CITY OF FERNDALE

Public Works Department
Ferndale, Washington 98248

Grandview Sewer Extension
North Malloy Avenue to Portal Way
Preliminary Design

Wilson Engineering Project No. 2017-083

Prepared By:
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Project Description

In the 2012 Sewer Comprehensive Plan, Wilson Engineering identified alternatives for extending sewer service to the Grandview and Portal Way area of the City and UGA. The City of Ferndale selected one of these alternatives for further development. The selected alternative would extend sewer north on Malloy Avenue to Brown Road, east a short distance on Brown Road to Portal Way, and then northwest on Portal way to the City limits north of Grandview Road. See attached Sheet C1.1.

The proposed sewer extension will include approximately 10,000-feet of gravity sewer, 10,000-feet of sewer forcemain, three sewer pump stations, one crossing of BNSF railroad right-of way (ROW), and one 675-foot boring for sewer installation.

The proposed sewer extension will provide capacity to serve the areas shown in Exhibit B-3 in the Comprehensive Sewer Plan (2017): Grandview West, most of Grandview East, North Malloy west of Interstate 5, Brown, and Aldergrove East. These service areas are described herein as ULID #10 west of I-5, ULID #10 east of I-5, ULID #9 and all the UGA west of Portal Way and Malloy Avenue. The proposed sewer extension will provide immediate service (without further extensions) to ULID #10 west of I-5 and in the City Limits, ULID #9, and all the UGA west of Portal Way and Malloy Avenue. All areas east of Malloy Avenue (except those adjacent to Brown road) are downslope from Malloy Avenue and thus will require pump stations in order to connect to the extended sewer. These pump stations would likely be paid for by property developers, but could be city-owned or residence-owned (e.g., grinder pumps).

This report presents preliminary plans, criteria, and estimated costs for proposed sanitary sewer extension. Attachments to this report include: a map of improvements and service areas, preliminary plan and profile sheets for the sewer extension, a road cross-section showing typical pipe placement, utility crossing details, and detailed construction cost estimates.

Background and Related Projects

The original proposed alternatives included an upgrade in the size of the 8-inch sewer pipe traversing south from Thornton Road and west of Malloy Avenue. This route was abandoned in favor of a new route, which will be installed east along Thornton Road to near Interstate 5 (I-5) and south along I-5 to the Portal Way roundabout at I-5 (this 4,300-foot sewer line is currently under design as a separate project [2017] and is no longer part of the Grandview Sewer extension project).

The existing sewer at the Portal Way roundabout is a 17-inch gravity sewer line which has capacity for approximately 2,900 GPM. It currently receives about 400 GPM intermittently from PS#16. By 2037, it may receive up to 2,900 GPM combined flow from the Grandview sewer extension, Malloy Avenue, and an upgraded PS#16.

Future Additional Extensions

Three additional future sewer extensions are also described herein.

1. The most likely additional sewer extension to occur is west along Grandview to Salashan Parkway. This extension includes 1,700 LF of 10-inch sewer main. This route is in the SR 548 ROW and thus requires a franchise agreement with WSDOT. It includes one crossing under BNSF ROW and thus requires a franchise agreement with BNSF. See exhibit *Grandview Sewer Extension – Future Additions.*

2. A sewer extension to the business park area northeast of I-5 may be implemented sometime in the future. This extension would require 4,300 LF of 8-inch forcemain, a pump station and 1,225 LF of 10-inch gravity sewer. This extension requires a crossing of I-5 and thus requires a franchise agreement with WSDOT. Whatcom County will need to be involved in this project because part of Atwood Road is owned by Whatcom County. Part of this service area is in the city limits and part of it is currently in the UGA. See exhibit *Grandview Sewer Extension – Future Additions.*

3. A sewer extension north of the city limits could include up to approximately 4,000 LF of 8-inch gravity sewer along Portal Way. This potential service area is outside the city limits but within the UGA.

Derivation of Design Flows

Design flows for gravity sewer piping and forcemain sewer piping are for the buildout planning horizon (Year 2060). Design flows for sewer pump stations are for the 20-year planning horizon (per the Department of Ecology Criteria for Sewage Works Design). City of Ferndale Planning Department population projections for Year 2034 were used to estimate flows for the 20-year planning horizon (Year 2037). The projected 2060 flows were estimated by doubling the projected 2034 flows. Peak Hour Flow (which is the design basis) is calculated by multiplying Average Daily Flow by a peaking factor of 4.0. See Table 1 and Table 2 below.

Table 1. Basis of Flow Calculations

Land Use	Units	Average Daily Flow Per Unit (GPD)
Single-Family Housing	House	250
Service Business	Employee	100
Manufacturing	Employee	25
Retail Business	Employee	250
Wholesale Business	Employee	25
Construction Business	Employee	25

Table 2. Projected Sewer Flows

Source Area	Average Daily Flow 2037 (GPD)	Peak Hour Flow 2037 (GPM)	Average Daily Flow 2060 (GPD)	Peak Hour Flow 2060 (GPM)
ULID #10 East	28,800	80	50,400	140
ULID #10 West	146,160	406	259,920	722
Commercial Zone West of Portal Way	88,200	245	156,960	436
ULID #9	15,840	44	27,360	76
Urban Reserve West of Malloy	79,200	220	140,400	390
Total	**358,200**	**995**	**635,040**	**1,764**

Design Criteria and Standards

Design standards are contained in the current City of Ferndale development standards. General sewer system design standards are contained the Washington State Department of Ecology Criteria for Sewage Works Design (Publication # 98-37 WQ).

Pump station equipment (pumps, starters, etc.) are sized for the 2037 flows. All other infrastructure are sized for 2060 flows. See Table 3 below for pump station design flows and pressures.

Table 3. Pump Station Design Flows and Design Head

Collection Point	Projected Flows Year 2037	Static Head	Total Dynamic Head
	GPM	**feet**	**feet**
Portal Way Pump Station	895	60	125
Malloy Pump Station – North	980	30	40
Malloy Pump Station - South	995	30	40

BNSF Utility Franchise Criteria

Full criteria are described in Burlington Northern Santa Fe Utility Accommodation Policy, May 18, 2011. The following select excerpts constitute the basic preliminary design criteria:

1. General

b. All utility crossings under ditches and railroad trackage should have a minimum depth of cover of three (3) feet below the flow line of the ditch or ground surface and five and one-half (5-1/2) feet from base of rail. In fill sections, the natural ground line at the toe of slope will be considered as ditch grade.

c. For all boring and jacking installations under main and passing tracks, greater than 26 inches in diameter, and at a depth of between 5.5 and 10.0 feet below top of tie, a geotechnical study will need to be performed to determine the presence of granular material and/or high water table elevation, at the sole expense of the Permittee.

2. General Design and Construction Requirements

c. Underground installations may be made by open-trenching from the property line to the toe of the fill slope in fill sections and to the toe of the shoulder slope in cut sections but to no closer than thirty (30) feet of the centerline of track. The remainder will be tunneled, augured, jacked or directional-bored through the roadbed. Refer to the following sections for required encasement of utilities and boring requirements.

d. Manholes should be located outside railroad property, when possible. No manhole will be located in the shoulder, shoulder slope, ditch or backslope, or within twenty-five (25) feet of the centerline of track, and shall not protrude above the surrounding ground without approval of BNSF.

f. Jacking/boring pits shall be located a minimum of thirty (30) feet from the centerline of track, and kept to the minimum size necessary.

3. Pipeline Requirements

c. Pipelines under railroad tracks and across railroad property shall be encased in a larger pipe or conduit called "casings." Generally, casings shall extend from right-of-way line to right-of-way line, unless otherwise approved.

WSDOT Utility Franchise Criteria

Installations shall conform to the current version of the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction. Crossing of Interstate 5 will require boring and casing installation. Installation along Grandview Road will most likely be allowed by trench and cover methods. The following excerpts constitute the basic preliminary design criteria:

Pipelines — Encasement.

(2) Casings shall be required for the following conditions:

(a) Pipeline crossings where casing is required by appropriate industry practice or special conditions.

(c) Pipeline installations where local features, embankment materials, construction methods or other conditions indicate probability of damage to the pipeline that will render it unusable.

(3) Casings may be required as protection for carrier pipe from external loads or shock during existing highway improvement projects or new highway construction.

(4) Casing pipes shall extend a minimum of six feet beyond the toe of fill slopes, or back of ditch line, or outside curb unless limited by restrictive local conditions. The casing pipe need not be continuous on freeways with or without frontage roads; however, maintenance in the median shall not be required on a routine basis.

(5) Casing pipes shall be sealed at the ends.

(6) Casing pipes shall be designed to support the load of the highway and superimposed loads thereon and, as a minimum, shall equal the structural requirements for highway drainage facilities. Casings shall be composed of materials of sufficient durability to withstand any conditions to which they may be exposed.

Pipelines—Installation.

Installation or replacement of pipelines along or crossing highways shall ordinarily be controlled by end-product specifications. However, to insure safety of traffic and preservation of the earth structure supporting the pavement, any required construction shall be in accordance with the following controls:

(1) Trenched construction and backfill. The essential features for trench and backfill construction are:

(a) Restoration of the structural integrity of entrenched roadbed.

(b) Security of the pipe against deformation likely to cause leakage.

(c) Assurance against the trench becoming a drainage channel or against drainage being blocked by the backfill.

(3) Untrenched construction shall be required on all pipeline crossings of limited access highways and:

(a) The width of untrenched construction shall extend a minimum of 6 feet outside the roadway prism.

Whatcom County Utility Franchise Criteria

The City of Ferndale currently has a general franchise agreement with Whatcom County. A new franchise agreement is not required.

Basic Criteria:
Sewers shall be located three (3) feet south and west of centerline; depth to be 36 inches minimum cover from finished grade, or 30 inches from ditch bottom or natural ground. Wherever possible, sanitary sewers proposed on existing roads shall consider locating outside road rights-of-way within separate easements. Generally, as a matter of policy, utility trenching or transverse cuts in County roads will be discouraged. They will not be permitted unless it can be shown that alternatives, such as boring or jacking or relocating outside of the paved area are unfeasible, or unless the utility can be installed just prior to reconstruction or overlay of the road.

Critical Areas

California Creek (Class 4 stream) is located within the Portal Way ROW. Whiskey Creek (Class 4 stream) or its tributaries cross Brown Road (1 location) and Malloy Avenue (3 locations). A Hydraulic Project Approval (HPA) Permit will be needed for any work within the ordinary high water mark (horizontal boring/drilling does not require an HPA permit). The stream channels are Class 4 streams.

Grandview Sewer Extension – Malloy Avenue near Oxford Court to Portal Way

This sewer extension will include approximately 10,000-feet of gravity piping and 10,000-feet of sewer forcemain using a trench-and-cover method (See attached Sheet C3.1 for road prism detail). The alignment topography requires installation of three pump stations. Sewer installation by auger-boring is proposed for approximately 675 feet on Malloy Avenue at Station 91+00 (alternatively a fourth pump station could be used).

Pump Stations
A series of three pump stations is needed to convey the wastewater from the north end of ULID #10 West to the existing 15-inch Malloy Avenue sewer located just south of Oxford Court and north of Jensen Road.

1. The Portal Way Pump Station is located at Station 0+00 (at the northern city limit)
2. Malloy Ave North Pump Station is located at Station 94+34
3. Malloy Ave South Pump Station is located at Station 109+94

A modification of this scheme would be to extend the forcemain from the Malloy Ave North Pump Station to the end of the alignment, in which case the Malloy Ave South Pump Station could be downsized to a very small pump station and could be postponed until service is needed in this stretch of Malloy Avenue (the assumption is that service is needed soon).

Each of the three pump stations will include an 8-foot diameter concrete wet well, duplex submersible pumps, valve vault, flow meter, controls, telemetry, and backup generator. According to PSE (Puget Sound Energy), the fee to connect power to the pump stations is estimated to be in the range of $20,000 per pump station. Flygt pumps were selected based on the operating parameters of each pump station (Table 3). Budgetary costs were obtained from the pump supplier Whitney Equipment.

Residential customers along Portal Way, Brown Road, and on the West side of Malloy Avenue will typically have enough elevation to allow for standard service connections to the sewer. However, most subdivisions or residences on the east side of Malloy Avenue will need to pump their sewage up to the Malloy sewer.

BNSF Railroad Crossing

The proposed alignment will cross the Burlington Northern Santa Fe (BNSF) railroad right-of-way at the Portal Way – Brown Road intersection, at STA 50+85. Approximately 100 feet of boring per pipe is anticipated for the railway crossing.

Stream and Drainage Crossings

The proposed alignment will cross Whiskey Creek at STA 52+50 on Brown Road. A new box culvert was recently installed at this location. The cost estimate assumes that the sewer will be installed under the culvert by horizontal boring. However, a trench and cover installation would be feasible with the appropriate HPA permit. See attached sheet C3.1 for a stream crossing detail.

We identified three significant Whiskey Creek channels crossing the Malloy Avenue portion of the proposed alignment. The sewer crossings for these channels/culverts should meet the requirements set forth in the *"Pipeline Separation Design and Installation Reference Guide."* The crossings are to provide a minimum 18-inch vertical separation, a casing pipe, and a CDF encasement. See attached sheet C3.1 for a culvert crossing detail. One of these crossings, at STA 110+18, is about 20 feet below the road grade. The existing 36-inch culvert needs to be replaced with a larger fish passable culvert prior to installation of the sewer line. The drainage area is approximately 325 acres and the 100-year flow is estimated at about 100 cfs. A 6-foot wide to 9-foot wide arch culvert would be appropriate for this channel.

Pavement Replacement/Restoration

Pavement disturbance should be avoided wherever possible to minimize cost and traffic disruption. The proposed alignment places the new piping beneath the south and west shoulders of the right-of-ways, however the connection near Oxford Court is at the centerline of Malloy Avenue. The proposed alignment shifts from the shoulder to the centerline at the culvert crossing at STA 110+18 due to narrowing of the ROW to 40 feet. The culvert at STA 110+18 needs to be replaced with a larger fish passable culvert prior to installation of the sewer line. The sewer will be installed at the road centerline for the 1,500 feet from this culvert to the connection to the existing 15-inch sewer near Oxford Court.

Traffic Control

The impacts to traffic will be minimized by installing the new piping in the shoulder rather than in the paved roadway (excepting STA 110+18 and south to Oxford Court). Single lane closures may be needed intermittently as work progresses in these areas. A road closure and detour will likely be needed during for construction of the replacement culvert and sewer at STA 110+18. From the culvert crossing to the connection near Oxford Court a single lane closure with full-time flagging is expected.

Capital Costs

Detailed capital costs estimates are attached at the end of this report. The estimated costs are summarized below in Table 4.

Table 4. Capital Cost for Oxford Court to Portal Way Extension

	Estimated Cost (2017 dollars)
Construction Subtotal	$5,175,000
General Project Contingency (15%)	$775,000
Sales Tax (8.7%)	$450,000
Construction Total	**$6,400,000**
Design Phase Services	$900,000
Construction Phase Services	$700,000
Grand Total	**$8,000,000**

Operations & Maintenance Costs

Estimated operation and maintenance costs for the pump stations and piping are shown below in Table 3. The staff time for the three pump stations include monthly cleanings (2 workers for 8-hours) and unexpected monthly maintenance, e.g. clogged pumps & power outages (2 workers for 8-hours). The estimated average is equal to 60 percent of projected annual power cost for 2037 flows at $0.095/KW-hr. The O&M costs are summarized in Table 5 below.

Table 5. O&M Costs

	2037 Annual Power Demand (KW-hrs)	2037 Annual Estimated Cost (2017 dollars)	Average Annual Estimated Cost[1] (2017 dollars)
Portal Way PS	83,900	$8,000	$4,800
Malloy PS – North	29,400	$2,800	$1,600
Malloy PS –South	29,900	$2,800	$1,600
Power Cost Subtotal	**143,200**	**$11,500**	**$8,000**
Labor			$15,000
Equipment/Supplies			$3,000
Total Cost			**$26,000**

1. Average cost over 20 years.

Life Cycle Costs

The life cycle costs for the project are shown in Table 5 below. The annualized capital cost is based on a 30-year period, 5 percent interest, and 3 percent inflation. Replacement costs are for those items which have less than a 30-year life expectancy. If the 675 linear feet of sewer bored from STA 87+20 to STA 93+95 is replaced with a fourth pump station, the capital cost would be about $300,000 less, but the life cycle cost would be about 1 percent higher due to higher O & M and replacement costs.

Table 6. Life Cycle Costs for Oxford Court to Portal Way Extension

	PRIMARY OPTION	4-PUMP STATION OPTION
	Annualized Cost	Annualized Cost
	(2017 dollars)	(2017 dollars)
Capital Costs (30-year period)	$355,000	$335,000
O & M Costs	$26,000	$34,000
Replacement Costs	$50,000	$65,000
Total Cost	**$431,000**	**$434,000**

FUTURE EXTENSIONS

Three additional smaller extensions may occur along with the project or sometime in the future.

1. Sewer Service to Grandview Road, West of the BNSF right-of-way to Salashan Parkway

An addition to the planned service extension to ULID #10 West has been investigated to provide sewer to the Grandview Industrial Park. The proposed service extends a 12-inch gravity sewer line from the intersection of Portal Way and Grandview Road approximately 1,500-feet along Grandview Road to Salashan Road in order to provide service to the industrial park (See exhibit *Grandview Sewer Extension – Future Additions*).

This addition will require a crossing under the BNSF railroad right-of-way. Approximately 80-feet of boring is expected at this location to cross the railway and meet the requirements set by BNSF.

Table 7. Capital Cost

	Estimated Cost (2017 dollars)
Construction Subtotal	$242,000
General Project Contingency (15%)	$36,000
Sales Tax (8.7%)	$21,000
Construction Total	**$299,000**
Design Phase Services	$45,000
Construction Phase Services	$35,000
Grand Total	**$379,000**

2. Sewer Service to ULID #10 East: Proctor Rd to Atwood Rd via I-5 Boring

An addition to the planned service extension to ULID #10 West has been investigated to provide sewer to the I-5 Industrial Park in ULID #10 East. Due to the apparent flat grade in the area an 8-inch gravity collection system is proposed to be installed within the boundary of the park that flows to a pump station that then conveys the wastewater to the Portal Way PS (See exhibit *Grandview Sewer Extension – Future Additions*).

The proposed addition will cross California Creek, which is dry in the summer months. This crossing is planned to be completed using the trench and cover method with a contingency cost in place for boring, if required by Whatcom County.

Boring is the preferred method of crossing I-5, however an alternative to boring is to cross I-5 using the Grandview Road overpass. A franchise agreement with WSDOT will be required for boring beneath I-5. Crossing I-5 using the Grandview overpass will be a more complex permitting route that involves a bridge review that will impose larger permitting fees, inspections, and time requirements.

This addition will require permitting with Whatcom County to amend the City of Ferndale's existing franchise agreement in order to include the project area. Whatcom County permitting may also include a land disturbance permit and SEPA checklist to be completed. A Hydraulic Project Approval is required by the Washington State Department of Fish and Wildlife.

Table 8. Capital Cost

	Estimated Cost (2017 dollars)
Construction Subtotal	$1,013,000
General Project Contingency (15%)	$152,000
Sales Tax (8.7%)	$88,000
Construction Total	**$1,253,000**
Design Phase Services	$180,000
Construction Phase Services	$130,000
Grand Total (rounded)	**$1,563,000**

3. Sewer extension north of the city limits

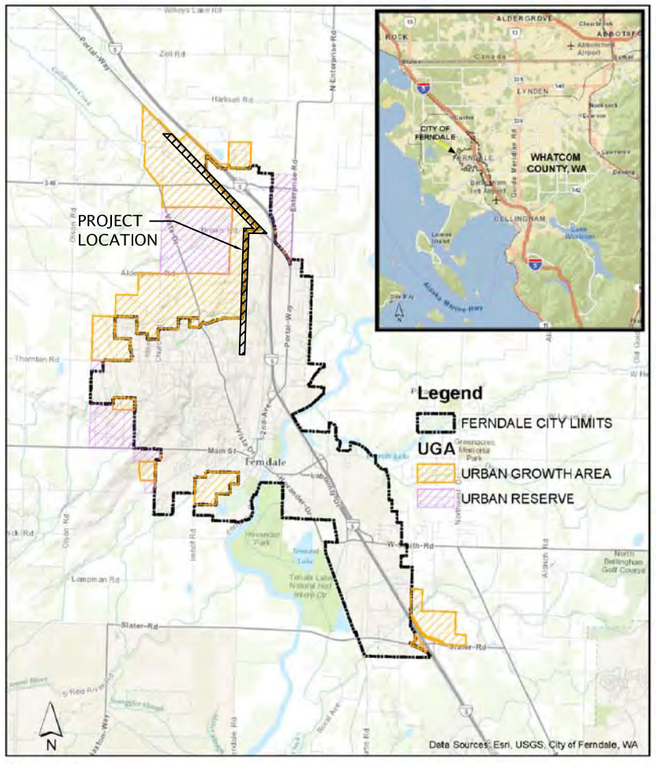
This could include up to approximately 4,000 LF of 8-inch gravity sewer along Portal Way. This potential service area is outside the city limits in the UGA. The cost for this extension if completed would likely be borne by those requesting service.

CITY OF FERNDALE, WA

GRANDVIEW SEWER EXTENSION – CITY PROJECT No. SS201_-__

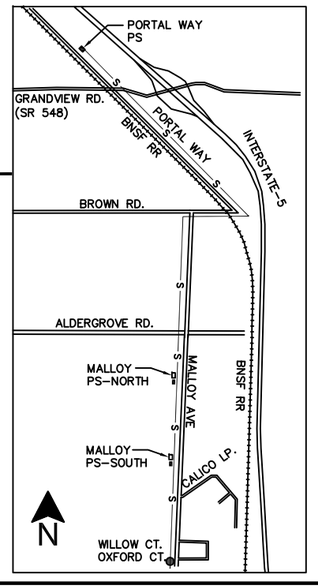
NO.	REVISIONS	BY	DATE

VICINITY MAP - NOT TO SCALE



1 inch = 1 miles

LOCATION MAP - NOT TO SCALE



GENERAL NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH CITY OF FERNDALE STANDARDS AND THE MOST CURRENT COPY OF THE STATE OF WASHINGTON STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION (WSDOT/APWA).
2. ALL APPROVALS AND PERMITS REQUIRED BY THE CITY OF FERNDALE SHALL BE OBTAINED PRIOR TO THE START OF CONSTRUCTION.
3. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO CONSTRUCTION BY CALLING THE UNDERGROUND LOCATE LINE AT 1-800-332-2344 A MINIMUM OF 2 BUSINESS DAYS PRIOR TO ANY EXCAVATION.
4. ALL NEW PLASTIC PIPE AND SERVICES SHALL BE INSTALLED WITH CONTINUOUS TRACER TAPE INSTALLED 8" TO 12" UNDER THE PROPOSED FINISHED SUBGRADE. THE MARKER SHALL BE PLASTIC NON-BIODEGRADABLE, METAL CORE OR BACKING MARKED SEWER WHICH CAN BE DETECTED BY A STANDARD METAL DETECTOR.
5. EROSION CONTROL MEASURES SHALL BE TAKEN BY THE CONTRACTOR DURING CONSTRUCTION TO PREVENT SILTATION TO EXISTING STORM DRAINAGE FACILITIES AND ROADWAYS.
6. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE A COPY OF THESE APPROVED PLANS ON CONSTRUCTION SITE AT ALL TIMES.
7. ANY CHANGES TO THE DESIGN SHALL FIRST BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER.
8. ALL LINES SHALL BE CLEANED AND PRESSURE TESTED PRIOR TO PAVING IN CONFORMANCE WITH THE ABOVE REFERENCED SPECIFICATIONS. TESTING SHALL TAKE PLACE AFTER ALL UNDERGROUND UTILITIES ARE INSTALLED AND COMPACTION OF THE ROADWAY SUBGRADE IS COMPLETED.
9. PRIOR TO BACKFILL ALL MAINS AND APPURTENANCES SHALL BE INSPECTED AND APPROVED BY THE CITY OF FERNDALE CONSTRUCTION INSPECTOR. APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FOR CORRECTION OF ANY DEFICIENCIES AND/OR FAILURES AS DETERMINED BY SUBSEQUENT TESTING AND INSPECTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE INSPECTOR FOR THE REQUIRED INSPECTIONS.
10. ALL WORK AND MATERIALS SHALL BE GUARANTEED BY THE CONTRACTOR FOR ONE YEAR AFTER FINAL ACCEPTANCE.
11. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE AND NOT ALL ARE SHOWN. THE CONTRACTOR IS RESPONSIBLE TO VERIFY AND PROTECT ALL UTILITIES.
12. ALL RESTORATION AND LANDSCAPING WITHIN PUBLIC OR PRIVATE PROPERTY SHALL OCCUR WITHIN THREE WEEKS OF DISTURBANCE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, ALL LAWNS, LANDSCAPING, FENCES, GRAVEL, ASPHALT AND CONCRETE.
13. THE CONTRACTOR SHALL KEEP A RECORD OF AS-BUILT INFORMATION THROUGHOUT THE ENTIRE PROJECT. THIS INFORMATION SHALL INCLUDE ALL DEVIATIONS FROM THE PLANS AND ANY OTHER INFORMATION NOT SHOWN ON THE PLANS AND THE LOCATION OF ALL SIDE SEWER CONNECTIONS TO THE MAIN LINE.
14. THE CONTRACTOR SHALL REPLACE ALL MONUMENTS, RIGHT-OF-WAY MARKERS, PROPERTY STAKES, ETC. THAT ARE DISTURBED DURING CONSTRUCTION. THE CONTRACTOR SHALL USE A SURVEYOR REGISTERED IN THE STATE OF WASHINGTON TO COMPLETE ALL SURVEY WORK.

EROSION AND SEDIMENTATION CONTROL

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PREVENT POLLUTION AND EROSION IN ACCORDANCE WITH WSDOT SECTION 1.07.15. EROSION CONTROL BEST MANAGEMENT PRACTICES SHALL CONFORM TO THE CURRENT WASHINGTON DEPARTMENT OF ECOLOGY STORMWATER MANAGEMENT MANUAL.

EXISTING UTILITIES

1. CONTRACTOR IS ADVISED THAT UNDERGROUND WATER, SEWER, STORM, TELEPHONE, FIBER OPTIC, AND GAS MAY BE LOCATED IN THE VICINITY OF THIS PROJECT. NO ATTEMPT WAS MADE TO SHOW ALL UTILITIES ON THE PLAN. LOCATIONS SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE. OTHER UTILITIES MAY EXIST WHICH ARE NOT SHOWN ON THE PLANS.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE TRUE AND CORRECT LOCATIONS OF EXISTING UTILITIES THAT MAY IMPACT THE WORK. CONTRACTOR SHALL NOTIFY ENGINEER PRIOR TO COMMENCING CONSTRUCTION IF MARKED UTILITIES APPEAR TO CONFLICT WITH PROPOSED IMPROVEMENTS. THE COST OF LOCATING, PROTECTING AND ACCOMMODATING EXISTING UTILITIES SHALL BE INCIDENTAL TO THE COST OF THE PROJECT. IF AN ACTUAL CONFLICT REQUIRES RELOCATION OF AN EXISTING UTILITY OR THE REDESIGN OF THE PROPOSED IMPROVEMENT, THE ENGINEER WILL DETERMINE IF EXTRA PAY IS WARRANTED TO ACCOMMODATE THE CHANGED OR UNFORESEEN CONDITION. MINOR HORIZONTAL OR VERTICAL ADJUSTMENTS OF THE PROPOSED IMPROVEMENTS TO AVOID CONFLICTS SHALL NOT ENTITLE THE CONTRACTOR TO EXTRA PAY.

TRAFFIC CONTROL

1. CONTRACTOR IS NOT ALLOWED TO COMPLETELY CLOSE ANY STREET TO TRAFFIC. THE NUMBER OF OPEN LANES OF TRAFFIC TO BE MAINTAINED IN EACH AREA IS ONE LANE. TRAFFIC SHALL BE MAINTAINED ACCORDING TO WSDOT SECTION 1-07.23, AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

SPECIFIC NOTES

1. FORCEMAIN CLEANOUTS AND AIR-VACUUM RELIEF VALVES NOT SHOWN.
2. ALL EXISTING FEATURES ARE SHOWN AT APPROXIMATE LOCATIONS ONLY.

CONTROL NOTES

INDEX TO DRAWINGS

CALL TWO BUSINESS DAYS BEFORE YOU DIG 1-800-424-5555 UTILITIES UNDERGROUND LOCATION CENTER

NOT FOR CONSTRUCTION

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Wilson SURVEY/ENGINEERING

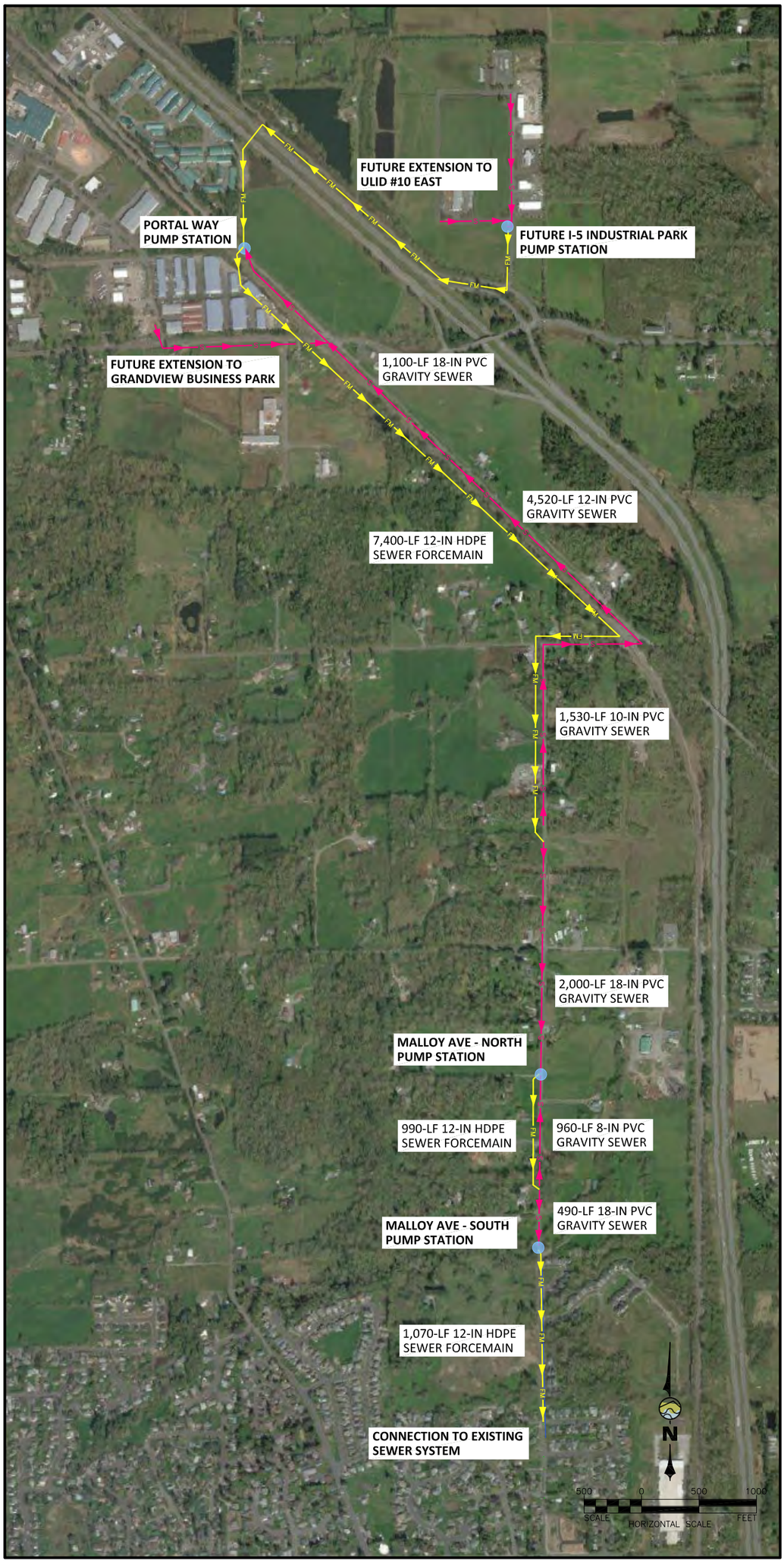
DESIGNED BY ROG | DRAWN BY ROG | CHECKED BY AWL

CITY OF FERNDALE
FERNDALE WASHINGTON
GRANDVIEW SEWER EXTENSION
COVER SHEET

DATE AUGUST 2017 | SCALE AS SHOWN | JOB NUMBER 2017-083

SHEET C1.1 OF C1.3

PLOT SETTINGS: Adobe PDF, Tabloid, Landscape, 1:2, WE APWA_COLOR.ctb
W:\2017\2017-083 FERNDALE GRANDVIEW SEWER EXTENSION\DWG\GRANDVIEW SEWER EXTENSION - C1.2 - OVERVIEW MAP - C3D 2016.DWG - 8/18/2017 10:11 AM - Ryan Griggs



NOT FOR CONSTRUCTION

SHEET	DATE	CITY OF FERNDALE	DESIGNED BY
C1.2	AUGUST 2017		ROG
OF	SCALE	FERNDALE WASHINGTON	DRAWN BY
C1.3	AS SHOWN	GRANDVIEW SEWER EXTENSION	ROG
	JOB NUMBER	OVERALL PROJECT MAP	CHECKED BY
	2017-083		AWL

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LEGEND & ABBREVIATIONS– SIZE & SCALE MAY VARY

EXISTING HATCH PATTERNS

DESCRIPTION
EXIST. CONCRETE
EXIST. BUILDING
EXIST. EARTH
EXIST. GRAVEL
EXIST. SAND

PROPOSED HATCH PATTERNS

DESCRIPTION
PROP. CONCRETE
PROP. TOP COURSE GRAVEL
PROP. GRAVEL
PROP. SAND
PROP. QUARRY SPALLS

SURFACE FEATURES
EXISTING PLAN LINETYPES

DESCRIPTION
BRIDGE
BUILDING LINE
BUILDING COLUMN
BUILDING OVERHANG
BULKHEAD
CONCRETE EDGE
CREEK EDGE
CROWN OF ROAD
CURB
DITCH CENTERLINE
DECK
DOCK
EDGE OF SAWCUT
EDGE OF PAVEMENT
FENCE
HIGH VISIBILTY FENCE
GATE
GRADE
GRAVEL
GUARDRAIL
JERSEY BARRIER
LAKE/POND WATER EDGE
LIP OF CURB
MISC SURFACE FEATURE
MISC TRAFFIC
PLANTER
PATH
RAILROAD
RAMP (WOOD)
RETAINING WALL
ROAD STRIPING
ROCKERY
RIVERBANK/SHORELINE
THALWAG LINE
TOP OF BANK/SLOPE
TOE OF BANK/SLOPE
VEGETATION/SHRUB LINE
WETLAND/SWAMP PERIMETER
WETLAND BUFFER

SURFACE FEATURES
PROPOSED PLAN LINETYPES

DESCRIPTION
BRIDGE
BUILDING LINE
CONCRETE
CURB
DITCH CENTERLINE
EDGE OF BIKE LANE
EDGE OF PAVEMENT
FENCE
GATE
GRAVEL
GUARDRAIL
JERSEY BARRIER
LIP OF CURB
REBAR
RETAINING WALL
ROCKERY
ROAD STRIPING

UTILITIES
EXISTING PLAN LINETYPES

DESCRIPTION
CABLE TELEVISION (AERIAL)
CABLE TELEVISION (BURIED)
SURVEILLLANCE CAMERA (BURIED
FIBER OPTIC LINE (AERIAL)
FIBER OPTIC LINE (BURIED)
TELEPHONE (AERIAL)
TELEPHONE (BURIED)
TRAFFIC SIGNAL CONDUIT LINE
POWER (AERIAL)
POWER (BURIED)
UTILITY (AERIAL)
UTILITY (BURIED)
POWER DUCT BANK (BURIED)
DRAIN FIELD
SANITARY SEWER
SANITARY SEWER (FORCE MAIN)
STORM DRAINAGE
CULVERT (@ WIDTH)
CULVERT
RECLAIMED WATER
IRRIGATION
WATER
8" WATER
OVERFLOW
STEAM
GAS
GAS TANK/STRUCTURE
OIL
AIR LINE
BURIED UTILITY APPROX. EXTENTS
MISC UTILITY (BURIED)

PROPOSED PLAN UTILITY LINETYPES
WATER

DESCRIPTION
WATER
8" WATER
IRRIGATION
RECLAIMED WATER
POTABLE WATER
WATER SERVICE
WATER STRUCTURE
FIRE DEPARTMENT CONNECTION
FIRE PROTECTION LINE

SANITARY SEWER

SEWER
8" SEWER
FORCE MAIN
DRAIN FIELD
SEWER SERVICE
SEWER STRUCTURE

STORM DRAIN

STORM DRAIN – SUBJECT PIPE
STORM DRAIN – OTHER PIPE
STORM SERVICE
FOOTING DRAIN
STORM STRUCTURE

MISC. UTILITIES

GAS
POWER
TELEPHONE/COMMUNICATIONS

GRADING

GRADE BREAK
SLOPE ARROWS

EROSION CONTROL

DESCRIPTION
EROSION TRIANGULAR SILT DIKE
EROSION CONTROL COMPOST BERM
EROSION CONTROL MINOR CONTOUR
EROSION CONTROL MAJOR CONTOUR
ORANGE BARRIER FENCE
SILT FENCE
STRAW WATTLE
EROSION CONTROL FLOWLINE
STRAW BALE
INLET PROTECTION
CHECK DAM

DEMOLITION

DESCRIPTION
SURFACE FEATURE OR UTILITY TO BE REMOVED
SAWCUT
CLEARING LIMIT
TREE OR BUSH TO BE REMOVED

SURVEY
PLAN LINETYPES

DESCRIPTION
CENTERLINE (EXISTING)
CENTERLINE (CONSTRUCTION)
CENTERLINE (PROPOSED)
CONTOUR (EXISTING MINOR)
CONTOUR (EXISTING INDEX)
HYDRO CONTOUR (EXISTING INDEX)
CONTOUR (PROPOSED INDEX)
CONTOUR (PROPOSED MINOR)
CATCHLINE
CUT LINE
DONATION LAND CLAIM (EXIST.)
EASEMENT (PROPOSED)
EASEMENT (EXISTING)
FILL LINE
MEANDER LINE
ORDINARY HIGH WATER LINE
MEAN LOW LEVEL WATER LINE
OWNERSHIP LINE
PROPERTY LINE (RECORD OR ADJACENT)
PROPERTY LINE
QUARTER SECTION LINE
RANGE/TOWNSHIP LINE
RESERVATION/PARK/FOREST (EX)
RIGHT–OF–WAY ℄ (EXISTING)
RIGHT–OF–WAY (EXISTING)
RIGHT–OF–WAY (EXISTING USED)
RIGHT–OF–WAY (PROPOSED)
RIGHT–OF–WAY (EX. RECORD) (RECORD OR ADJACENT)
RIGHT–OF–WAY (LIMITED ACCESS)
RIGHT–OF–WAY (LIMITED ACCESS)
SECTION LINE
SETBACK LINE (EXISTING)
SIXTEENTH SECTION LINE
STATE/COUNTY/CORPORATE LIMIT
VACATED RIGHT–OF–WAY
EASEMENT (RECORD)
RIGHT–OF–WAY CENTER (RECORD)
DONATION LAND CLAIM (RECORD)
MEANDER LINE (RECORD)
PARK LINE (RECORD)
SECTION LINE (RECORD)
QUARTER SECTION LINE (RECORD)
SIXTEENTH SECTION LINE (RECORD)
STATE LINE (RECORD)
RANGE LINE (RECORD)

PROFILE LINETYPES

DESCRIPTION
PROFILE EX. GRND ℄
PROFILE FINISH GRND ℄
PROFILE GRID
PROFILE VERTICAL GRID
PROFILE EX. GROUND LEFT
PROFILE EXISTING GROUND RIGHT
FIBER OPTIC PROFILE (EXISTING)
GAS PROFILE (EXISTING)
POWER PROFILE (EXISTING)
RAILROAD PROFILE (EXISTING)
SANITARY PROFILE (EXISTING)
SANITARY PROFILE (PROPOSED)
STORM PROFILE (EXISTING)
TELEPHONE PROFILE (EXISTING)
STORM PROFILE (PROPOSED)
TV PROFILE (EXISTING)
UTILITY PROFILE (EXISTING)
WATER PROFILE (EXISTING)
WATER PROFILE (PROPOSED)

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UTILITIES UNDERGROUND LOCATION CENTER

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MISC. SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		SOIL BORING
		MONITORING WELL
		TEST WELL
		TEST PIT
		EMBANKMENT
		MAIL BOX
		SIGN
		RIP RAP
		BOULDER
		SHRUB
		TREE (Conifer)*
		TREE (Deciduous)*
		STUMP–PLAN VIEW
		YARD LIGHT
		WELL
		PILE
		ROCKERY
		WHEEL STOP
		SPLASH BLOCK
		GAS METER
		GAS VALVE
		PAD MOUNTED TRANSFORMER
		POWER VAULT
		TRANSMISSION TOWER
		POWER METER
		GUY POLE
		UTILITY POLE
		UTILITY POLE ANCHOR
		TELE RISER
		CABLE RISER
		TELEPHONE VAULT
		STEAM MANHOLE
		PARKING METER
		POST

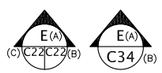
SANITARY SEWER SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		SAN. SEWER CLEAN OUT
		SAN. SEWER MANHOLE

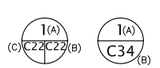
STORM DRAIN SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		STORM DRAIN CB TYPE 1
		STORM DRAIN CB TYPE 2
		STORM DRAIN CB TYPE 2 W/CB LID
		STORM DRAIN WITH OVERFLOW GRATE
		STORM DRAIN CLEAN–OUT

SECTION/DETAIL CALL–OUTS



SECTION CALL OUTS: (A) REPRESENTS THE SECTION LABEL, (B) INDICATES THE SHEET ON WHICH THE SECTION APPEARS, AND (C) INDICATES THE SHEET ON WHICH THE SECTION IS CALLED OUT.

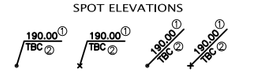


DETAIL CALL OUTS: (A) REPRESENTS THE DETAIL LABEL, (B) INDICATES THE SHEET ON WHICH THE DETAIL APPEARS, AND (C) INDICATES THE SHEET ON WHICH THE DETAIL IS CALLED OUT.

SYMBOLS

°	=DEGREES
±	=PLUS/MINUS
⌀	=DIAMETER
Δ	=DELTA
℄	=CENTERLINE
℄	=FLOWLINE
℄	=PROPERTY LINE

SPOT ELEVATIONS



① = ELEVATION
② = DESCRIPTION– SEE DEFINED ABBREVIATIONS ABOVE

DIRECTIONAL ABBREVIATIONS

N	=NORTH
NE	=NORTHEAST
E	=EAST
SE	=SOUTHEAST
S	=SOUTH
SW	=SOUTHWEST
W	=WEST
NW	=NORTHWEST

WATER SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		ARV VALVE
		GLOBE VALVE, FL
		BALL CHECK VALVE, FL
		BLOW–OFF VALVE
		SWING CHECK VALVE, FL
		BUTTERFLY VALVE, FL
		HOSE BIB/SPIGOT
		DOUBLE LEAF CHECK VALVE
		PLUG VALVE
		BALL VALVE
		FLOAT VALVE
		PINCH VALVE
		PRESSURE & VACUUM RELIEF VALVE
		VACUUM RELIEF VALVE
		PRESSURE RELIEF VALVE
		PRESSURE REGULATING VALVE (SELF CONTAINED)
		BACK PRESSURE REGULATING VALVE (SELF CONTAINED)
		IN–LINE SPRING LOADED RELIEF VALVE
		CAP/PLUG
		GUARD POST
		THRUST BLOCK
		WATER METER
		FIRE DEPARTMENT CONNECTION
		WATER VALVE
		FIRE HYDRANT
		WATER MANHOLE
		POST INDICATOR VALVE
		11–1/4 BEND, MJ–FL
		22–1/2 BEND, MJ–FL
		45 BEND, MJ–FL
		90 BEND, MJ–FL
		FLXMJ ADAPTER
		COUPLER
		BLIND FLANGE
		GATE VALVE, FLxMJ
		GATE VALVE, MJ
		REDUCER, MJxFL
		REDUCER, MJ
		TEE, FL
		TEE, MJ
		TEE, MJxFL
		TEE, FLxMJ
		CROSS, FL
		CROSS, MJ

SURVEY SYMBOLS

BRASS SURFACE MONUMENT
NAIL IN CONCRETE
REBAR & CAP

ABBREVIATIONS

AL	=ALIGNMENT
ANC	=UTILITY POLE ANCHOR
APPROX	=APPROXIMATE
ASPH or AC	=ASPHALT
ASS'Y	=ASSEMBLY
ASTM	=AMERICAN SOCIETY FOR TESTING & MATERIALS
BLDG	=BUILDING
BMP	=BEST MANAGEMENT PRACTICE
BVCS	=BEGIN VERTICAL CURVE STATION
BVCE	=BEGIN VERTICAL CURVE ELEVATION
CB	=CATCH BASIN
CK	=CHECK VALVE
C/L, ℄	=CENTERLINE
CESCL	=CERTIFIED EROSION SEDIMENT CONTROL LEAD
COL	=COLUMN
CMP	=CORRUGATED METAL PIPE
C.O.	=CLEAN OUT
CONC, C	=CONCRETE
COR	=CORNER
CPP	=CORRUGATED POLYETHYLENE PIPE
CSTC	=CRUSHED SURFACING TOP COURSE
DDCVA	=DOUBLE DETECTOR CHECK VALVE ASSEMBLY
DF	=DRAIN FIELD
DI	=DUCTILE IRON
DO	=DISSOLVED OXYGEN
DR	=DIAMETER RATIO
DS	=DOWNSPOUT
EB	=EXPLORATION BORING
EFFL	=EFFLUENT
EG	=EXISTING GRADE
ELEV, EL	=ELEVATION
EOG	=EDGE OF GRAVEL
EOP	=EDGE OF PAVEMENT
EP	=EXPLORATION PIT
EXIST, EX	=EXISTING
EVCS	=END VERTICAL CURVE STATION
EVCE	=END VERTICAL CURVE ELEVATION
FDC	=FIRE DEPARTMENT CONNECTION
FF	=FINISH FLOOR
FG	=FINISH GRADE
FL	=FLOWLINE OR FLANGE (CONNECTION)
℄	=FLOWLINE
FLC	=FLOWLINE OF CURB
FNC	=FENCE
GB	=GRADE BREAK
GMET	=GAS METER
GP	=GUY POLE
GPM	=GALLONS PER MINUTE
GRVL, G	=GRAVEL
GUTT	=GUTTER
GV	=GATE VALVE
HB	=HOSE BIB
HDG	=HOT–DIP GALVANIZED
HDPE	=HIGH DENSITY POLYETHYLENE
H:V	=HORIZONTAL:VERTICAL
HWL	=HIGH WATER LEVEL
HYD	=HYDRANT
IE	=INVERT ELEVATION
INV	=INVERT
LF	=LINEAR FEET
LUM	=LUMINAIRE
LT	=LEFT
MAX	=MAXIMUM
MB	=MAIL BOX
MBR	=MEMBRANE BIO–REACTOR
MC	=MAINTENANCE CLEANING
MFEM	=MEMBRANE FILTRATION EQUIPMENT MANUFACTURER
MFR	=MANUFACTURER
MH	=MANHOLE
MIN	=MINIMUM
MISC	=MISCELLANEOUS
MJ	=MECHANICAL JOINT
MLSS	=MIXED LIQUOR SUSPENDED SOLIDS
MW	=MONITORING WELL
NPDES	=NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
O.C.	=ON CENTER
O.C.E.W	=ON CENTER EACH WAY
OD	=OUTSIDE DIAMETER
OHP	=OVERHEAD POWER
OHT	=OVERHEAD TELEPHONE
OSHA	=OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PC	=POINT OF CURVATURE
PCC	=POINT OF CONTINUING CURVATURE
PIV	=POST INDICATOR VALVE
P/L, ℄	=PROPERTY LINE
PLC	=PROGRAMMABLE LOGIC CONTROLLER
PLTR	=PLANTER
POL	=POINT ON LINE
PROP	=PROPOSED
PS	=PUMP STATION
PSI	=POUNDS PER SQUARE INCH
PT	=POINT OF TANGENCY
PVC	=POLYVINYL CHLORIDE
PVI	=POINT OF VERTICAL INTERSECTION
PW	=POTABLE WATER
R	=RADIUS
ROK	=ROCK/BOULDER
RET	=RETAINING
REC	=RECORD
REQ'D	=REQUIRED
RI	=RAPID INFILTRATION
RPBA	=REUSE PRESSURE BACKFLOW ASSEMBLY
RR	=RAILROAD
RT	=RIGHT
R/W or ROW	=RIGHT–OF–WAY
RW	=REUSE WATER
SCADA	=SUPERVISORY CONTROL AND DATA ACQUISITION
SCH	=SCHEDULE
SDCB	=STORM DRAIN CATCH BASIN
SD	=STORM DRAIN
SDMH	=STORM DRAIN MANHOLE
SFH	=SINGLE FAMILY HOUSING
SH	=SHRUB/BUSH
SN	=SIGN
SPD	=STANDARD PROCTOR DENSITY
SPK	=SPIKE
SS	=SANITARY SEWER
SSCO	=SANITARY SEWER CLEAN–OUT
SSMH	=SANITARY SEWER MANHOLE
STA	=STATION
STEP	=SEPTIC TANK EFFLUENT PUMP
S/W	=SIDEWALK
TBC	=TOP BACK OF CURB
TBD	=TO BE DETERMINED
TBM	=TEMPORARY BENCH MARK
T.O.W.	=TOP OF WALL
TYP	=TYPICAL
UP	=UTILITY POLE
VAC	=VACATED
VC	=VERTICAL CURVE
VCI	=VOLATILE CORROSION INHIBITOR
VEG	=VEGETATION
VFD	=VARIABLE FREQUENCY DRIVE
WAS	=WASTE ACTIVATED SLUDGE
WL	=WATERLINE
WM	=WATER METER
WS	=WATER SURFACE
WSDOT	=WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
WV	=WATER VALVE
WWTP	=WASTE WATER TREATMENT PLANT
YD	=YARD DRAIN
YL	=YARD LIGHT

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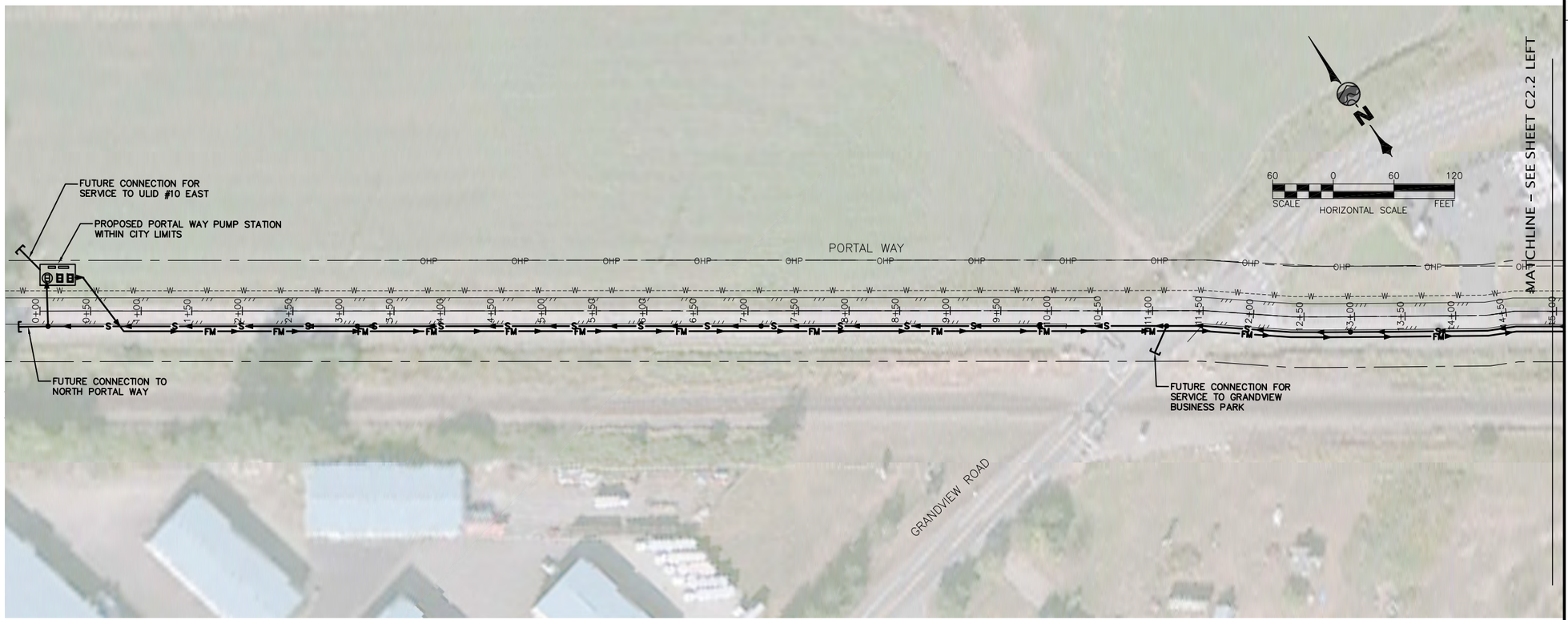
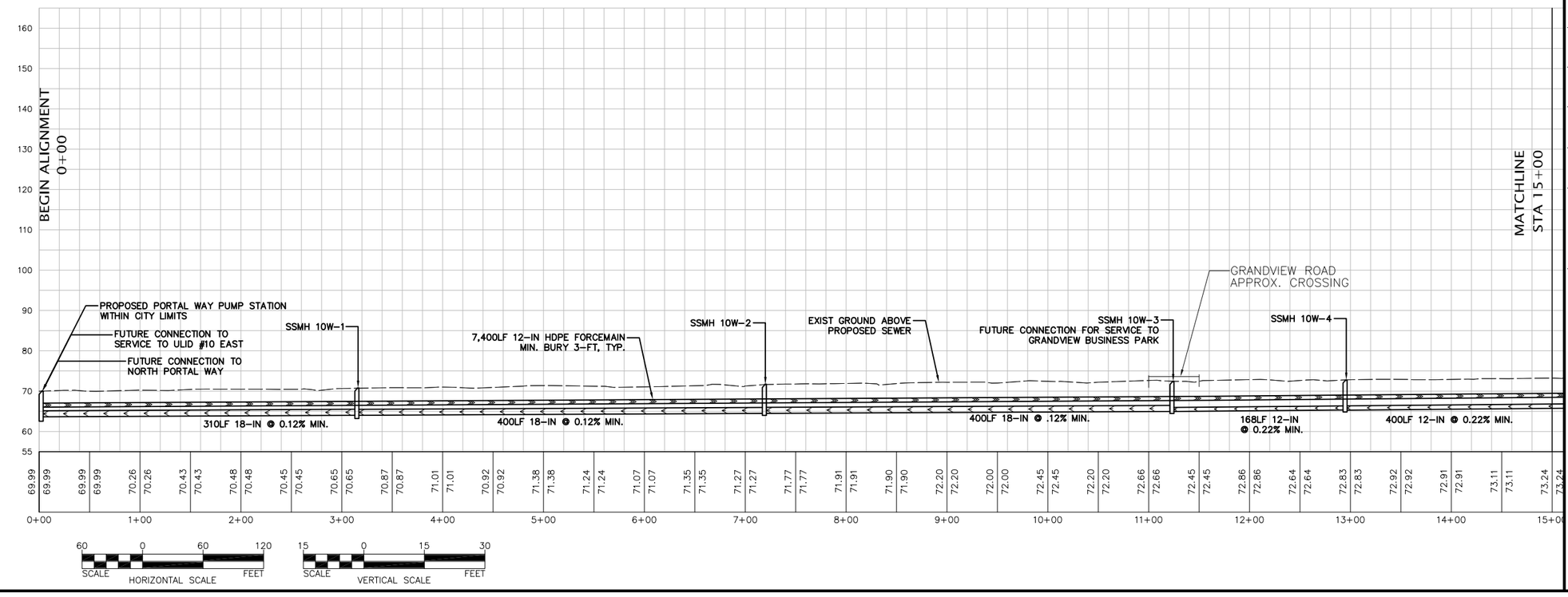
FERNDALE WASHINGTON
GRANDVIEW SEWER EXTENSION
LEGEND AND ABBREVIATIONS

DATE	SCALE	JOB NUMBER
AUGUST 2017	AS SHOWN	2017-083

SHEET C1.3 OF C1.3



NORTH PORTAL WAY



60 0 60 120
SCALE HORIZONTAL SCALE FEET

15 0 15 30
SCALE VERTICAL SCALE FEET

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DATE AUGUST 2017
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SHEET C2.1 OF C2.9

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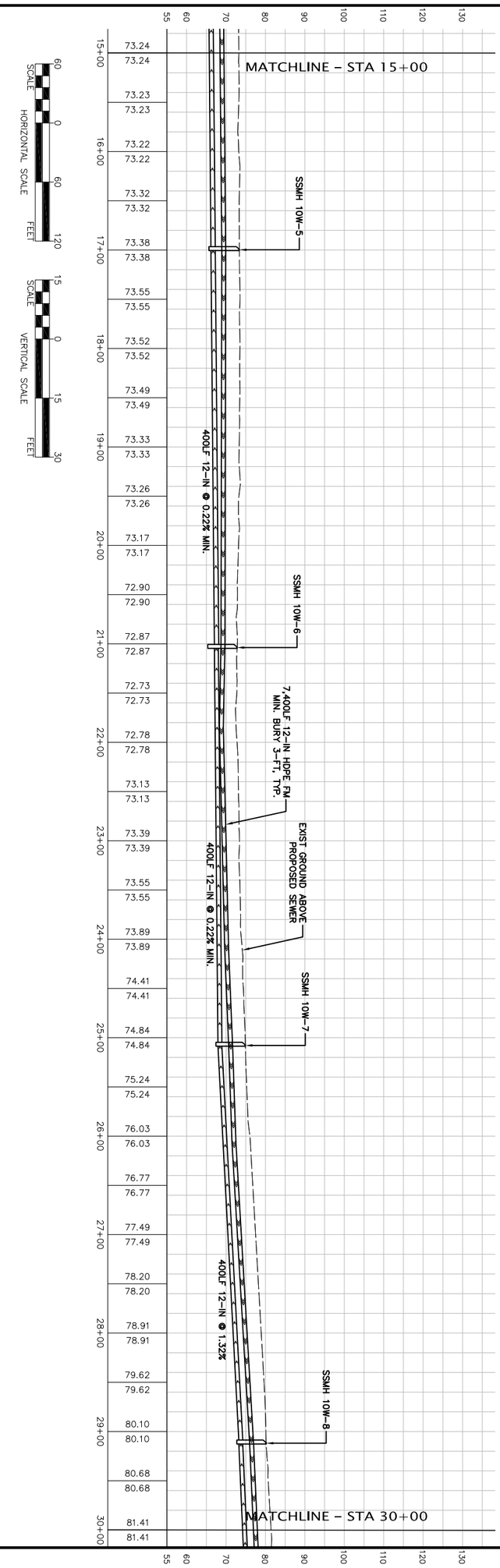

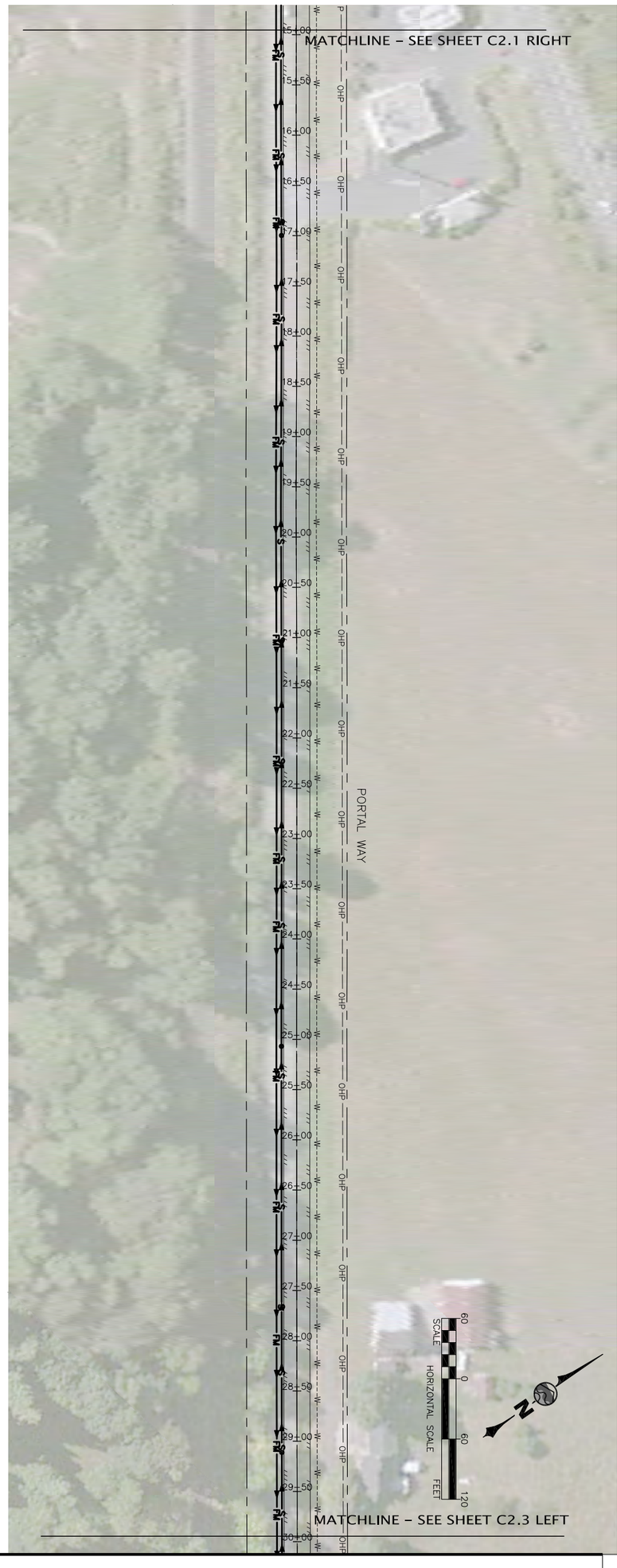

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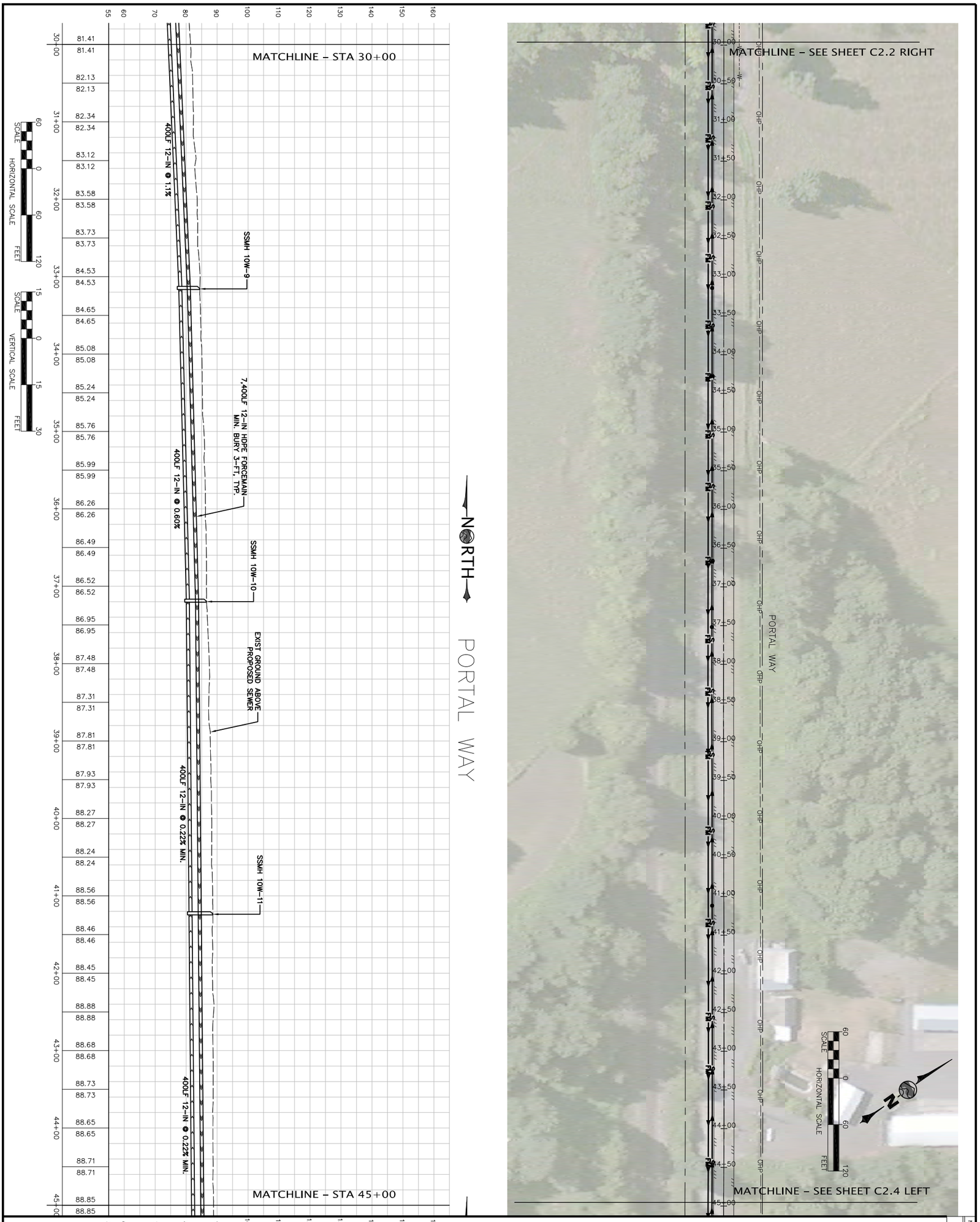

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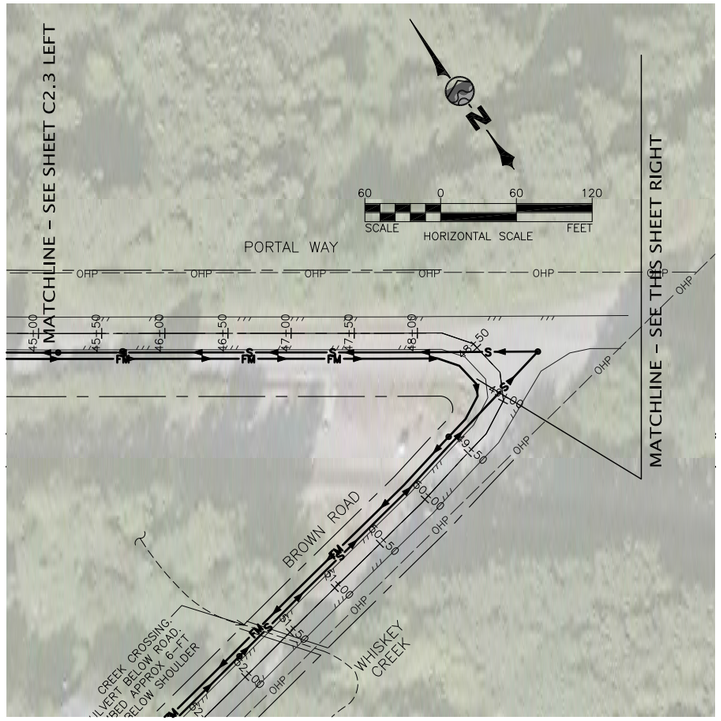
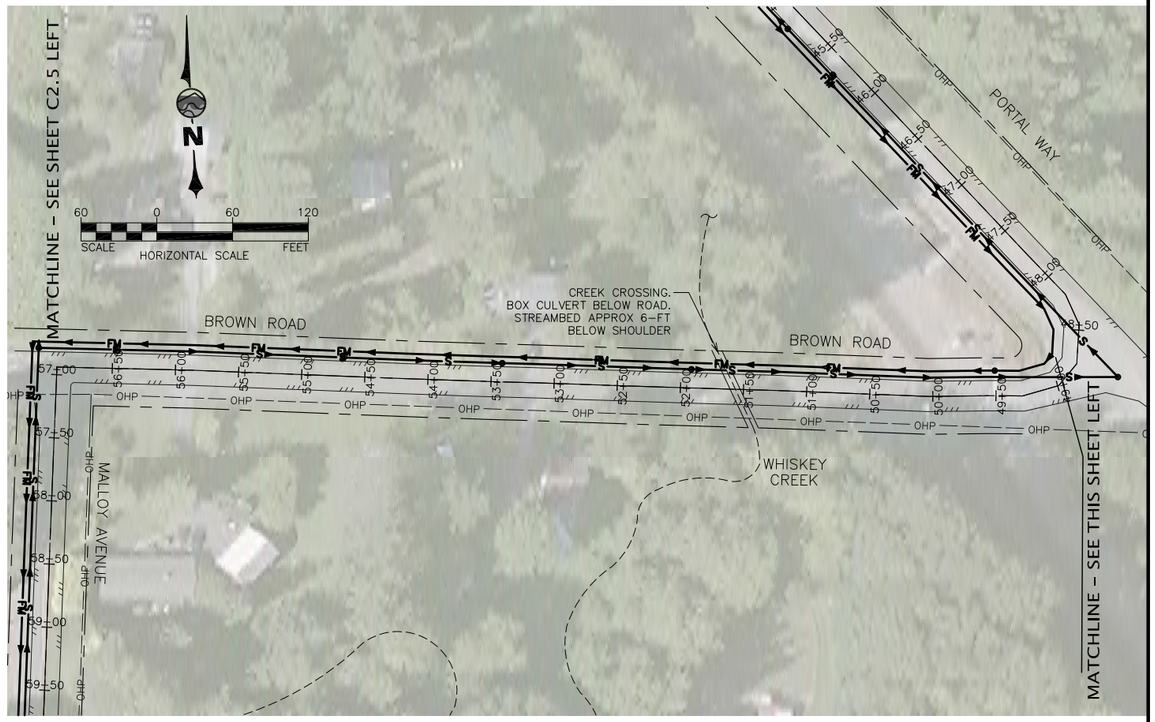
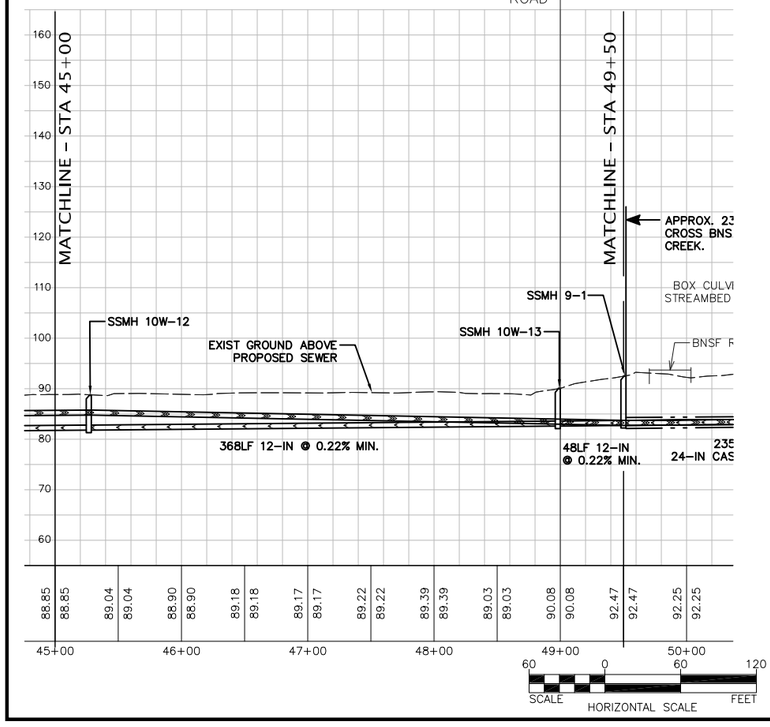
45+00 PORTAL WAY – 52+00 BROWN ROAD



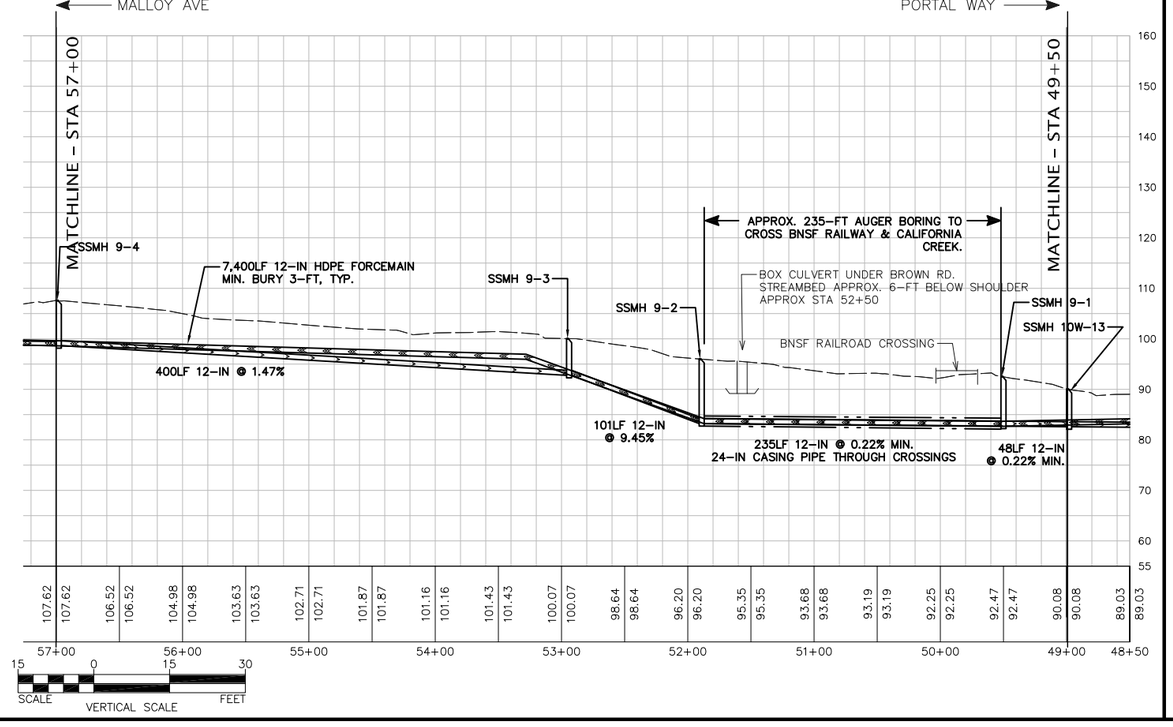
57+00 MALLOY AVENUE – 49+50 BROWN ROAD



NORTH — PORTAL WAY — BROWN ROAD



BROWN ROAD — EAST



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DATE AUGUST 2017 | SCALE AS SHOWN | JOB NUMBER 2017-083

SHEET C2.4 OF C2.9

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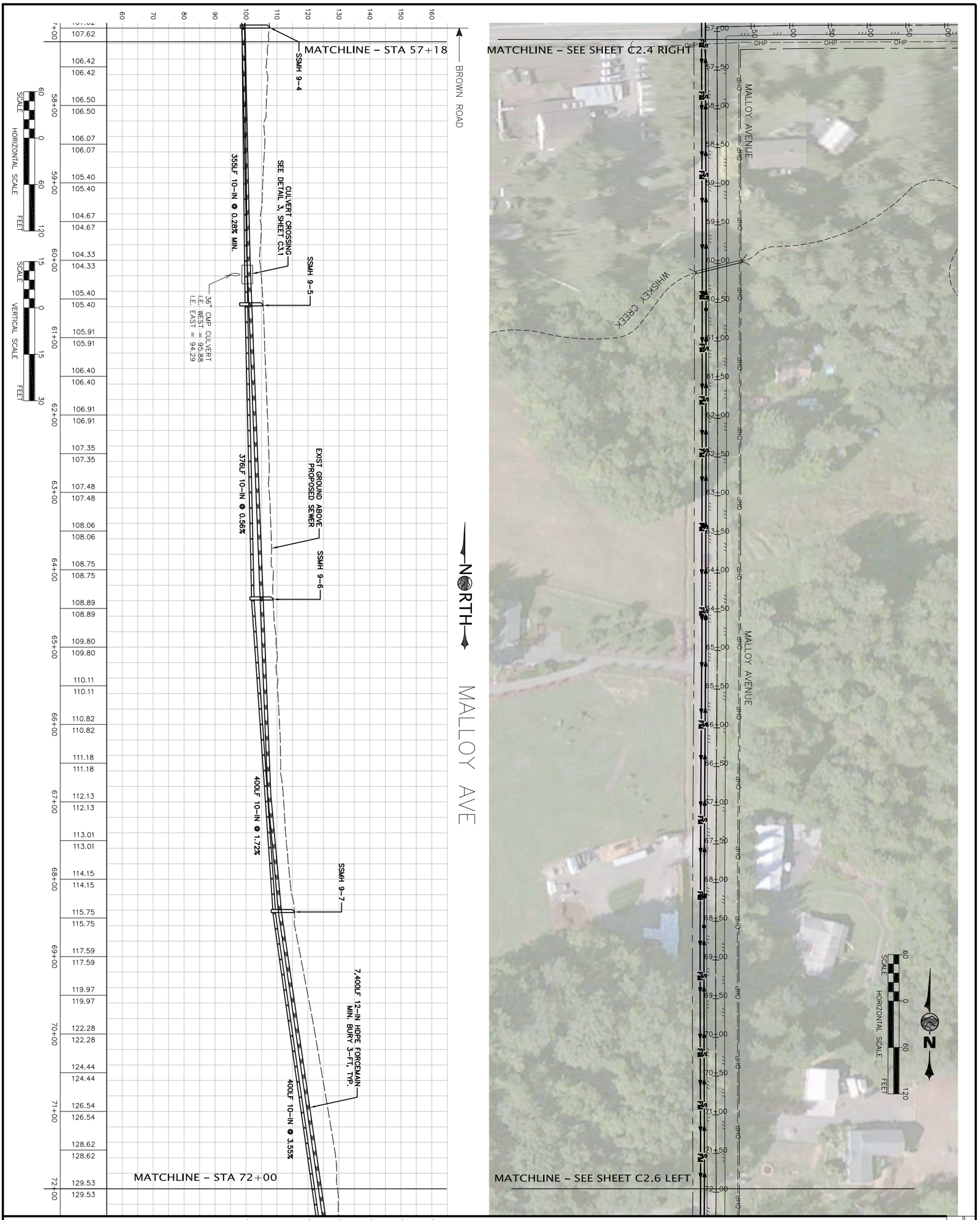

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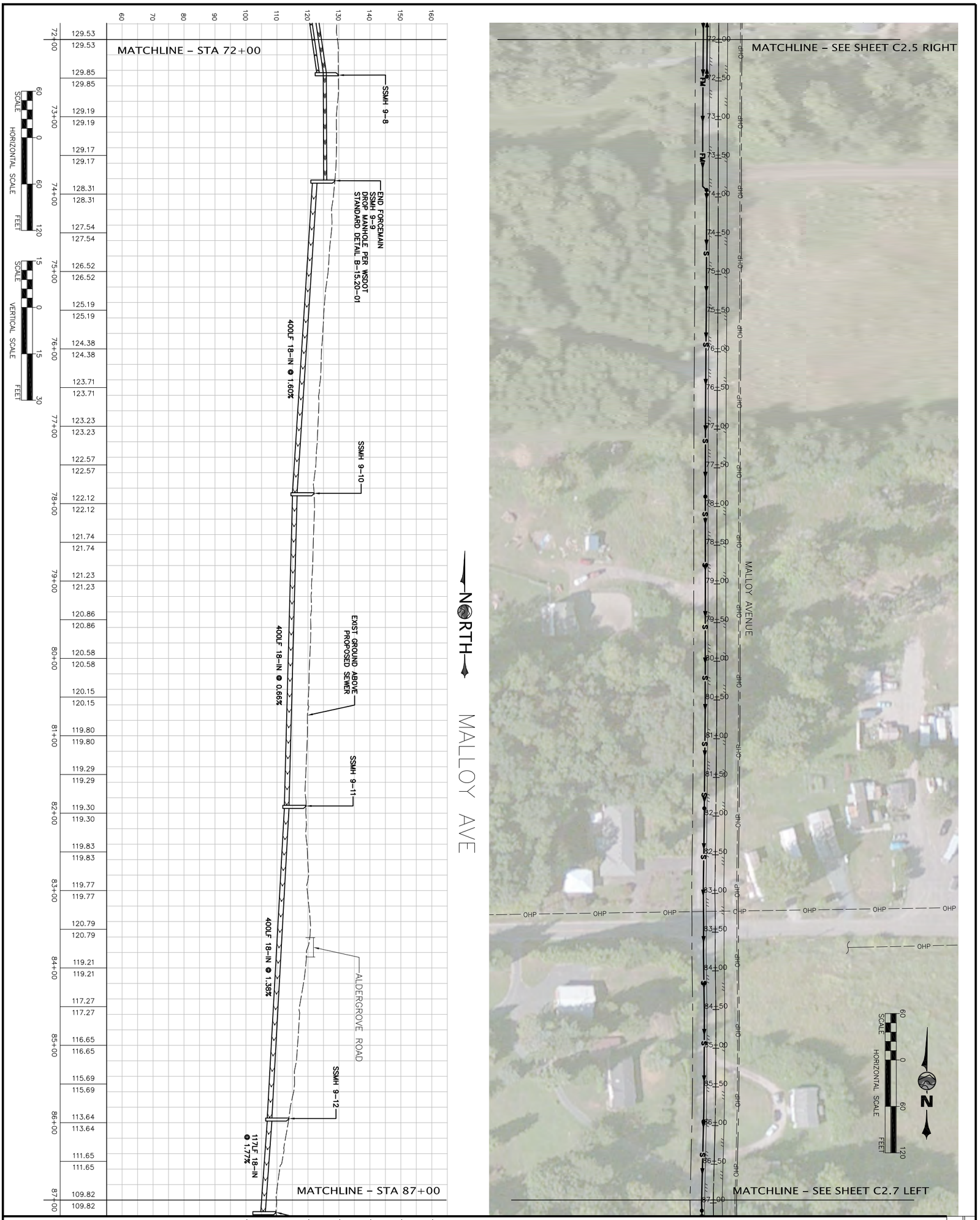

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NOT FOR CONSTRUCTION

NO.	REVISIONS	BY	DATE

SHEET	DATE	CITY OF FERNDALE	DESIGNED BY
C2.6	AUGUST 2017	FERNDALE WASHINGTON	ROG
OF	SCALE	GRANDVIEW SEWER EXTENSION	DRAWN BY
C2.9	AS SHOWN	PLAN AND PROFILE	ROG
	JOB NUMBER 2017-083		CHECKED BY AWL

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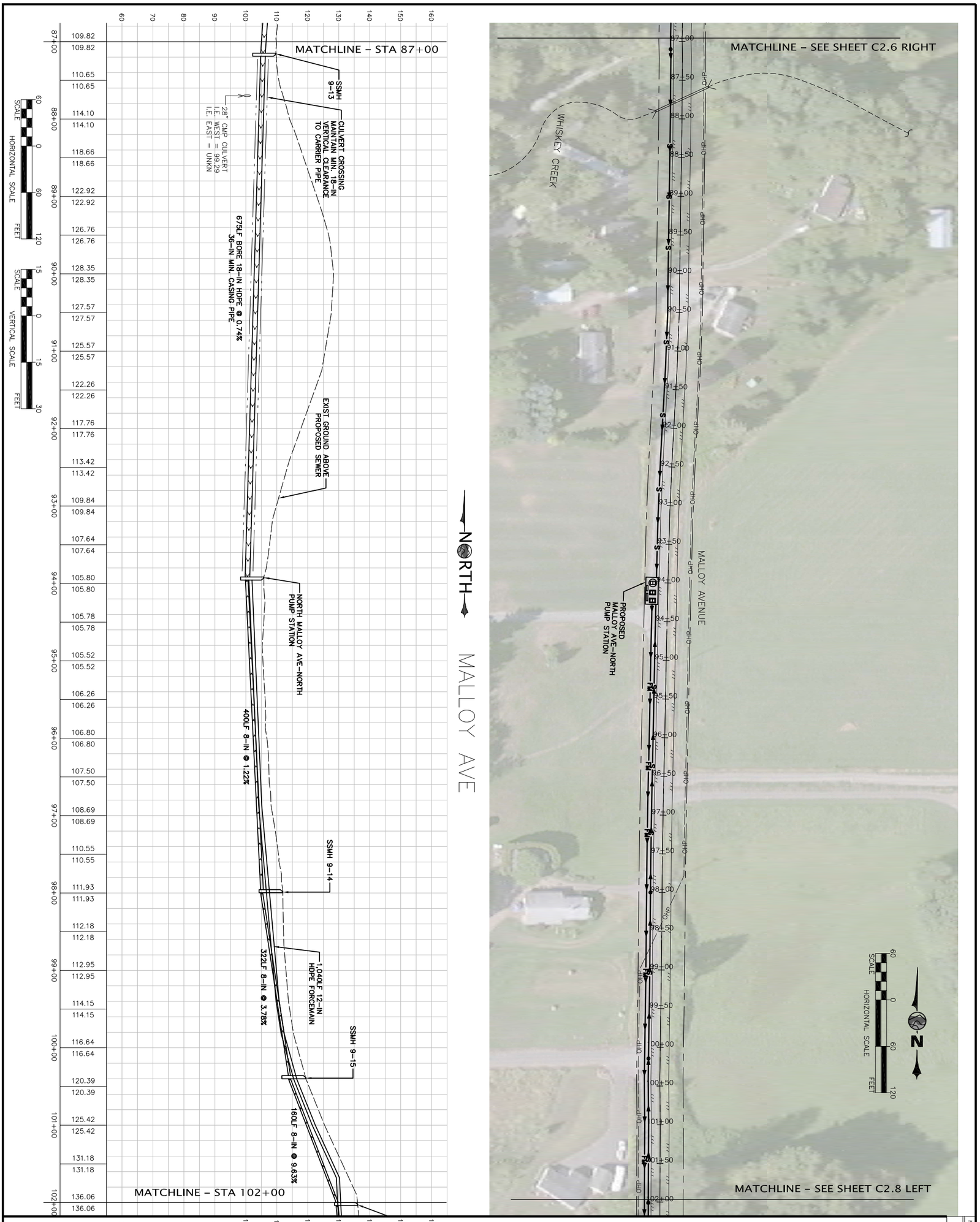

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NO.	REVISIONS	BY	DATE

SHEET	DATE	CITY OF FERNDALE	DESIGNED BY
C2.7	AUGUST 2017	FERNDALE WASHINGTON	ROG
OF	SCALE	GRANDVIEW SEWER EXTENSION	DRAWN BY
C2.9	AS SHOWN	PLAN AND PROFILE	ROG
	JOB NUMBER 2017-083		CHECKED BY AWL

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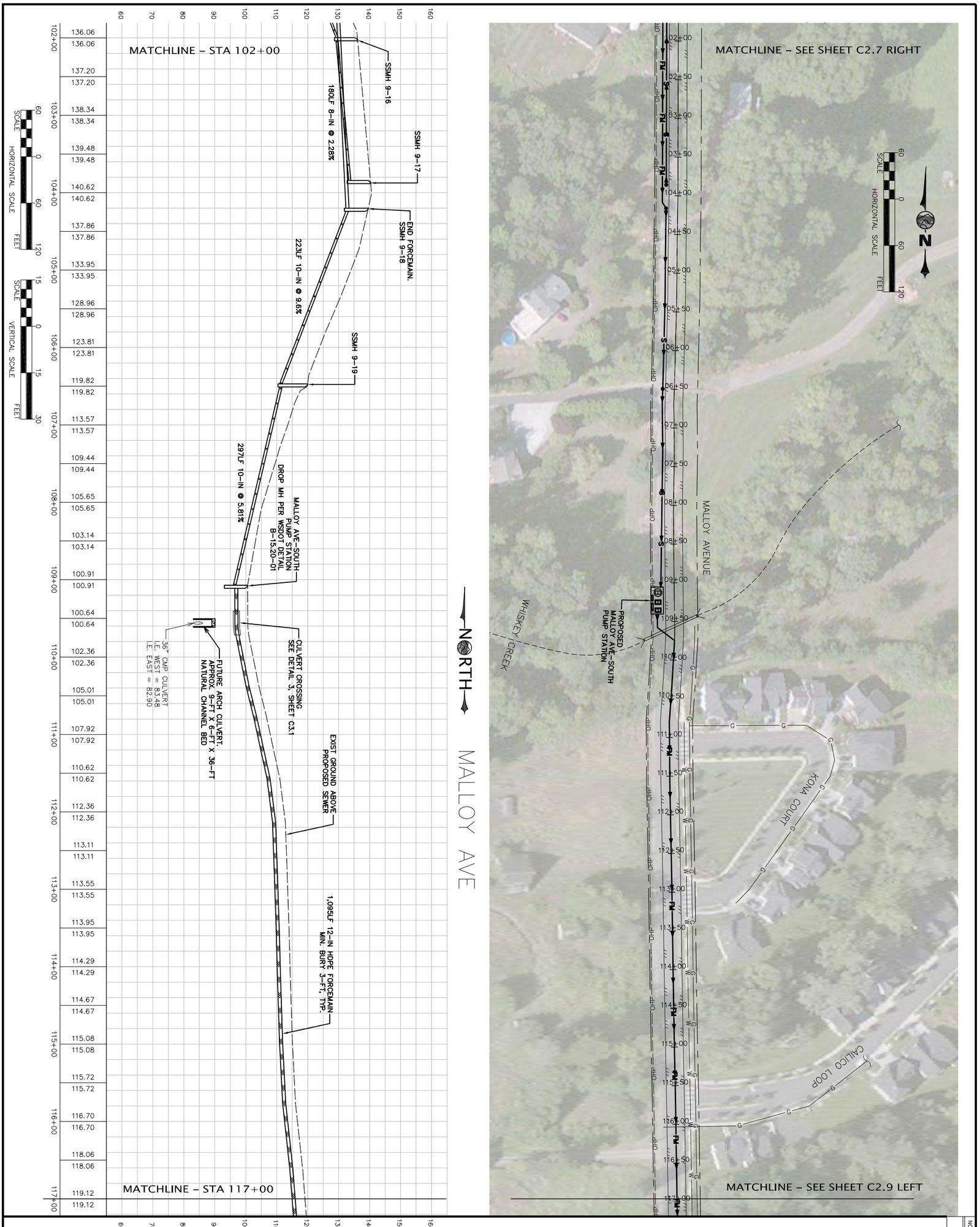

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NO.	REVISIONS	BY	DATE

SHEET	DATE	CITY OF FERNDALE	DESIGNED BY
C2.8	AUGUST 2017	FERNDALE WASHINGTON	ROG
OF	SCALE	GRANDVIEW SEWER EXTENSION	DRAWN BY
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	JOB NUMBER		CHECKED BY
	2017-083		AWL

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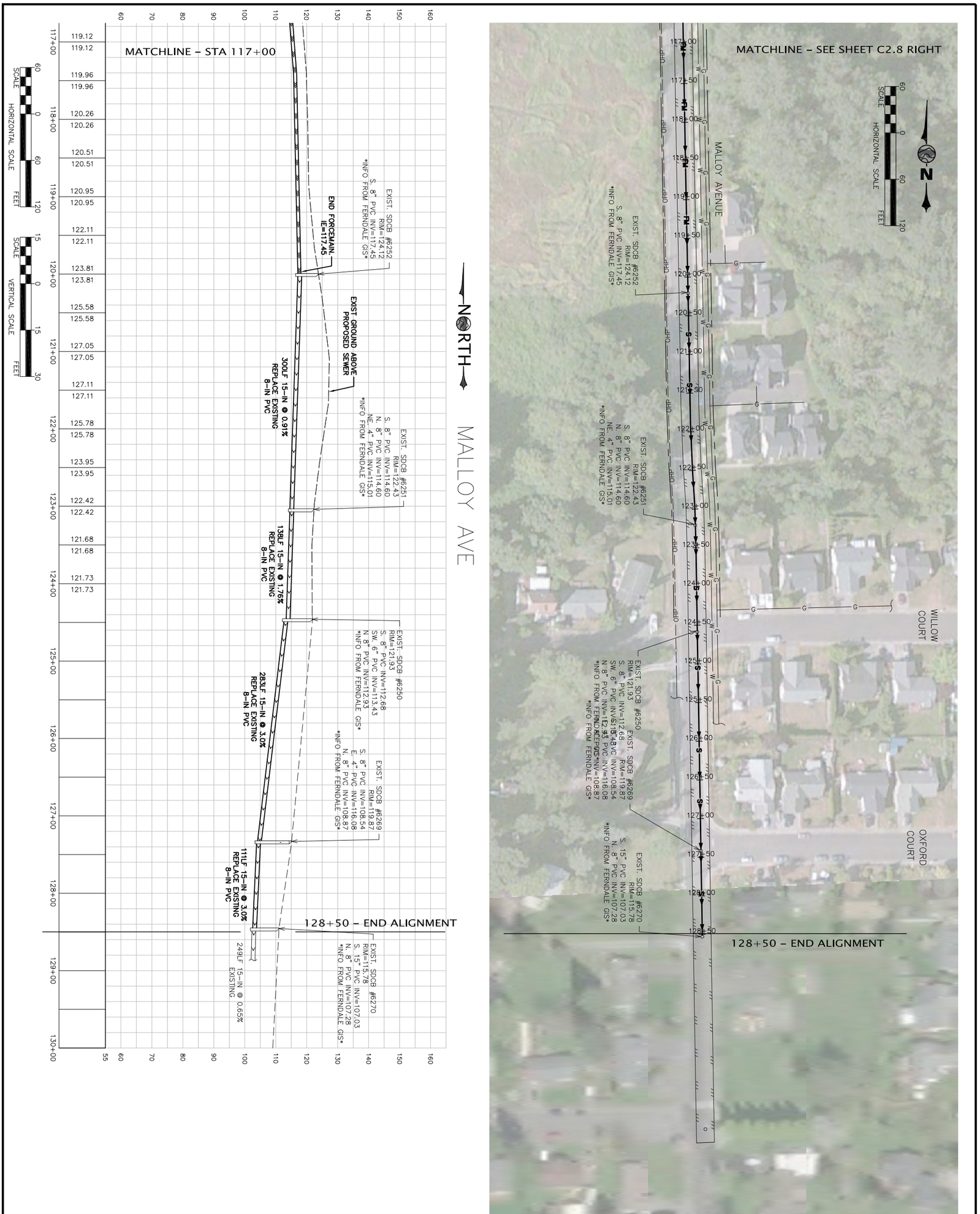

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NO.	REVISIONS	BY	DATE

SHEET	DATE	CITY OF FERNDALE	DESIGNED BY
C2.9	AUGUST 2017	FERNDALE WASHINGTON	ROG
OF	SCALE	GRANDVIEW SEWER EXTENSION	DRAWN BY
C2.9	AS SHOWN	PLAN AND PROFILE	ROG
	JOB NUMBER 2017-083		CHECKED BY AWL

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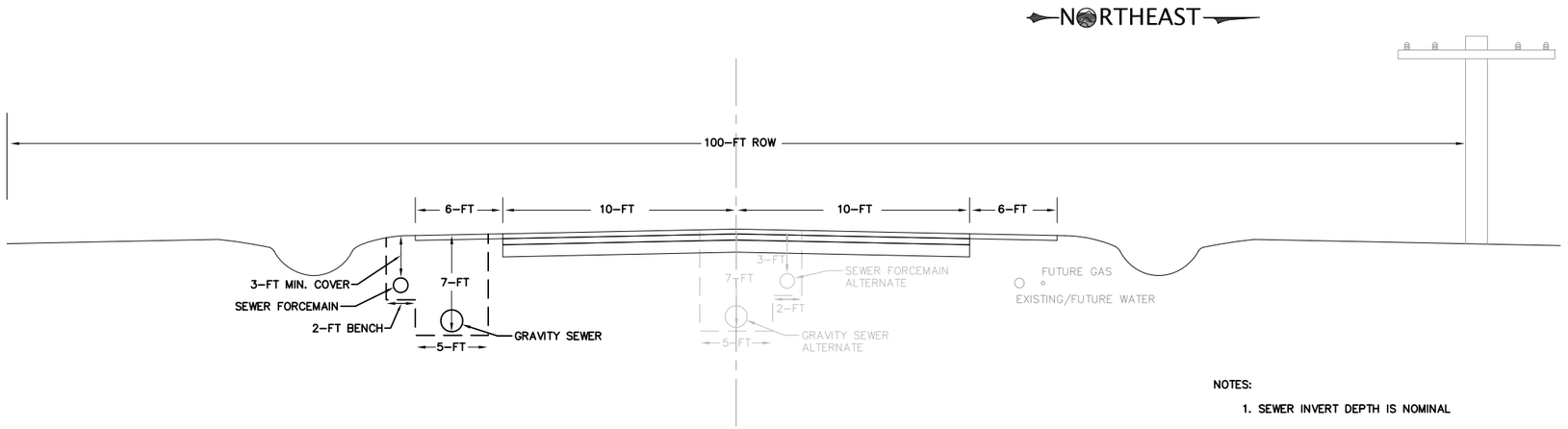
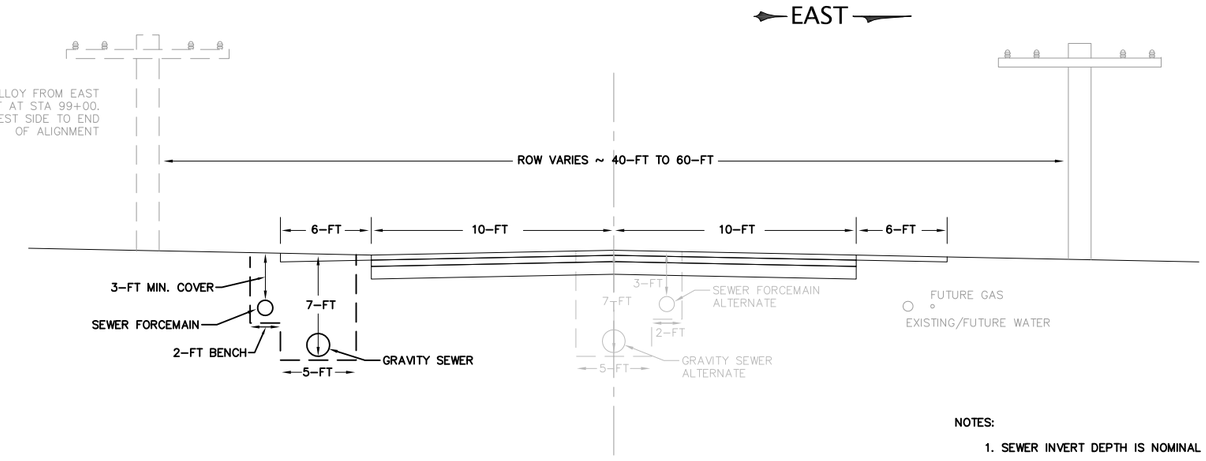


NOTES:

1. SEWER INVERT DEPTH IS NOMINAL

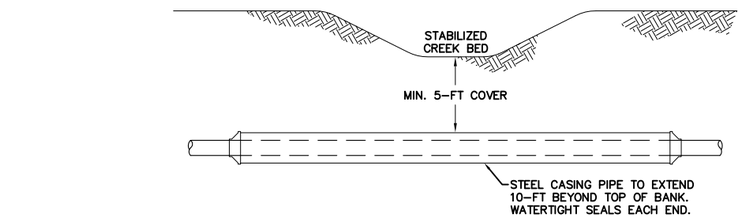
1 PORTAL WAY ROAD SECTION

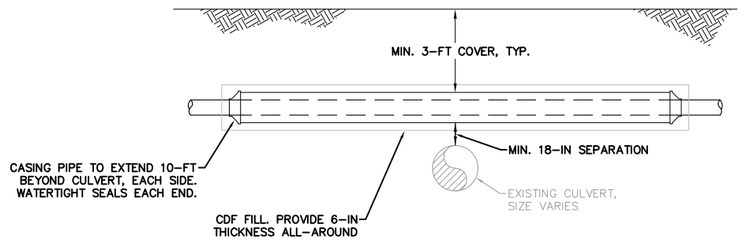


NOTES:

1. SEWER INVERT DEPTH IS NOMINAL

2 MALLOY AVENUE ROAD SECTION





3 STREAM AND CULVERT CROSSING

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CITY OF FERNDALE
FERNDALE WASHINGTON
GRANDVIEW SEWER EXTENSION
DETAILS

DATE	SCALE	JOB NUMBER
AUGUST 2017	AS SHOWN	2017-083

SHEET C3.1 OF C3.1

PLOT SETTINGS: Adobe PDF, Tabloid, Landscape, 1:2, WE APWA_SCREENED.ctb
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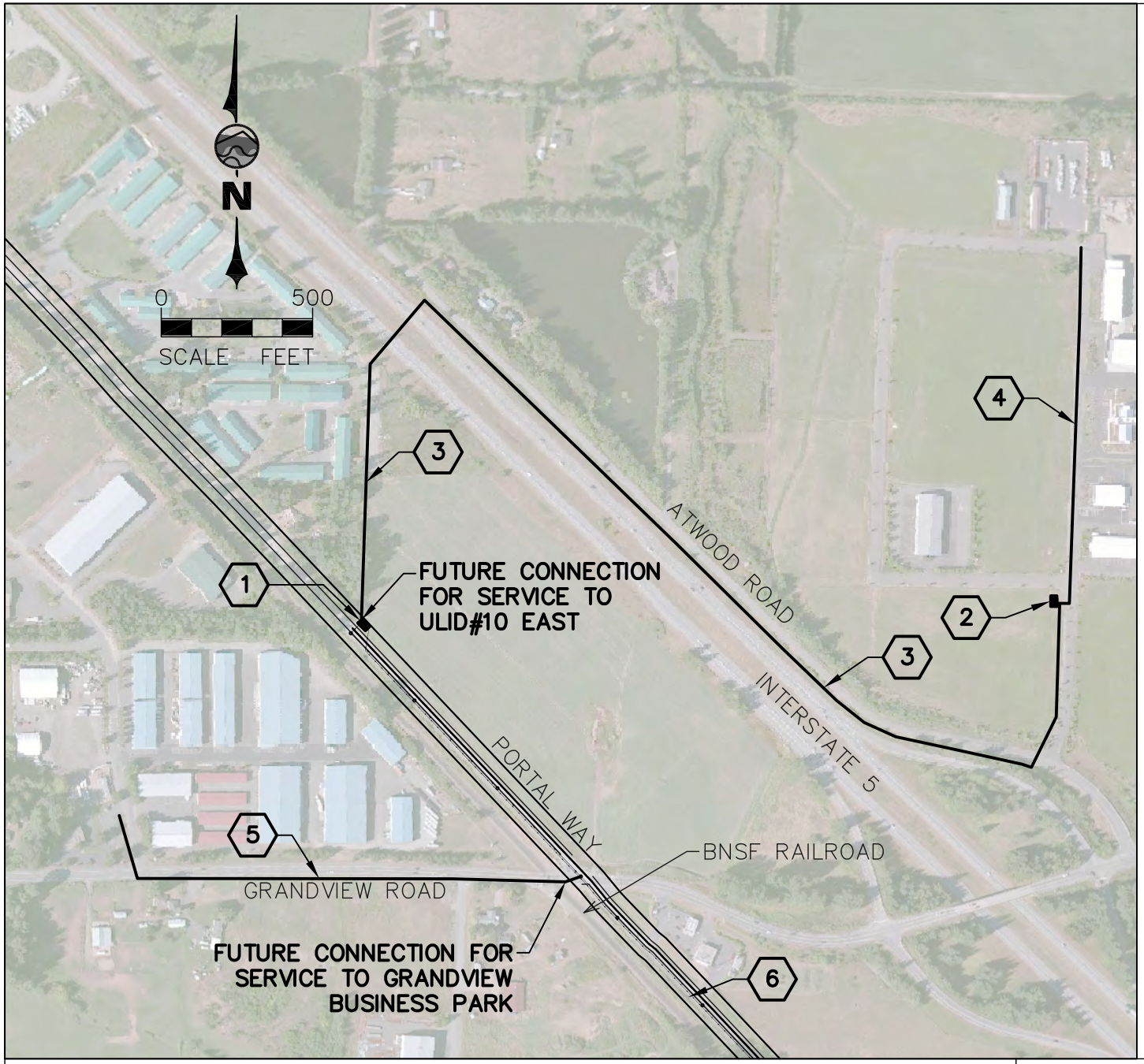

KEYED NOTES

1. = PROPOSED PORTAL WAY PUMP STATION
2. = PROPOSED ULID#10 PUMP STATION
3. = PROPOSED 4,300-LF 8-IN HDPE SEWER FORCEMAIN
4. = PROPOSED 1,225-LF 10-IN PVC GRAVITY SEWER
5. = PROPOSED 1,700-LF 10-IN PVC GRAVITY SEWER
6. = PROPOSED OXFORD COURT TO PORTAL WAY PUMP STATION ALIGNMENT

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CITY OF FERNDALE

FERNDALE WASHINGTON

GRANDVIEW SEWER EXTENSION

FUTURE ADDITIONS

DATE	SHEET
AUGUST 2017	1
SCALE	OF
AS SHOWN	1
JOB NO.	
2017-083	

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
Sanitary Sewer Utility Extension - Oxford Court to Portal Way Pump Station							
A.	PROJECT STARTUP						
		Mobilization / Demobilization - Assumes 10% of Total	1	LS	$458,672	$ 458,672	
		Construction Survey	1	LS	$90,000	$ 90,000	
		TESC Installation	1	LS	$40,000	$ 40,000	
						PROJECT STARTUP SUBTOTAL	$588,672
B.	GRANDVIEW PUMP STATION						
		Demolition / Clear & Grub	119	SF	$5	$ 595	
		Traffic Control	1	LS	$4,000	$ 4,000	
		Excavation	120	CY	$25	$ 3,000	
		Structural Backfill	60	CY	$40	$ 2,400	
		Temporary Facilities	1	LS	$3,000	$ 3,000	
		Concrete Slabs	1	LS	$3,000	$ 3,000	
		Pump Station Wet Well	1	LS	$35,000	$ 35,000	
		Concrete Protective Coating	1	LS	$25,000	$ 25,000	
		Halliday double leaf hydraulic assist hatch	3	LS	$4,000	$ 12,000	
		Painting Mechanical Piping	1	LS	$4,000	$ 4,000	
		Interior Concrete Protective Lining	400	SF	$24	$ 9,600	
		Exterior Concrete Protective Lining	1	LS	$4,000	$ 4,000	
		85 Hp FLYGT Pumps	2	EA	$58,495	$ 116,990	
		Pump Standard Accessories	2	LS	$7,260	$ 14,520	
		Startup Services	2	DAY	$1,500	$ 3,000	
		Install Pumps & Mechanical Piping	1	LS	$11,699	$ 11,699	
		FLYGT TOP Fiberglass Basin Installed	1	EA	$10,000	$ 10,000	
		Ladder-Up	3	EA	$1,500	$ 4,500	
		Valve Vault Concrete Structure	1	EA	$3,000	$ 3,000	
		Valve Vault Install	1	LS	$2,000	$ 2,000	
		12" Gate Valve	2	EA	$4,650	$ 9,300	
		12" Check Valve	2	EA	$10,500	$ 21,000	
		Flow Meter Vault Concrete Structure	1	EA	$3,000	$ 3,000	
		Flow Meter Vault Install	1	LS	$2,000	$ 2,000	
		10" Flow Meter	1	EA	$6,500	$ 6,500	
		Bypassing Port	1	LS	$6,000	$ 6,000	
		HMA - Access Road / Parking Area	40	TON	$220	$ 8,800	
		Finish Grading	1	LS	$5,000	$ 5,000	
		CSTC	25	TON	$40	$ 1,000	
		CSBC	40	TON	$38	$ 1,520	
		Gravel Base	100	TON	$23	$ 2,300	
		Fencing & Gates	1	LS	$4,500	$ 4,500	
		Groundwater Management	1	LS	$15,000	$ 15,000	
		Electrical - Lighting	1	LS	$3,000	$ 3,000	
		Electrical - Enclosure & Generator	1	LS	$96,000	$ 96,000	
		Electrical - Branch Wiring	1	LS	$25,000	$ 25,000	
		Electrical - Receptacles & Switches	1	LS	$1,200	$ 1,200	
		Electrical - Instruments & Antenna	1	LS	$8,000	$ 8,000	
		Electrical - Grounding	1	LS	$1,000	$ 1,000	
		Electrical - Trenching	1	LS	$3,000	$ 3,000	
		Programming Services	1	LS	$30,000	$ 30,000	
		Misc Additional Items	1	LS	$35,000	$ 35,000	
		Trench Safety & Shoring	1	LS	$13,000	$ 13,000	
						GRANDVIEW PUMP STATION SUBTOTAL	$572,424

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
C.	MALLOY PUMP STATIONS (NORTH & SOUTH)						
		Demolition / Clear & Grub	119	SF	$5	$ 595	
		Traffic Control	1	LS	$8,000	$ 8,000	
		Excavation & Haul	120	CY	$25	$ 3,000	
		Structural Backfill	60	CY	$40	$ 2,400	
		Temporary Facilities	1	LS	$3,000	$ 3,000	
		Concrete Slabs	1	LS	$3,000	$ 3,000	
		Pump Station Wet Well	1	LS	$35,000	$ 35,000	
		Halliday double leaf hydraulic assist hatch	3	LS	$4,000	$ 12,000	
		Painting Mechanical Piping	1	LS	$4,000	$ 4,000	
		Interior Concrete Protective Lining	400	SF	$24	$ 9,600	
		25 Hp FLYGT Pumps	2	EA	$24,640	$ 49,280	
		Standard Pump Accessories	2	LS	$4,400	$ 8,800	
		Startup Services	2	DAY	$1,500	$ 3,000	
		Install Pumps & Mechanical Piping	1	LS	$4,928	$ 4,928	
		FLYGT TOP Fiberglass Basin Installed	1	EA	$10,000	$ 10,000	
		Ladder-Up	3	EA	$1,500	$ 4,500	
		Valve Vault Concrete Structure	1	EA	$3,000	$ 3,000	
		Valve Vault Install	1	LS	$2,000	$ 2,000	
		12" Gate Valve	2	EA	$4,650	$ 9,300	
		12" Check Valve	2	EA	$10,500	$ 21,000	
		Flow Meter Vault Concrete Structure	1	EA	$3,000	$ 3,000	
		Flow Meter Vault Install	1	LS	$2,000	$ 2,000	
		10" Flow Meter	1	EA	$6,500	$ 6,500	
		Bypassing Port	1	LS	$6,000	$ 6,000	
		HMA - Access Road / Parking Area	40	TON	$220	$ 8,800	
		Finish Grading	1	LS	$5,000	$ 5,000	
		CSTC	25	TON	$40	$ 1,000	
		CSBC	40	TON	$38	$ 1,520	
		Gravel Base	100	TON	$23	$ 2,300	
		Fencing & Gates	1	LS	$4,500	$ 4,500	
		Groundwater Management	1	LS	$15,000	$ 15,000	
		Electrical - Lighting	1	LS	$3,000	$ 3,000	
		Electrical - Enclosure & Generator	1	LS	$96,000	$ 96,000	
		Electrical - Branch Wiring	1	LS	$25,000	$ 25,000	
		Electrical - Receptacles & Switches	1	LS	$1,200	$ 1,200	
		Electrical - Instruments & Antenna	1	LS	$8,000	$ 8,000	
		Electrical - Grounding	1	LS	$1,000	$ 1,000	
		Electrical - Trenching	1	LS	$3,000	$ 3,000	
		Programming Services	1	LS	$30,000	$ 30,000	
		Misc Additional Items	1	LS	$35,000	$ 35,000	
		Trench Safety & Shoring	1	LS	$13,000	$ 13,000	
					NORTH & SOUTH MALLOY PUMP STATIONS SUBTOTAL		$934,446

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
D.	PORTAL WAY ROAD & PIPING						
		12" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	3,765	LF	$60	$ 225,900	
		18" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	1,165	LF	$120	$ 139,800	
		12" HDPE Forcemain Install (Pipe, Bed, Backfill & Compaction)	4,930	LF	$60	$ 295,800	
		Excavation and Haul	8,034	CY	$20	$ 160,681	
		Testing Sewer Pipe	9,860	LF	$5	$ 49,300	
		Traffic Control	1	LS	$25,000	$ 25,000	
		48-in Manhole Structure & Install	13	EA	$3,500	$ 45,500	
		Pigging Station / FM Cleanout	7	EA	$1,500	$ 10,500	
		Forcemain Combination air/vac release	3	EA	$2,500	$ 7,500	
		Forcemain Blowoff	5	EA	$500	$ 2,500	
					PORTAL WAY ROAD & PIPING SUBTOTAL		$962,481
E.	BROWN ROAD ROAD & PIPING						
		12" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	525	LF	$60	$ 31,500	
		12" HDPE Forcemain Install (Pipe, Bed, Backfill & Compaction)	525	LF	$60	$ 31,500	
		Trenching & Shoring	1	LS	$6,000	$ 6,000	
		Groundwater Control	1	LS	$3,000	$ 3,000	
		24" Auger-Boring	500	LF	$235	$ 117,500	
		Excavation and Haul of Spoils	58	CY	$20	$ 1,164	
		Excavation & Haul	856	CY	$25	$ 21,389	
		Testing Sewer Pipe	800	LF	$5	$ 4,000	
		Traffic Control	1	LS	$3,000	$ 3,000	
		48-in Manhole Structure & Install	2	EA	$3,500	$ 7,000	
		Pigging Station / FM Cleanout	2	EA	$1,500	$ 3,000	
		Forcemain Combination Air/Vac Release	1	EA	$2,500	$ 2,500	
		Forcemain Blowoff	1	EA	$500	$ 500	
					BROWN ROAD ROAD & PIPING SUBTOTAL		$232,052
F.	MALLOY ROAD & PIPING						
		8" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	975	LF	$50	$ 48,750	
		10" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	2,025	LF	$70	$ 141,750	
		18" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	2,046	LF	$110	$ 225,060	
		12" HDPE Sewer Forcemain (Pipe, Bed, Backfill & Compaction)	4,234	LF	$60	$ 254,040	
		Excavation & Haul	8,450	CY	$20	$ 169,000	
		Stream Crossing	1	LS	$8,000	$ 8,000	
		Removal of Existing Pavement (Culvert ~STA 110 - End)	1,100	SY	$25	$ 27,500	
		Road Repair - HMA	27	TON	$170	$ 4,519	
		Road Repair - Asphalt Treated Base	27	TON	$100	$ 2,658	
		Road Repair - Gravel Base	80	TON	$23	$ 1,834	
		Traffic Control	1	LS	$25,000	$ 25,000	
		48-in Manhole Structure & Install	14	LS	$3,500	$ 49,000	
		Concrete Protective Lining - 48-in MH at Forcemain End	1	LS	$3,500	$ 3,500	
		Pigging Station / FM Cleanout	10	EA	$1,500	$ 15,000	
		Forcemain Combination air/vac release	6	EA	$2,500	$ 15,000	
		Forcemain Blowoff	4	EA	$500	$ 2,000	
					MALLOY ROAD AND PIPING WORK SUBTOTAL		$992,612

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
G.	MALLOY ROAD AUGER-BORING						
		Preliminary Geo-Investigation & Geotechnical Report	1	LS	$25,000	$ 25,000	
		Further Site Geo-Investigation Provided Positive Preliminary Investigation	1	LS	$50,000	$ 50,000	
		Temporary Facilities	1	LS	$30,000	$ 30,000	
		Trenching & Shoring	1	LS	$16,000	$ 16,000	
		Groundwater Control	1	LS	$8,000	$ 8,000	
		Auger-Boring	675	LF	na	$ 581,000	
		Auger-Boring Disposal	1	LS	$30,000	$ 30,000	
		18" HDPE Gravity Sewer	675	LF	$120	$ 81,000	
						MALLOY ROAD DIRECTIONAL DRILLING OPTION SUBTOTAL	$821,000
H.	PERMITTING						
	BNSF	Application for pipeline crossing	1	LS	$5,000		
	WSDOT	Franchise application	1	LS	$5,000		
	Whatcom County	franchise application / amendment	1	LS	$500		
	Whatcom County	Land Disturbance Permit	1	LS	$600		
	Whatcom County	SEPA Checklist	1	LS	$600		
	WDFW	Hydraulic Project Approval	1	LS	$0		
						PERMITTING SUBTOTAL	$11,700
I.	PROJECT CLOSEOUT						
		TESC Removal	1	LS	$10,000		
		Restoration	1	LS	$50,000		
						PROJECT CLOSEOUT SUBTOTAL	$60,000
SERVICE TO ULID #10 WEST							
	Construction Subtotal					$ 5,175,387	
	General Project Contingency (15%)					$ 776,308	
	Drilling Contingency [Pump Station Alternative - Credit $(300,000)]					not used	
	Sales Tax (8.7%)					$ 517,797	
						SERVICE TO ULID #10 WEST - CONSTRUCTION COST	$ 6,469,000

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
Sanitary Sewer Utility Extension - Future Extension Along Grandview Road							
A.	GRANDVIEW ROAD & PIPING						
		Mobilization / Demobilization - Assumes 10% of Total	1	LS	$20,000	$ 20,000	
		Construction Survey	1	LS	$4,000	$ 4,000	
		TESC Installation	1	LS	$2,000	$ 2,000	
		12" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	1,500	LF	$60	$ 90,000	
		Excavation and Haul	1	CY	$25	$ 32	
		Testing Sewer Pipe	1,500	LF	$5	$ 7,500	
		Removal of Existing Pavement (Culvert ~STA 110 - End)	152	SY	$25	$ 3,800	
		Road Repair - HMA	5	TON	$170	$ 805	
		Road Repair - Asphalt Treated Base	6	TON	$100	$ 560	
		Road Repair - Gravel Base	20	TON	$23	$ 463	
		Road Repair - Pipe Zone Bedding	15	TON	$35	$ 517	
		Traffic Control	1	LS	$2,000	$ 2,000	
		48-in Manhole Structure & Install	5	LS	$3,000	$ 15,000	
		Preliminary Geo-Investigation & Geotechnical Report	1	LS	$10,000	$ 10,000	
		Trenching & Shoring	1	LS	$9,000	$ 9,000	
		Groundwater Control	1	LS	$3,000	$ 3,000	
		24" Auger-Boring for BNSF Crossing and culvert crossing	150	LF	$480	$ 72,000	
		Excavation & Haul of Spoils	17	CY	$25	$ 436	
		BNSF Permitting	1	EA	$500	$ 500	
					GRANDVIEW ROAD AND PIPING SUBTOTAL		$241,614
SERVICE TO GRANDVIEW INDUSTRIAL PARK							
	Construction Subtotal					$ 241,614	
	General Project Contingency (15%)					$ 36,242	
	Sales Tax (8.7%)					$ 24,173	
					SERVICE TO GRANDVIEW - CONSTRUCTION COST		$ 302,000

CITY OF FERNDALE
PRELIMINARY CONSTRUCTION COST ESTIMATE - Grandview Sewer Extension

Item No.	Item	Description	Approx. Quantity	Unit	$/Unit	Total $	Section Subtotal
Sanitary Sewer Utility Extension - Future Extension to ULID #10 East							
A.	ATWOOD ROAD & PIPING						
		Mobilization / Demobilization - Assumes 10% of Total	1	LS	$20,000	$ 100,000	
		Construction Survey	1	LS	$4,000	$ 20,000	
		TESC Installation	1	LS	$2,000	$ 10,000	
		8" PVC Gravity Sewer Install (Pipe, Bed, Backfill & Compaction)	2,500	LF	$50	$ 125,000	
		8" HDPE Sewer Forcemain (Pipe, Bed, Backfill & Compaction)	3,800	LF	$50	$ 190,000	
		Excavation & Haul	1	CY	$25	$ 32	
		Testing Sewer Pipe	3,801	LF	$5	$ 19,005	
		Creek Crossing - Trenching & Shoring	1	LS	$9,000	$ 9,000	
		Creek Crossing - Groundwater Control	1	LS	$3,000	$ 3,000	
		Creek Crossing - 24" Auger-Boring	50	LF	$235	$ 11,750	
		Creek Crossing - Excavation and Haul of Spoils	157	CY	$25	$ 3,927	
		Traffic Control	1	LS	$20,000	$ 20,000	
		48-in Manhole Structure & Install	10	LS	$3,500	$ 35,000	
		Duplex Package Pump Station - 15ft deep - 140gpm @ appr 10' TDH	1	LS	$285,000	$ 285,000	
						ATWOOD ROAD & PIPING SUBTOTAL	$831,714
B.	I-5 CROSSING						
		Preliminary Geo-Investigation & Geotechnical Report	1	LS	$10,000	$ 10,000	
		Trenching & Shoring	1	LS	$9,000	$ 9,000	
		Groundwater Control	1	LS	$3,000	$ 3,000	
		24" Auger-Boring	330	LF	$480	$ 158,400	
		Excavation & Haul of Spoils	40	CY	$25	$ 1,000	
						I-5 CROSSING SUBTOTAL	$181,400
SERVICE TO ULID #10 EAST							
	Construction Subtotal					$ 1,013,114	
	General Project Contingency (15%)					$ 151,967	
	Sales Tax (8.7%)					$ 101,362	
						SERVICE TO ULID #10 EAST - CONSTRUCTION COST	$ 1,266,000