



June 12, 2017

Mr. Mark Baumgarten
Director of Capital Projects
Sumner School District
19701 104th Street East
Bonney Lake, WA 98390-7948

Project: Sumner Early Learning Center, AHBL No. 2160246.10
Subject: Sewer Capacity Memo

Dear Mr. Baumgarten:

The City of Sumner has requested an analysis of the sewer system serving the Sumner Middle School parcel. Per the January 27, 2017, City of Sumner comments on the SEPA Environmental Checklist:

UTILITIES: City records indicate that a 6" sewer main serves the entire Sumner Middle School including all of the portables. The proposal must include an analysis of the capacity of this sewer main to ensure it can handle the current and proposed flows. If the sewer main is found to be insufficient, the project must include the upgrade of all public and private sewer mains necessary to increase the capacity as needed. In order to ensure that this is completed please include this as a SEPA mitigation condition.

In response to this comment, we have coordinated with the City to gather the required information, performed an analysis of the system, and found that the increased flows from the proposed Early Learning Center (ELC) will not cause the capacity of the existing system to be exceeded. A summary of our calculations is provided below; also see the attached exhibits.

Per Joe Fessler, City of Sumner, the analysis required a capacity check of the onsite sewer pipes, as well as the public sewer system in Sumner Avenue, Maybelle Street, and the Highway 410 crossing. A review of the sewer basin shows that 56 single-family residences, in addition to the existing Sumner Middle School and the proposed ELC, will contribute flows to the basin. A sketch of the basin has been included as Exhibit 1. Flow calculations were completed per Orange Book criteria, and it was found that peak flow in the basin was 0.155 cubic feet per second (cfs). See Exhibit 2 for calculation spreadsheet.

Review of as-builts and system information provided by the City (see Exhibit 3) shows that the onsite sewer main for the existing Sumner Middle School and the proposed ELC is 10-inch. The sewer main in Sumner Avenue and Maybelle Street is 8-inch, and the sewer main under Highway 410 is 12-inch. We routed the 0.155 cfs flow through these pipes, assuming they were at Orange Book minimum slopes, and found that the 8-inch pipe is at 29.3 percent capacity, the 10-inch pipe is at 23.7 percent capacity, and the 12-inch pipe is at 19.8 percent capacity.

Civil Engineers

Structural Engineers

Landscape Architects

Community Planners

Land Surveyors

Neighbors

TACOMA

2215 North 30th Street
Suite 300

Tacoma, WA 98403-3350

253.383.2422 TEL

www.ahbl.com



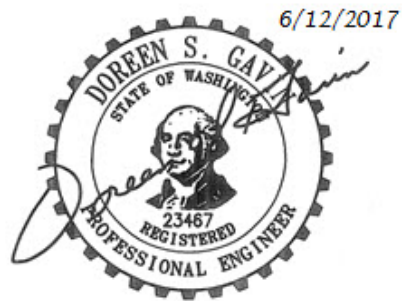
It is our opinion that the calculations show the system has plenty of excess capacity, and no further analysis or improvements need to be made to the system on account of the proposed ELC. Results of our analysis were informally shared with the City of Sumner via email to Joe Fessler on March 2, 2017. Please feel free to contact us if there are any questions regarding the calculations.

Sincerely,

Doreen S. Gavin, PE, LEED AP BD+C
President

DSG/lsk

Enclosures





56 SFR
 4 vacant
 SFR lots



2215 N. 30th Street, #300
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SUMNER ELC
SEWER CALCULATIONS

EX-1

Sumner ELC

2160246.1

Sanitary Sewer Capacity Analysis

	Qty:	Unit	Flow/unit	Total Q
Single Family Residential Lots	56	SFRs	250 gpd	14000
Sumner MS	758	Students/ Staff	16 gpd	12128
Sumner ELC (proposed)	250	Students/ Staff	10 gpd	2500
			Total Average Daily Flow	28628 gpd
			Peak Factor	3.5
			Estimated Peak Flow	100198 gpd 70 gpm 0.155 cfs

Assumptions:

Flows per Wash. Criteria for Sewage Works Design Manual (Orange Book)
Per Orange Book I/I included
Assumes 250 gpd / SFR
Sumner MS has kitchen and lockers/showers
Proposed ELC has serving kitchen

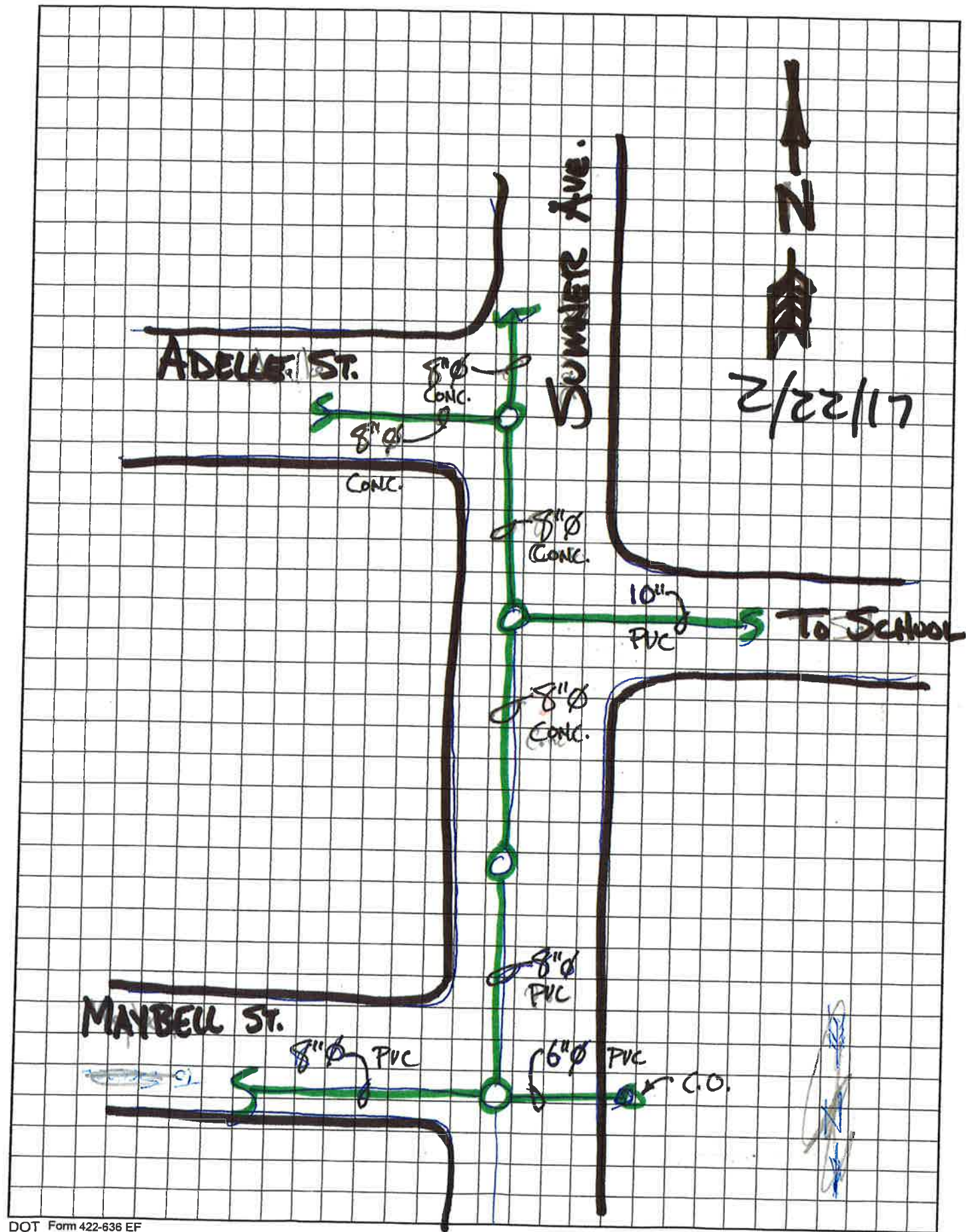


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SUMNER ELC

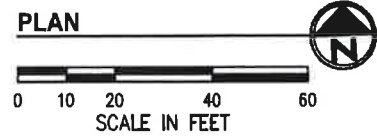
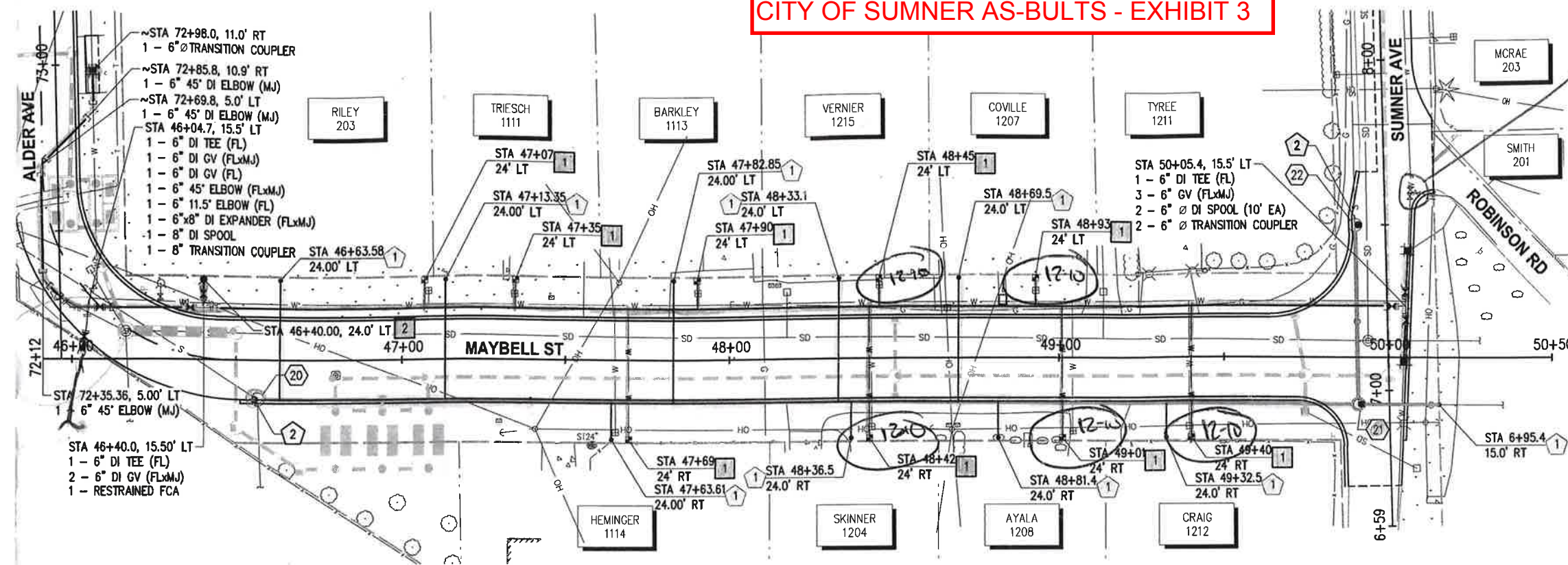
SEWER CALCULATIONS

EX-2



CITY OF SUMNER AS-BULTS - EXHIBIT 3

adjust (3) Etc. Values



GENERAL NOTES

- STRUCTURE AND APPURTENANCE CALLOUTS REPRESENT THE CENTER OF REFERENCED STRUCTURE OR APPURTENANCE.
- ALL EXISTING UTILITY CONDITIONS, INCLUDING EXISTING MATERIAL TYPES, BURY DEPTHS AND HORIZONTAL LOCATIONS ARE BASED ON BEST AVAILABLE INFORMATION WITHOUT POTHOLING. CONTRACTOR SHALL POTHOLE UTILITY CROSSING AND CONNECTION POINTS FIVE WORKING DAYS PRIOR TO MAKING THE CROSSING/CONNECTION TO VERIFY HORIZONTAL/VERTICAL LOCATION AND MATERIAL.
- CONTRACTOR SHALL PLACE FOAM BLOCK BETWEEN UTILITIES IF THERE IS 1' OR LESS SEPARATION.
- CONTRACTOR SHALL POTHOLE THE LOCATIONS OF CONNECTIONS TO EXISTING WATER MAIN AND SIDE SEWERS TO VERIFY HORIZONTAL AND VERTICAL LOCATION, PIPE MATERIAL AND SIZE PRIOR TO PROCURING FITTINGS FOR THE CONNECTION AND/OR ORDERING STRUCTURES.
- WATER METER LOCATIONS MAY BE ADJUSTED IN THE FIELD. COORDINATE WITH ENGINEER FOR FINAL LOCATION.
- WATER MAIN, INCLUDING HYDRANT ASSEMBLIES, SHALL HAVE THRUST BLOCKING AT ALL HORIZONTAL AND VERTICAL BENDS. THRUST BLOCKS NOT SHOWN FOR CLARITY.
- ALL WATER MAIN FITTINGS SHALL BE MECHANICAL JOINT UNLESS OTHERWISE SPECIFIED. MECHANICAL JOINT AND FLANGE COUPLING ADAPTERS SHALL BE RIGIDLY RESTRAINED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL EQUIPMENT, LABOR, TOOLS, AND MATERIALS NECESSARY TO ESTABLISH SANITARY SEWER TEMPORARY BYPASS PUMPING DURING SEWER MAIN CONSTRUCTION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY WATER SERVICE TO ALL AFFECTED RESIDENCES DURING WATER MAIN CONSTRUCTION.

SEWER CONSTRUCTION NOTES

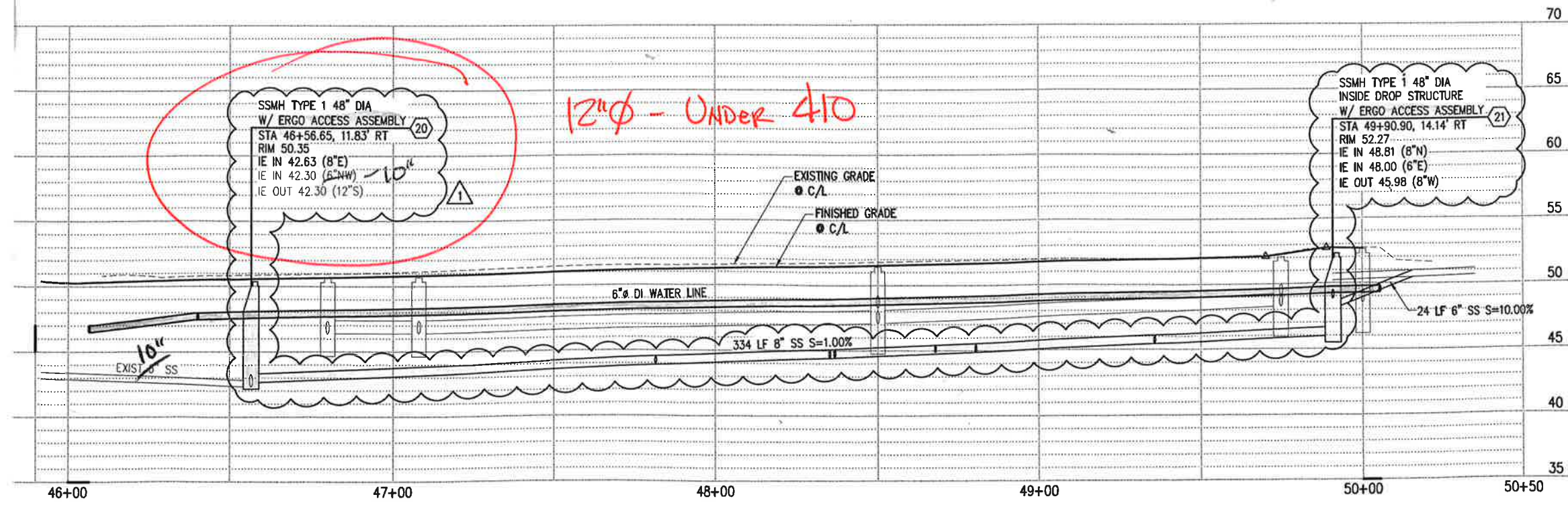
- INSTALL CLEANOUT PER CITY OF SUMNER STD DETAIL SS4-5 AND NEW SIDE SEWER PER SS4-4.1. CONNECT TO EXISTING SIDE SEWER ON PRIVATE SIDE OF CLEANOUT WITH ROMAC STYLE 501 TRANSITION COUPLER.
- CONNECT TO EXISTING

WATER CONSTRUCTION NOTES

- INSTALL NEW 3/4" WATER SERVICE, COMPLETE, PER CITY OF SUMNER STD DETAIL W3-1. EXTEND SERVICE LINE OFF BACKSIDE OF NEW SETTER AND CONNECT TO EXISTING PRIVATE SERVICE LINE USING APPROPRIATE COUPLER.
- INSTALL NEW HYDRANT ASSEMBLY PER CITY OF SUMNER STD DETAIL W3-15.1. INSTALL GUARD POSTS (2 EACH) PER CITY OF SUMNER STD DETAIL W3-15.2.

LEGEND

- SIDE SEWER
- SANITARY SEWER MANHOLE
- SANITARY SEWER CLEANOUT
- # SEWER STRUCTURE CALLOUT
- WATER MAIN
- w — WATER SERVICE LINE
- WATER METER
- ⊕ FIRE HYDRANT



PROFILE

APPROVED
BY: CITY OF SUMNER DATE:

REV	APPR.	REVISIONS
M.	NIM	REVISED SEWER PIPE DIAMETER, SLOPES, IE'S

Approved By

ENGINEERING MANAGER	DATE
PROJECT MANAGER	DATE
PROJECT ENGINEER	DATE



KPG
753 9th Ave N
Seattle, WA 98109
(206) 266-1640
www.kpg.com

2502 Jefferson Ave
Tacoma, WA 98402
(253) 627-0720

BID DOCUMENT



**CITY OF SUMNER
2012 ECOLOGY STORMWATER
RETROFIT PROJECT**

UTILITY PLAN & PROFILE
SITE A.2 - MAYBELL ST
STA 45+97 TO STA 50+50
KPG PROJECT No. 12078 SHT 13 OF 23

FLOW CALCULATIONS - EXHIBIT 4

Worksheet for 8" Circular Pipe

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.40 %	<i>Orange Book Min.</i>
Diameter	8.00 in	
Discharge	0.16 ft ³ /s	<i>conservative, same as 12" under 410</i>

Results

Normal Depth	0.20 ft	
Flow Area	0.09 ft ²	
Wetted Perimeter	0.76 ft	
Hydraulic Radius	0.11 ft	
Top Width	0.61 ft	
Critical Depth	0.18 ft	
Percent Full	29.3 %	<i>OK, 29.3% full</i>
Critical Slope	0.00551 ft/ft	
Velocity	<u>1.82 ft/s</u>	
Velocity Head	0.05 ft	
Specific Energy	0.25 ft	
Froude Number	0.85	
Maximum Discharge	0.89 ft ³ /s	
Discharge Full	0.83 ft ³ /s	
Slope Full	0.00014 ft/ft	
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	29.33 %
Downstream Velocity	Infinity ft/s

Worksheet for 8" Circular Pipe

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.18	ft
Channel Slope	0.40	%
Critical Slope	0.00551	ft/ft

FLOW CALCULATIONS - EXHIBIT 4

10" at Minimum Slope

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.28 %	<i>Orange Book Minimum</i>
Diameter	10.00 in	
Discharge	<u>0.16</u> ft ³ /s	<i>0.155 cfs</i>

Results

Normal Depth	0.20 ft	
Flow Area	0.10 ft ²	
Wetted Perimeter	0.85 ft	
Hydraulic Radius	0.12 ft	
Top Width	0.71 ft	
Critical Depth	0.17 ft	
Percent Full	<u>23.7</u> %	<i>Pipe at 23.7% capacity</i>
Critical Slope	0.00521 ft/ft	
Velocity	<u>1.57</u> ft/s	<i>velocity</i>
Velocity Head	0.04 ft	
Specific Energy	0.24 ft	
Froude Number	0.74	
Maximum Discharge	1.35 ft ³ /s	
Discharge Full	1.26 ft ³ /s	
Slope Full	0.00004 ft/ft	
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %
Normal Depth Over Rise	23.70 %
Downstream Velocity	Infinity ft/s

10" at Minimum Slope

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.20	ft
Critical Depth	0.17	ft
Channel Slope	0.28	%
Critical Slope	0.00521	ft/ft

FLOW CALCULATIONS - EXHIBIT 4

Worksheet for Circular Pipe - 1

Project Description

Friction Method	Manning Formula	
Solve For	Normal Depth	<i>Flow calc for 0.155 cfs</i>

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00220	ft/ft
Diameter	1.00	ft
Discharge	0.16	ft ³ /s

Results

Normal Depth	0.20	ft
Flow Area	0.11	ft ²
Wetted Perimeter	0.92	ft
Hydraulic Radius	0.12	ft
Top Width	0.80	ft
Critical Depth	0.16	ft
Percent Full	19.8	% ← <i>φ @ 19.8% (capaci)</i>
Critical Slope	0.00510	ft/ft
Velocity	<u>1.41</u>	ft/s ← <i>Velocity</i>
Velocity Head	0.03	ft
Specific Energy	0.23	ft
Froude Number	0.67	
Maximum Discharge	1.95	ft ³ /s
Discharge Full	1.81	ft ³ /s
Slope Full	0.00002	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	19.78	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - 1

Project Description

Friction Method Manning Formula
 Solve For Full Flow Capacity

12" Pipe full Flow Capacity Check.

Input Data

Roughness Coefficient	0.012	
Channel Slope	0.00220 ft/ft	← <i>assumed min. slope.</i>
Normal Depth	1.00 ft	
Diameter	1.00 ft	
Discharge	1.81 ft ³ /s	← <i>capacity of 12" ϕ</i>

Results

Discharge	1.81 ft ³ /s
Normal Depth	1.00 ft
Flow Area	0.79 ft ²
Wetted Perimeter	3.14 ft
Hydraulic Radius	0.25 ft
Top Width	0.00 ft
Critical Depth	0.57 ft
Percent Full	100.0 %
Critical Slope	0.00563 ft/ft
Velocity	2.30 ft/s
Velocity Head	0.08 ft
Specific Energy	1.08 ft
Froude Number	0.00
Maximum Discharge	1.95 ft ³ /s
Discharge Full	1.81 ft ³ /s
Slope Full	0.00220 ft/ft
Flow Type	SubCritical

GVF Input Data

Downstream Depth	0.00 ft
Length	0.00 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.00 ft
Profile Description	
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.00 %