSHED SURFACING BASE COURSE
- 3 SELECT BORROW INCL HAUL
- 4 CEMENT CONC. SIDEWALK
- 5 TEXTURED AND PIGMENTED CEMENT CONCRETE PAVEMENT
- 6 ROADWAY EXCAVATION INCL. HAUL
- 7 EMBANKMENT COMPACTION
- 8 PLANING BITUMINOUS PAVEMENT
- 9 COMMERCIAL HMA
- 10 PERVIOUS BASE COURSE
- 11 ASPHALT FOR FOG SEAL
- 12 PRECAST DUAL FACED SLOPED MOUNTABLE CURB
- 13 PERVIOUS HOT MIX ASPHALT

FILE NAME T:\412354\XL4998_Sharpes\CAD\ContractPlans\XL4998_PS_RS.dgn										REGION NO. STATE		FED.AID PROJ.NO.						SR 20 SHARPES CORNER VICINITY IMPROVEMENTS		Plot 11	
TIME 10:08:09 AM								PLAN REF NO													
DATE 5/2/2017								10 WASH								RS11					
PLOTTED BY shartoi								JOB NUMBER								SHEET					
DESIGNED BY C. PILLAR								CONTRACT NO.		LOCATION NO.						17					
ENTERED BY C. PILLAR																OF					
CHECKED BY J. KORESKI																170					
PROJ. ENGR. G. NG																SHEETS					
REGIONAL ADM. L. ENG		REVISION		DATE		BY															

Appendix A-6.0b

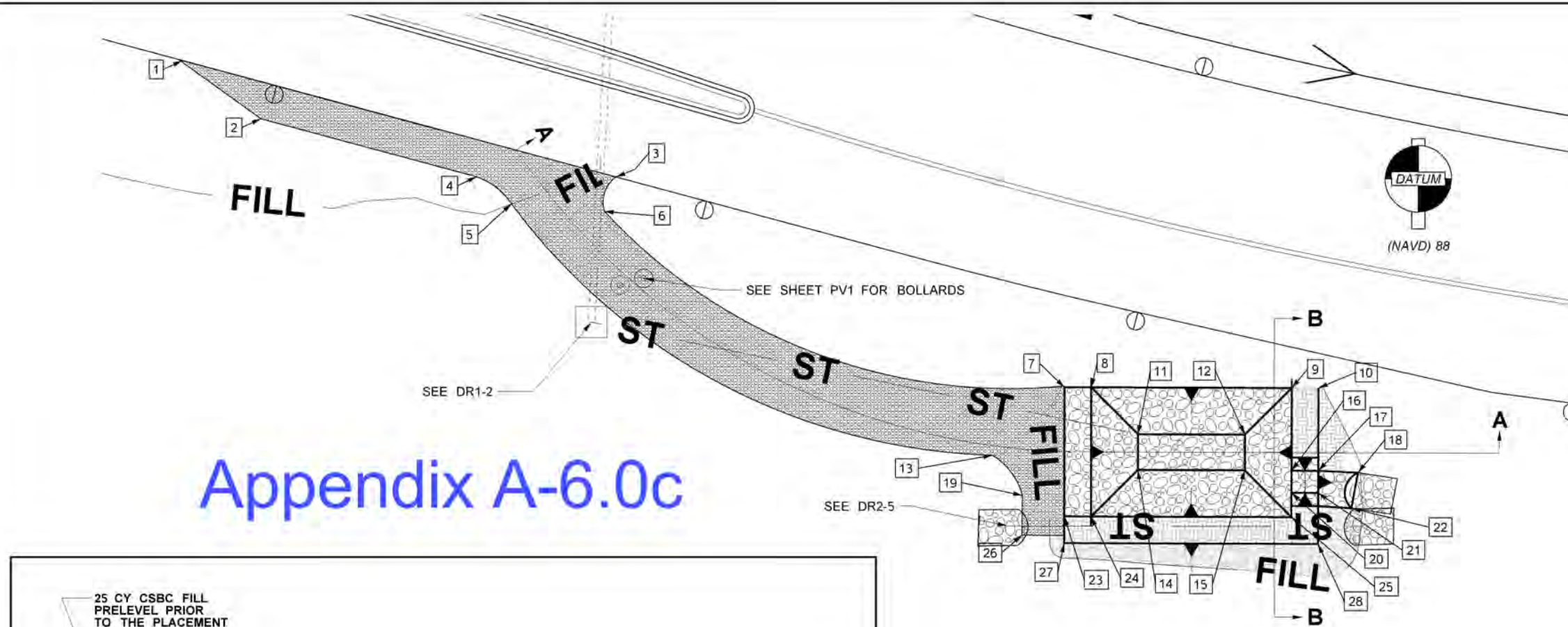


FILE NAME T:\412354\XL4998_Sharpest\CAD\ContractPlans\XL4998_PS_RP.dgn																Plot 1			
TIME 10:35:36 AM						REGION NO.		STATE		FED.AID PROJ.NO.				 Washington State Department of Transportation		SR 20 SHARPES CORNER VICINITY IMPROVEMENTS		PLAN REF. NO.	
DATE 5/2/2017						10 WASH		RP1											
PLOTTED BY shartoi								JOB NUMBER										SHEET	
DESIGNED BY C. PILLAR																		37	
ENTERED BY C. PILLAR																		OF	
CHECKED BY J. KORESKE																		170	
PROJ. ENGR. G. NG										CONTRACT NO.		LOCATION NO.						SHEETS	
REGIONAL ADM. L. ENG																			
REVISION				DATE		BY													



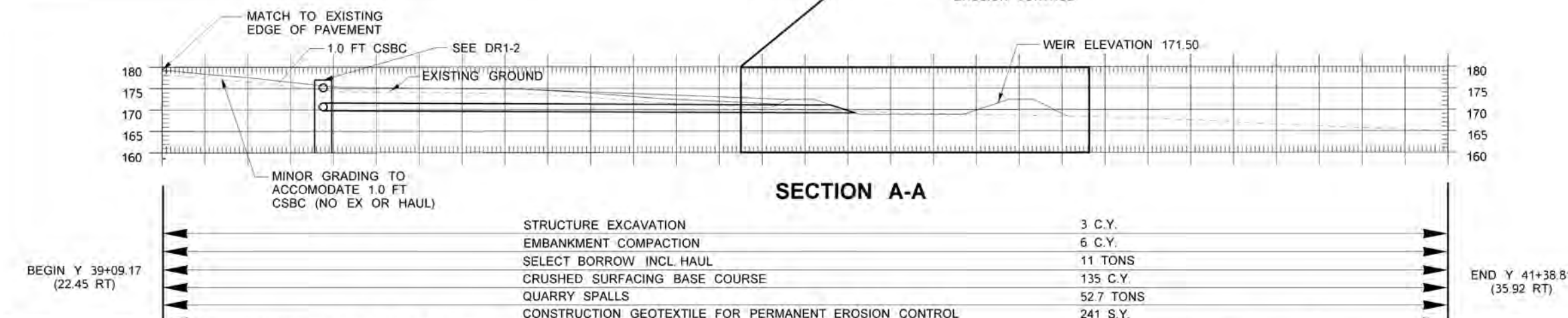
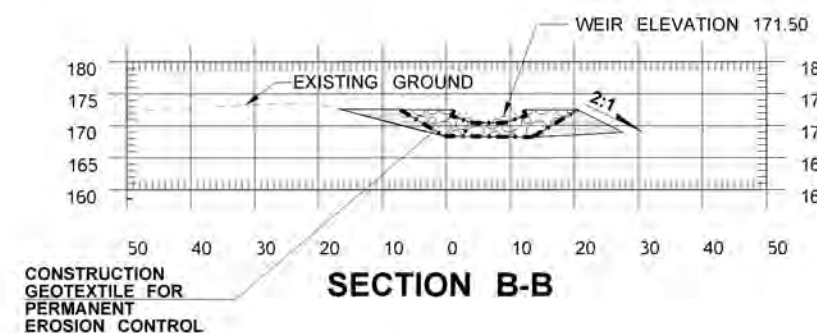
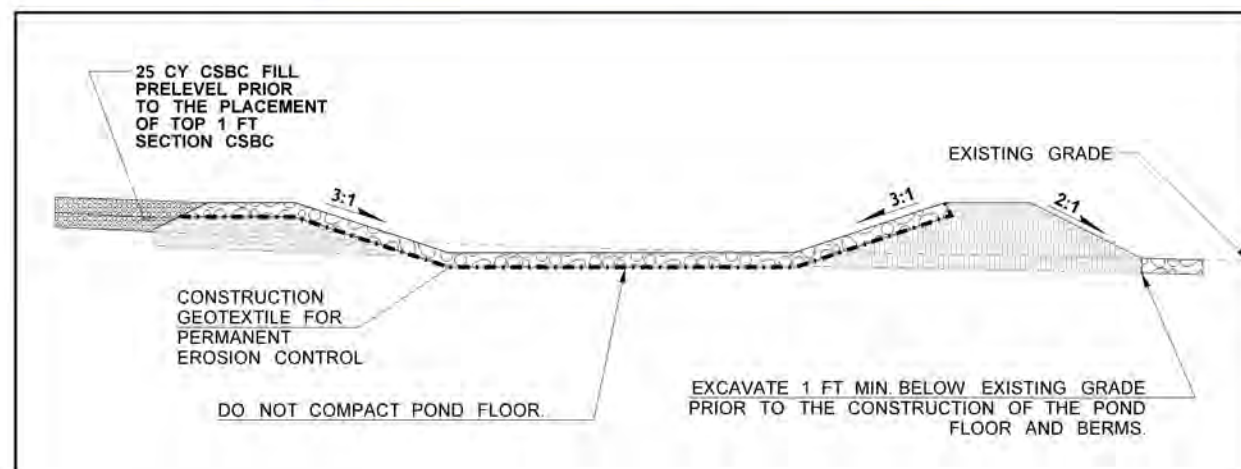
FILE NAME T:\412354\XL4998 Sharpes\CAD\ContractPlans\XL4998 PS RP.dgn		REGION NO. 10		STATE WASH	FED.AID PROJ.NO.					SR 20 SHARPES CORNER VICINITY IMPROVEMENTS		Plot 2
TIME 10:35:42 AM						DATE		DATE		ROADWAY PROFILES		PLAN REF. NO. RP2
DATE 5/2/2017						P.E. STAMP BOX		P.E. STAMP BOX				SHEET 38
PLOTTED BY shartoi												OF 170
DESIGNED BY C. PILLAR												SHEETS
ENTERED BY C. PILLAR												
CHECKED BY J. KORESKI												
PROJ. ENGR. G. NG												
REGIONAL ADM. L. ENG	REVISION	DATE	BY	CONTRACT NO.	LOCATION NO.							

Appendix A-6.0c



POINT TABLE *			
POINT NUMBER	STATION	OFFSET	ELEVATION
1	Y 38+37.82	35.54 RT	187.08
2	Y 38+59.34	40.40 RT	183.99
3	Y 39+36.37	24.01 RT	181.62
4	Y 39+07.61	34.61 RT	181.4
5	Y 39+16.80	37.58 RT	179.89
6	Y 39+36.44	32.20 RT	179.84
7	Y 40+43.42	40.79 RT	172.50
8	Y 40+49.06	39.39 RT	172.50
9	Y 40+91.75	29.80 RT	172.50
10	Y 40+97.54	28.64 RT	172.50
11	Y 40+61.20	47.25 RT	169.00
12	Y 40+83.79	42.18 RT	169.00
13	Y 40+31.93	59.53 RT	170.82
14	Y 40+62.89	55.05 RT	169.00
15	Y 40+85.34	50.01 RT	169.00
16	Y 40+95.23	48.01 RT	172.50
17	Y 41+00.89	46.87 RT	172.50
18	Y 41+09.41	45.63 RT	168.03
19	Y 40+40.19	66.65 RT	170.99
20	Y 40+96.15	52.91 RT	172.50
21	Y 41+01.79	51.78 RT	172.50
22	Y 41+09.41	53.74 RT	168.77
23	Y 40+49.87	68.93 RT	172.50
24	Y 40+55.39	67.62 RT	172.50
25	Y 40+97.14	58.26 RT	172.50
26	Y 40+42.12	75.30 RT	171.06
27	Y 40+51.17	74.83 RT	172.50
28	Y 41+03.81	63.02 RT	172.50

* ELEVATION POINTS AT BOTTOM OF CSBC, TOP OF SELECT BORROW AND QUARRY SPALLS.



LEGEND	
TRIANGLE AT TOP OF SLOPE	
QUARRY SPALLS	
CONSTRUCTION GEOTEXTILE FOR PERMANENT EROSION CONTROL	
SELECT BORROW INCL. HAUL	
CRUSHED SURFACING TOP COURSE	

FILE NAME: T:\412354\XL4998_Sharpe\ICAD\ContractPlans\XL4998_PS_POD.dgn		REGION NO. 10		STATE WASH		FED.AID PROJ.NO.		DATE		DATE		Plot 1	
TIME: 8:40:15 AM		JOB NUMBER 17A020		CONTRACT NO.		LOCATION NO.		P.E. STAMP BOX		P.E. STAMP BOX		PLAN REF NO. POD1	
DATE: 7/31/2017		DESIGNED BY: C. CALHOUN		ENTERED BY: C. CALHOUN		CHECKED BY: S. SULLIVAN		PROJ. ENGR. G. NG		REGIONAL ADM. L. ENG		SHEET 66 OF 191 SHEETS	
PLOTTED BY: calhouc		REVISION		DATE		BY		Washington State Department of Transportation		SR 20 SHARPES CORNER VICINITY IMPROVEMENTS		POND DETAIL	