
Utilities Technical Report

New Whatcom Redevelopment Port of Bellingham

Prepared for:

Port of Bellingham, Washington

1801 Roeder Avenue

Bellingham, WA 98225

Prepared by:

David Evans and Associates, Inc.

119 Grand Avenue, Suite D

Bellingham, WA 98225

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Utilities Report

New Whatcom Redevelopment

Summary

This report describes the utility impacts of the three action alternatives and the no action alternative for the proposed New Whatcom Redevelopment. Stormwater impacts will be addressed in a separate report. This utility report is intended to support the New Whatcom Environmental Impact Statement. Land uses in all of the proposed action alternatives include residential, light industrial, institutional, commercial, office, and parks and open space uses, with alternatives defined by varying densities of each use. Based on a review of the proposed alternatives and the utility infrastructure, the impacts of 2016 partial build-out and 2026 full build-out on the utility infrastructure will be typical for a development of this size. No significant unavoidable adverse impacts to utility systems will occur under the proposed actioned alternatives.

Table of Contents

Summary.....	i
1.0 Introduction.....	1
1.1 Alternative 1 – High Density Development.....	
1.2 Alternative 2 – Mid Density Development	
1.3 Alternative 3 – Low Density Development.....	
1.4 No Action Alternative.....	
2.0 Studies and Coordination.....	3
2.1 Study Methods.....	
2.2 Regulatory Context.....	
3.0 Affected Environment.....	4
3.1 Regional Setting.....	
3.2 Project Setting.....	
3.3 Existing Conditions.....	
4.0 Environmental Impact Assessment.....	7
4.1 Utilities Impacts.....	
4.2 Cumulative Effects.....	
5.0 Mitigation.....	14
6.0 References	

List of Figures

1.0 Introduction

This report describes the utility impacts of the three action alternatives and the no action alternative for the proposed New Whatcom Redevelopment. Utility impacts onsite and in the areas adjacent to the site are addressed. The report is intended to support the New Whatcom Environmental Impact Statement. The specific utilities that are addressed include water, sanitary sewer, electrical, and natural gas. Stormwater will be discussed in a separate report.

1.1 Alternative 1: Higher Density Alternative

Alternative 1 includes the highest level of density, the most extensive infrastructure network, and the largest array of park, trail, and open space amenities. Alternative 1 assumes a total of approximately 7.5 million sq. ft. of total floor space for mixed-use redevelopment over the 20-year planning horizon. Redevelopment is analyzed for two time periods – 2016 which represents an interim redevelopment stage, and 2026 which is assumed to represent build-out of the project. This Alternative would include approximately 3.36 million sq. ft. of redevelopment with employment-generating uses including institutional, office, light industrial and marine-related uses (of the total employment space, approximately 450,000 sq. ft. would be marine industrial use space). This Alternative also includes approximately 3.69 million sq. ft. of residential redevelopment as multi-family housing units. Included within Alternative 1 is 445,000 sq. ft. of retail redevelopment with a range of goods and services uses.

The most extensive infrastructure, roadway and utility systems would be developed under Alternative 1, including new roads onsite, road connections to existing streets, bridges, and parks and trails throughout the site. It is assumed under this Alternative that the railroad corridor would be relocated by 2016 to the eastern boundary of the site, adjacent to the bluff. Under this Alternative, the PSE Encogen plant would continue operations on the site for the 2016 timeframe but would be assumed to cease operations by 2026.

Under this Alternative, it is assumed that a marina with a different configuration from that assumed under the No Action Alternative would be constructed. This alternative marina configuration would feature a different number of moorage slips (460 compared to 600 under the No Action Alternative), and additional public access and habitat features to complement mixed use redevelopment - including a public walkway around the marina.

1.2 Alternative 2: Medium Density Alternative

Alternative 2 is the medium range redevelopment scenario. As compared to Alternative 1, this Alternative includes a reduced level of density, infrastructure network, and array of amenities. Alternative 2 assumes a total of approximately 6.0 million sq. ft. of total floor space for mixed-use redevelopment over the 20-year planning horizon. Redevelopment is analyzed for the two time periods – 2016 and 2026. This Alternative would include approximately 2.80 million sq. ft. of redevelopment with employment-generating uses

including institutional, office, light industrial, and marine-related uses (of the total employment space, approximately 450,000 sq. ft. would be marine industrial use space). This Alternative also includes approximately 2.82 million sq. ft. of residential redevelopment as multi-family housing units. Included within Alternative 2 is 375,000 sq. ft. of retail redevelopment with a range of goods and services uses

The level of infrastructure, roadway and utility systems would include new roads on-site, road connections to existing streets, bridges, and parks and trails at a level that would be slightly less than Alternative 1. It is assumed under this Alternative that the railroad corridor would be relocated to the eastern boundary of the site by 2016. Under this Alternative, the PSE Encogen plant would continue operations on the site for the 2016 timeframe, but would be assumed to cease operations by 2026.

A marina similar to that described under Alternative 1 is assumed.

1.3 Alternative 2A: Medium Density Alternative with Delayed Railroad Relocation and Modified Roadway System

Alternative 2A would be similar to Alternative 2, with the following differences: the relocation of the railroad corridor would occur by 2026; the Cornwall Bridge would be provided; and, Cornwall Avenue would remain open between the railroad crossing and Oak Street. The timing of certain roadway improvements would also differ from Alternative 2 (relative to the 2016 and 2026 time periods). See *New Whatcom Redevelopment Project Draft EIS*, Chapter 2, for information on the assumed timing of roadway improvements.

1.4 Alternative 3: Lower Density Alternative

Alternative 3 includes the lowest level of density, infrastructure network, and array of amenities, as compared to Alternatives 1 and 2. Alternative 3 assumes a total of approximately 4.0 million sq. ft. of total floor space mixed-use redevelopment over the 20-year planning horizon. Redevelopment is analyzed for the two time periods – 2016 and 2026. This Alternative would include approximately 2.15 million sq. ft. of redevelopment with employment-generating uses including institutional, office, light industrial, and marine uses (of the total employment space, approximately 450,000 sq. ft. would be marine industrial use space). This Alternative would also include approximately 1.59 million sq. ft. of residential redevelopment as multi-family housing units. Included within Alternative 3 is 260,000 sq. ft. of retail redevelopment with a range of goods and service uses.

Infrastructure, roadway, and utility systems would be developed under Alternative 3 at a level that would be generally less than in Alternatives 1 and 2. Under this Alternative, it is assumed that the railroad corridor would remain in its current alignment. Under this Alternative, the PSE Encogen plant would continue operations on the site for the 2016 timeframe but would be assumed to cease operations by 2026.

A marina similar to that described under Alternative 1 is assumed.

1.5 Alternative 4: No Action Alternative

The No Action Alternative assumes that the Proposed Actions would not be approved or implemented and that the site would remain in its industrial zoning classification. It is further assumed that some level of redevelopment would occur on the site over the 20-year build out horizon, including new industrial development and a new marina, boat launch, and boat haul-out facilities, consistent with existing zoning and the Port's condemnation action.

Under the No Action Alternative, it is assumed that approximately 1,040,000 square feet of new industrial development would occur on the site; in addition it assumes that approximately 1,125,000 square feet of existing building area would remain. A total of 2,165,000 square feet of building area would be located on the site.

Additional improvements currently planned by the Port or City for the site, with or without mixed-use redevelopment, and analyzed as elements of the No Action Alternative include:

- Marina Concept B
- Shipping Terminal Improvements

Roadway improvements assumed under the No Action Alternative include: at grade improvements of F Street, C Street and Hilton Avenue in Area 1; development of internal cross roads in Area 1; and, at grade improvements to Laurel Street (as a Port or private road). The No Action Alternative assumes that the railroad corridor remains in its current location, and the Encogen facility remains in operation through 2026.

2.0 Studies and Coordination

2.1 Study Methods

Existing utilities and infrastructure, along with applicable plans and development regulations associated with each of the alternatives are analyzed. Information was acquired through a combination of site visits, review of recent aerial photography and other secondary sources. The potential area of effect included properties adjacent to the external boundaries of the site.

2.3 Regulatory Context

Permits and Approvals

City of Bellingham Building, Construction, Water and Sewer Codes: Project Permits and Approvals – The provisions of the various elements of the Bellingham building, construction, water and sewer codes (Titles 15 and 17) establish the authority of the city to regulate all construction aspects of land and building development of the proposed project under all action alternatives. This includes but is not limited to: building, fire, drainage, clearing, sidewalk, street, and utilities.

City Plans and Policies

City of Bellingham Comprehensive Plan – The City of Bellingham under Growth Management Act must adopt a comprehensive plan consistent with local and regional planning policies. Comprehensive plans designate urban and rural areas, natural resource lands, and critical areas. Local comprehensive plans are required to include the following elements: land use, housing, capital facilities, public utilities, and transportation. The GMA requires that utility improvements must be made concurrently with land development in order to have adequate infrastructure to accommodate growth.

3.0 Affected Environment

3.1 Regional Setting

The proposal site is within the City of Bellingham. Bellingham is located in Whatcom County, Washington, adjacent to the Puget Sound and approximately 85 miles north of Seattle. The City has direct access to Interstate 5 and is also served by the main Western Washington north-south line of the Burlington Northern Santa Fe railroad.

3.2 Project Setting

The New Whatcom project site includes approximately 216.3 acres of contiguous waterfront property in central Bellingham. The site lies within the City of Bellingham's Central Business District Neighborhood Planning area. The site is generally bounded by Bellingham Bay to the west, and Roeder Avenue and State Street. The Central Business District Neighborhood is generally bounded by the Columbia and Lettered Streets neighborhoods to the north; the Sunnyland and York neighborhoods to the east and Cornwall Avenue and the Sehome and South Hill neighborhoods to the south.

3.3 Existing Conditions

Water

City of Bellingham Public Works Department provides water service to customers in the City of Bellingham. Public Works supplies drinking water from Lake Whatcom, located on the east side of the City. In order to augment water supplies in Lake Whatcom, a dam, tunnel and pipeline were constructed on the Middle Fork of the Nooksack River in 1960. The City has a Certificate of Water Right for withdrawal of 125 cubic feet per second (cfs) from the Middle fork of the Nooksack River and a Certificate of Water Right for storage of approximately 20,000 acre feet of water in Lake Whatcom. The water system is separated into 11 pressure zones served by 14 reservoirs and 12 pump stations. The distribution system consists of approximately 377 miles of City-maintained pipeline. The 2006 Bellingham Capital Facilities Plan (part of the City's adopted 2006 Comprehensive Plan) indicates that the City has adopted and will implement a long-term improvement program designed to adequately accommodate a projected population increase to approximately 113,000 and an

increase water demand of 17.0 million gallons per day (MGD) by 2022⁷. The average daily water demand in 2002 was 11 MGD and serviced a population of 81,454 people.

The Pressure Zone (Hydraulic Grade Line) for the New Whatcom site is elevation 276 feet. The site is at one of the lowest elevations in the zone thereby operating under the maximum water pressure in the zone. Two separate water systems (potable water and untreated or raw water) exist and provide service to the project site. The untreated water was used in Georgia Pacific's pulp mill operations.

Redevelopment Area 1

16 inch mains along C and F Street provide potable water service to the east side of this area. The F Street main connects with a 16-inch pipe along Roeder Ave that then extends down Hilton Ave via an 8-inch pipe and F Street via a 10-inch main. These mains currently provide potable water and fire flow to Georgia-Pacific's Tissue Warehouse, Bornstein Seafood, and other businesses located along Hilton Avenue, F Street, and the portion of Roeder Avenue between these two streets. The F Street water system is looped to C Street utilizing the 10-inch Tissue Warehouse main and an eight-inch main connecting to C Street's eight-inch main. The C Street main provides potable water and fire flow to the businesses along this street. See Figure 1B for the water system in this area.

Redevelopment Areas 2-9

Two mains provide potable and raw water service to the east side of this area. The raw water used by the GP and PSE Encogen facilities is chlorinated by the City to prevent fouling but not to drinking water standards. This water is supplied by a 48-inch main extending along the east side of Chestnut Street entering the site at Bay Street. Upon entering the site, the main is split sending water to both the GP and the Encogen sites. The Encogen main continues to Cornwall Avenue where a 16-inch diameter pipe re-enters the GP site at Laurel Street to provide fire flow to GP operations.

A 24-inch potable water main extends north-south along the east side of the site on Chestnut Street and connects with a 16-inch diameter pipe that extends west along Cornwall Avenue. At the Laurel Street intersection the main tees and enters the GP site providing potable water to the area. The Cornwall main reduces down to a 12 inch diameter and continues west to the Bellingham Shipping Terminal (BST). Two 12-inch mains enter the BST along Beal Memorial Way (east side) and Pine Street (west side) providing both potable water and fire flow to the site. See Figure 1A for the water system in this area.

Redevelopment Area 10

Water service in this area is limited to a water service to the building at 100 West Pine Street. Historically there was water service to the area's buildings provided by a water main on the west side of the railroad tracks. This main has since been abandoned after being damaged by a freeze.

⁷ City of Bellingham Capital Facilities Planning Year Horizon.

Sanitary Sewer

City of Bellingham Public Works Department provides sewer service to customers in the City of Bellingham. This sewer system consists of 250 miles of sewer mains and 25 miles of sewer trunks using 25 pump stations which then transport sanitary sewer to the City's treatment facility. Post Point Pollution Control Plant has a capacity of up to 18 MGD of primary treatment. In 1993, a secondary high purity oxygen treatment facility was added to the City's sewer infrastructure. In 2004, the average flow generated was about 12 MGD or 150 gallons per person per day and served a population of 71,080 people⁸. The 1993 expansion provided the City with a treatment capacity of 55 MGD. The 2006 Capital Facilities Plan indicates that the sewer capacity is projected to adequately support the City's projected population of 113,055 in the year 2022. All treated water is then discharged from the plant through a deep water pipe to an outfall in Bellingham Bay.

Area 1

Sanitary service is provided at the north portion of the site by gravity pipes installed in 1973 along Hilton Ave and Bellwether Way which discharge east into a small pump station at the intersection of Roeder Avenue and Hilton Avenue. The 8-inch PVC pipe along the south side of Hilton Avenue currently provides sewer service to 12 on-site domestic users. The 10-inch concrete pipe along the north side of C Street currently provides sewer service for 11 on-site domestic users. The pump station discharges through a six-inch diameter force main into the City's sewer interceptor line at the Roeder Avenue intersection. See Figure 2B for the sanitary sewer system in this area.

The 'C' Street Combined Sewer Overflow (CSO) is a wastewater gravity pipe that carries both sewage and stormwater in Area 1 and the surrounding vicinity to the City's treatment facility. However, in the unusual event of a severe rainfall, the CSO can release wastewater directly to the Bay through the stormwater outfall at the west end of 'C' Street. If the influent rate at the City's Oak Street Station exceeds the station's hydraulic lift capacity of 58-60 million gallons per day (MGD), the sanitary sewer overflow can occur. According to the City's NPDES permit with the Washington Department of Ecology, the City is allowed one spill per year.

Areas 2-9

Sanitary sewage from on-site buildings in Areas 2, 3, 4, and 5 is routed through small gravity systems to small pump stations. The collective discharge from these pump stations is believed to be a force main that discharges to the manhole along the City interceptor trunk line located at the intersection of Cornwall Avenue and Laurel Street⁹. Sanitary service to the Bellingham Shipping Terminal is provided by a 10-inch concrete pipe installed in 1968 on the west side of Beal Memorial Way. This pipe currently provides service to two on-site domestic users and then gravity flows to the Pine Street Pump Station and on to the Oak Street Pump Station. See Figure 2A for the sanitary sewer system in this area.

The City's interceptor trunk line conveys sanitary flow south along Roeder Avenue to Cornwall Avenue (along the east and south boundary of the project site) to the City's Oak

⁸ Washington State Office of Financial Management.

⁹ Personal communication with Georgia Pacific staff (Dick Perry) April 25, 2007.

Street Pump Station at the southwest end of the project area. The 60" concrete pipe was installed in 1973 and can become pressurized under high flow conditions. Due to the size and the operating condition of the pipe, the City carefully regulates connections to the interceptor and limits them to existing 8-inch diameter tie-in tees installed at 200 ft. to 300 ft. intervals.

Industrial wastewater from Puget Sound Energy's Encogen facility (Area 6) is pumped to the Georgia Pacific site where it is combined with the Georgia Pacific industrial effluent and pumped to the Aerated Stabilization Basin (ASB) on the north side of the waterway. The ASB was built by Georgia Pacific to provide secondary treatment of pulp and tissue mill wastewaters in compliance with the Clean Water Act. The *Whatcom Waterway Draft SEIS* identified cleanup actions for various areas in or near the Whatcom Waterway, including the ASB. Discharge to the ASB will be terminated in the near future as part of the Port's agreement with Georgia Pacific and it will comply with the Whatcom Waterway Clean-up Action Plan requirements.

Area 10

Sanitary sewer in this area is limited to a service to the building at 100 West Pine Street. There is no other known public sanitary sewer service in this area.

Electricity

Puget Sound Energy (PSE) provides electricity to the City of Bellingham via 14 distribution substations (<55,000 volts) and two transmission substations (>55 Kv). The project site contains three electrical substations: the first is located in Area 1 on Roeder Avenue between F and E Streets; the second is in the middle of Area 3, adjacent to Laurel Street; and the third is located in Area 6 at the Encogen power plant. The Area 3 substation is utilized to provide power to the Georgia Pacific processing equipment and the Encogen switch yard is used to transfer power generated at the plant to the PSE electrical grid.

Electrical service to the site south of the waterway is provided by two 115 Kv transmission lines located on utility poles along each side of Laurel Street. Electrical service to the site north of the waterway is provided by a 55 Kv transmission line entering the site on utility poles located along F Street. See Figures 3A and 3B for the electrical systems layout.

Natural Gas

Natural gas utility for the New Whatcom site is provided by Cascade Natural Gas. A 16-inch high-pressure natural gas distribution line travels the perimeter of the site along Roeder Avenue, Chestnut Street and Cornwall Avenue. A regulator station is at the west end of Cornwall Avenue.

3.0 Environmental Impact Assessment

3.1 Utilities Impacts

Alternatives 1 through 3 would include utility supply demands that result from different use densities associated with each Alternative. However, the overall water, sewer, electrical, and natural gas system design and improvements needed to serve the New Whatcom site will be similar among all Alternatives. Under the No Action Alternative, new development is limited to established uses. The existing utility infrastructure will need to be updated and expanded to meet this future growth. Based on the type of industrial activities and time schedule of this growth, the resulting future utility infrastructure could be very similar to the other Alternatives. Therefore, the below discussion of impacts relates to all the Alternatives.

Utility Demolition

Under 1-3 Alternatives, most existing onsite utilities, including water, sanitary sewer, electrical, and natural gas lines will be removed, replaced, or abandoned in place. The existing utilities are assumed to continue serving the site until GP's operations end. Underground utilities are anticipated to be abandoned during the site demolition and/or environmental cleanup activities. Based on the soil remediation requirements for designated areas of the site, abandoned-in-place pipes may be required to be filled with clean material and capped.

Water

Construction Impacts

No substantial interruption of water service is anticipated during the ongoing construction phase. The existing water distribution system would continue to service the site until new water mains are operational. Existing infrastructure will be used to provide water for initial construction activities.

Operation Impacts Common to 1-3 Alternatives

Under Alternatives 1-3 water distribution throughout the site will be comprised of a network of new water mains placed within the right-of-way (ROW) of the new roadway network with the exception of Area 1. The existing roadway network and water mains in Area 1 will continue to serve the redeveloped site with some upgrades to pipes and fire hydrants. Portions of the water utility corridors in the southern portion of the site (portions of Areas 2, 3, 4, 5 and 8) will be pre-excavated and backfilled with clean materials as part of initial utility/roadway installation, consistent with anticipated institutional control requirements associated with the environmental clean-up.

Estimated water demand reflects the total projected employment and permanent resident capacity associated with assumed New Whatcom land uses at both buildout phases in 2016 and 2026. Residential water demand is projected based on the number of proposed dwelling units multiplied by persons per household¹ and a standard water demand criteria of 50

¹ Derived ratio of 1.91 persons per unit. U.S. Census Bureau, American Survey, Whatcom County, 2005

gallons per day (gpd) per capita². Total residential water demand for each alternative is as follows:

Residential Buildout 2016

	Average Daily Demand (mgd)*	Peak Hour Demand (gpm)**
Residential Water Demand 2016		
Alternative		
1. High Density Development	.326	622
2. Mid Density Development	.250	477
2A Mid Density Modified Development	.250	477
3. Low Density Development	.133	254

*Million gallons per day

** Gallons per day

Residential Buildout 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Residential Water Demand 2026		
Alternative		
1. High Density Development	.623	1189
2. Mid Density Development	.476	909
2A Mid Density Modified Development	.476	909
3. Low Density Development	.268	512

Light industrial, commercial and office (non-residential) water demand is projected based on the number of proposed employees multiplied by a standard water demand criterion of 75 gpd per capita³. Total non-residential water demand is as follows:

Industrial, Commercial and Office Buildout 2016

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Non- Residential Water Demand 2016		
Alternative		
1. High Density Development	.158	303
2. Mid Density Development	.131	250
2A Mid Density Modified Development	.131	250
3. Low Density Development	.099	189

² City of Bellingham, Department of Public Works

³ *ibid.*

Industrial, Commercial and Office Buildout 2026

Non-Residential Water Demand 2026	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density Development	.436	833
2. Mid Density Development	.360	688
2A Mid Density Modified Development	.360	688
3. Low Density Development	.269	513
4. No Action Alternative	.800	153

Irrigation of parklands requires large amounts of water in the summer months. This demand is calculated using the standard water demand criterion of 600 gpd per 1000 square feet of park. Parkland size is the same for both phases of development (2016 and 2026). The below tables describes the projected water demand for Alternative 1-3:

Parks

	Average Daily Demand (mgd)	Peak Flow (gpm)
Alternative		
1. High Density Development	0.68	1,299
2. Mid Density Development	0.338	645
2A Mid Density Modified Development	0.338	645
3. Low Density Development	0.129	246

Combined total water demand for Alternatives 1-3 is as follows:

Total Average Daily Water Demand and Hourly Peak Demand

	AVERAGE DAILY DEMAND*		PEAK HOURLY DEMAND*	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
Alternative				
1. High Density Development	.484	1.06	925	2022
2. Mid Density Development	.381	.836	727	1597
2A Mid Density Modified Development	.381	.836	727	1597
3. Low Density Development	.232	.537	444	1026
4. No Action Alternative		.080		153

The highest water demand is generated under Alternative 1 at 1.45 MGD total and the lowest demand is generated under No Action Alternative at 0.12 MGD total. For the summer months, the combined water demand for Alternatives 1-3 is as follows:

Total Average Daily Water Demand and Hourly Peak Demand Summer Season

	AVERAGE DAILY DEMAND		PEAK HOURLY DEMAND	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
Alternative				
1. High Density Development	1.16	1.74	2,224	3,321
2. Mid Density Development	0.719	1.17	1372	2242
2A Mid Density Modified Development	0.719	1.17	727	2242
3. Low Density Development	0.361	0.666	690	1272
4. No Action Alternative	*	0.080	*	153

* No assumptions were analyzed for interim buildout of the 2016 No Action alternative

The current municipal system has capacity to provide 3,500gpm to buildings up to 10 stories and 30 psi for buildings up to 170 feet⁴. Buildings above these heights will need additional booster pumps to provide adequate fire protection and pressures above 30 psi. Based on the water demand projections, the City of Bellingham will have adequate water system capacity to serve the site under all Alternatives.

Sanitary Sewer

Construction Impacts

No substantial interruption of sanitary sewer service to existing users is anticipated during the ongoing construction phase. However, due to the limited amount and size of the existing infrastructure, maintenance and/or upgrades to portions of the existing system may be required should contractors wish to utilize and/or connect to the City sewer system during construction. Depending on the construction phase (2016 or 2026) maintenance of the sanitary sewer system could include connections between new and existing collector branches or pumping in order to facilitate construction.

Operation Impacts Common to 1-3 Alternatives

Most of the existing onsite sanitary sewer system is undersized, out-dated and/or conflicts with the assumed road network under redevelopment. For this reason, the majority of the site's gravity system, especially the area south of the waterway, will be reconstructed and located within the site's new roadway network. For the purposes of preliminary infrastructure planning, utility corridors in Area 1 and portions of Areas 2, 3, 4, 5 and 8 are assumed to be pre-excavated and backfilled with clean materials during the initial phase of utility and roadway installation, consistent with anticipated institutional control requirements of the site cleanup in these areas.

The existing 60" sewer interceptor along Roeder Avenue, Chestnut Street and Cornwall Avenue will continue to serve as a major transmission line to the Oak Street Pump Station.

⁴ City of Bellingham, Department of Public Works.

Due to the size and the operating condition of the pipe, the City will continue to carefully monitor and limit connections to the interceptor. For this reason, the New Whatcom site will most likely develop a sanitary sewer system independent of the interceptor line. The new system would be located in the new roadways and would gravity flow to a new pump station which would discharge directly into the Oak Street Pump Station.

Currently, PSE planning for the Encogen facility is to maintain operations, and to use the facility as a “peaking” station during times of high energy use¹⁰. The station’s industrial waste, which is currently pumped to the ASB for treatment and disposal, will be redirected to the City’s sanitary sewer system.

Estimated sanitary sewer demand reflects the total projected employment and permanent resident capacity associated with assumed New Whatcom land uses at buildouts for 2016 and 2026. Residential sanitary sewer collection is projected based on the number of proposed dwelling units multiplied by persons per household⁵ and a standard sanitary sewer collection criterion of 150 gallons per day (gpd) per capita⁶. Total residential sanitary sewer collection for each alternative is as follows:

Residential Buildout 2016

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density Development	0.461	881
2. Mid Density Development	0.354	675
2A Mid Density Modified Development	0.354	675
3. Low Density Development	0.189	360

Residential Buildout 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density Development	.881	1682
2. Mid Density Development	0.673	1,286
2A Mid Density Modified Development	0.673	1,286
3. Low Density Development	0.48	725
4. No Action Alternative	0	0

¹⁰ Personal communication with PSE Encogen staff

⁵ Ratio of 2.13 persons per unit. U.S. Census Bureau, American Survey, Whatcom County, 2005

⁶ City of Bellingham, Department of Public Works

Non-residential sanitary sewer collection is projected based on the number of proposed employees multiplied by a standard sanitary sewer collection criterion of 25 gpd per capita⁷. Total non-residential sanitary sewer collection is as follows:

Non-Residential Buildout 2016

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density Development	0.792	151
2. Mid Density Development	0.655	125
2A Modified Mid Density Development	0.655	125
3. Low Density Development	0.0495	95

Non-Residential Buildout 2026

	Average Daily Demand (mgd)	Peak Hour Demand (gpm)
Alternative		
1. High Density Development	0.218	416
2. Mid Density Development	0.180	344
2A Modified Mid Density Development	0.180	344
3. Low Density Development	0.134	257
4. No Action Alternative	0.04	76

Combined total sanitary sewer demand for all Alternatives is as follows:

Total Average Daily Sanitary sewer Demand and Hourly Peak Demand

	AVERAGE DAILY DEMAND		PEAK HOURLY DEMAND	
	Buildout 2016 (mgd)	Buildout 2026 (mgd)	Buildout 2016 (gpm)	Buildout 2026 (gpm)
Alternative				
1. High Density Development	0.540	1.10	1032	2099
2. Mid Density Development	0.419	.853	800	1630
2A Modified Mid Density Development	0.419	.853	800	1630
3. Low Density Development	0.238	0.514	455	982
4. No Action Alternative	*	0.04	*	76

* No assumptions were analyzed for interim buildout of the 2016 No Action alternative

The highest sanitary sewer collection is generated under Alternative 1 at 1.3 MGD total and the lowest demand is generated under No Action Alternative at 0.04 MGD total. The Oak

⁷ *ibid.*

Street pump station and Post Point Plant has adequate capacity to handle the New Whatcom redevelopment. The City is currently conducting a Sewer Comprehensive Plan update to address future capacity of the Post Point Plant and a lift stations to accommodate future growth in the surrounding vicinity.

Electricity

Most of the site's existing electrical lines will be removed or replaced during redevelopment. The electrical infrastructure is anticipated to be located in underground conduit. Existing transmission lines and the current Area 1 substation on site will not be relocated. PSE anticipates that the Area 3 substation will be replaced with a new substation that will be designed to accommodate the new types of uses at the New Whatcom redevelopment. The timing of the substation replacement is not presently known and is contingent upon the energy demands and schedule of the future site development and the results of long range planning at PSE.

Currently, PSE's plans for the Encogen station are to maintain its operation and use it as a "peaking" station during times of high energy use⁸. However, for purposes of this EIS analysis, it is assumed that the ECOGEN plant will not be located at the site in 2026 in Alternatives 1-3. The ECOGEN plant will need to obtain a new NPDES permit for discharge of wastewater once ABS facility is closed for remediation and redevelopment.

Electrical Power Demand

Electric power demand relates to the required capacity of electrical utility system to serve the site. Estimated electric power peak demand for land-uses associated with the New Whatcom Redevelopment at full buildout are as follows:

Land-Use Type	Estimated Peak Electric Power Demand (Watts per Square Foot) ⁹
Office/ Institutional	7.00
Light/Marine Industrial	5.80
Commercial	5.20
Restaurant	12.50
Residential	3.80

These values are used below to calculate electric power demand for all alternatives.

Alternative	Peak Electric Power Demand (Mega Watts)
1	39.2
2	32.4
2A	32.4
3	22.3
No Action	6.03

⁸ Personal communication with Encogen staff.

⁹ Puget Sound Energy planning demand factor for electricity 2007.

Construction of a new substation on site will result in a substantial investment for PSE. The use of “built green” or low-impact design features would reduce the demand for energy, relative to traditional building practices. Where possible, construction and operation activities would promote the use of recycled materials, eco-friendly building techniques, and energy conservation.

No significant impacts to PSE infrastructure are anticipated. PSE has the capacity to serve the demand for natural gas under Alternatives 1-3.

Natural Gas

Most of the on-site existing gas lines will be removed or replaced during redevelopment. The existing high pressure gas line that runs along Cornwall would serve the southern areas of the new development with some upgrades to the regulator station at the west end of Cornwall Street. The existing gas lines in Roeder Avenue and Hilton Street would serve the northern area.

Natural Gas Demand

Natural gas demand relates to the required capacity of gas utility system to serve the site. Estimated peak gas demand for land-uses associated with the New Whatcom Redevelopment at full build out are as follows:

Land-Use Type	Annual Natural Gas Demand per Square Foot ¹⁰
Office/Institutional	30,000 BTU (British Thermal Units)
Light/Marine Industrial	16,000 BTU
Retail	33,000 BTU
Residential	27,000 BTU

These values are used below to calculate natural gas demand for all alternatives.

Alternative	Annual Natural Gas Demand
1	203,550 MMBTU (Millions British Thermal Units)
2	172,665 MMBTU
2A	172,665 MMBTU
3	116,010 MMBTU
No Action	5079 MMBTU

No significant impacts to Cascade Natural Gas infrastructure are anticipated. Cascade Natural Gas has the capacity to serve the demand for natural gas under Alternatives 1-3.

¹⁰ Puget Sound Energy planning demand factor for natural gas.

4.0 Mitigation

Water

- The Port will coordinate with the City of Bellingham regarding the Master Development Plan and redevelopment of the New Whatcom site's water infrastructure to ensure consistency with the City's overall water system.
- Design of proposed water distribution facilities will comply with all City of Bellingham water utility standards for constructing extensions to the City's water system.
- Water mains will be located within the site's new roadway network, consistent with the City of Bellingham's water regulations and design standards.
- The New Whatcom Master Plan design phase will include a range of development standards related to the construction and development of buildings that include provisions to encourage water conservation during building construction and long-term operation.

Sanitary Sewer

- The Port will coordinate with the City of Bellingham regarding the Master Development Plan and redevelopment of the New Whatcom site's sanitary sewer infrastructure to ensure consistency with the City's overall sewer system.
- Design of proposed sanitary sewer collection facilities will comply with all City of Bellingham sanitary sewer collection utility standards for constructing extension to the City's sewer system.
- Sanitary sewer collector pipes will be located within the site's new roadway network, consistent with the City of Bellingham's sanitary sewer regulations and design standards.

Electric Power

- The Port will coordinate with PSE during the Master Development Plan and permitting of new electrical lines on site in order to adequately size facility electrical networks.
- All new buildings on the site will meet City of Bellingham and Washington State energy utility requirements, including potential construction of temporary service lines to avoid construction-related impacts to existing customers.
- Most of the electrical lines will be installed underground to minimize disruption to the natural environment.
- The New Whatcom Master Development Plan phase will include a range of development standards related to the construction and development of buildings that include provisions to encourage energy efficiency and conservation during building construction and long-term operation.

Natural Gas

- The Port will coordinate with Cascade Natural Gas during the Master Development Plan and permitting of new gas lines on site in order to adequately size facility gas infrastructure.

- All new buildings on the site will meet City of Bellingham and Washington State energy utility requirements.
- The New Whatcom Master Development Plan phase will include a range of development standards related to the construction and development of buildings that include provisions to encourage energy efficiency and conservation during building construction and long-term operation.

No significant impacts to utilities from the New Whatcom Redevelopment have been identified under any of the Alternatives. As such, no additional mitigation is required.

References

City of Bellingham Comprehensive Plan. Chapter 5: Capital Facilities. June 5, 2006. <http://www.cob.org/pcd/planning/growth/comp-update.htm>

City of Bellingham Comprehensive Plan. Chapter 6: Private Utilities and Services. June 5, 2006. <http://www.cob.org/pcd/planning/growth/comp-update.htm>

City of Bellingham, Department of Public Works, Development Guidelines and Improvement Standards.

The City of Bellingham Final Environmental Statement for Bellingham Urban Growth Area; Five-Year Review Areas; and Whatcom County Urban Fringe Subarea. Chapter 4: Built Environment. July 1, 2004. <http://www.cob.org/pcd/planning/growth/eis.htm>

Washington State Department of Health. Water Design Manual. Chapter 5 Water Demand Requirements. August 2001

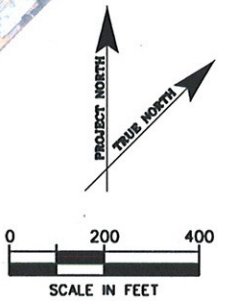
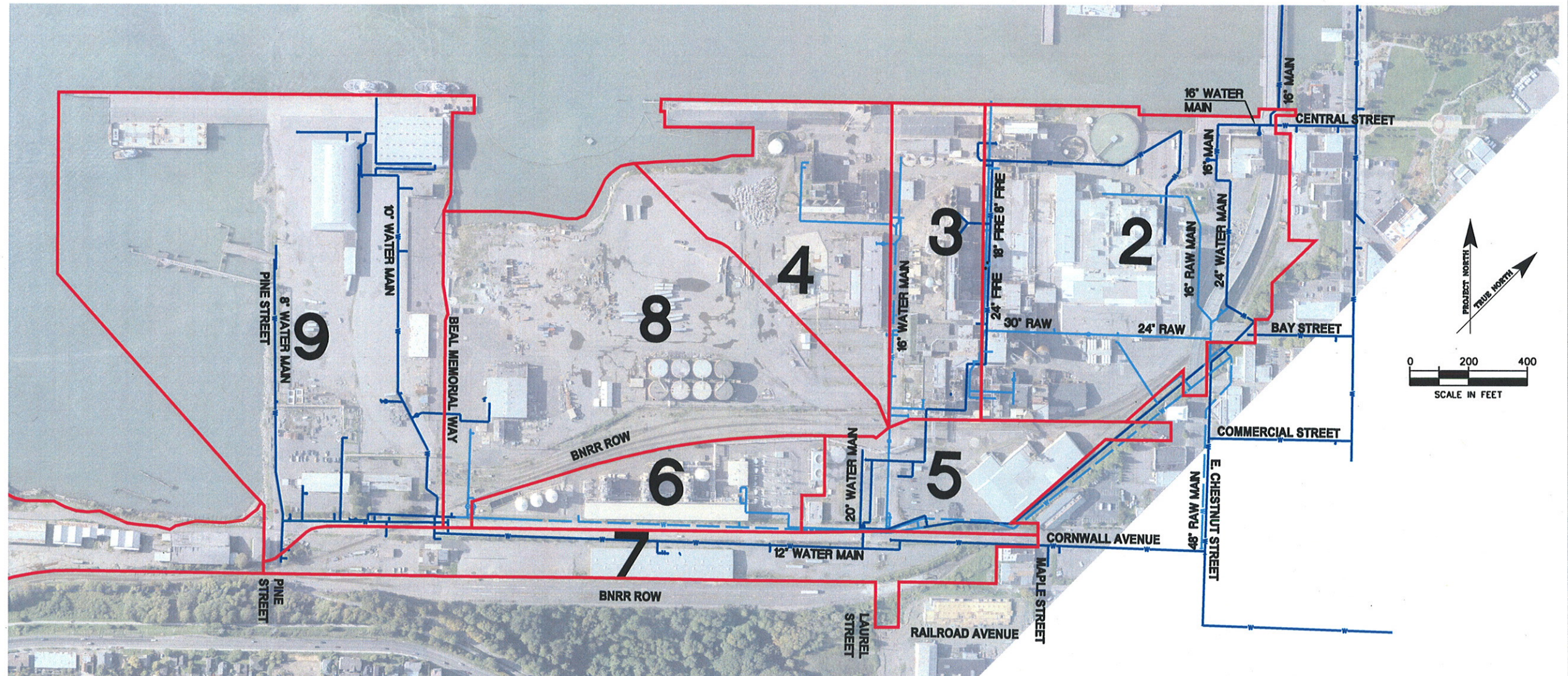
Kjelstad, Martin. City of Bellingham Department of Public Works Engineer. Personal Communication (via telephone) 6/13/2007 with David Evans and Associates.

Van Corbach, Gordon. Cascade Natural Gas Staff. Personal Communication (via telephone and email) 6/25/2007 with David Evans and Associates.

Maret, Kit. Puget Sound Energy Consulting Engineer. Personal Communication (via telephone and email) 6/22/2007 with David Evans and Associates.

Smyth, Geoffrey M. City of Bellingham Public Works Superintendent. Email Communication 9/4/2007 with David Evans and Associates.

Perry, Dick. Georgia Pacific staff. Personal Communication 4/25/2007 with David Evans and Associates.



LEGEND

- POTABLE WATER MAIN
- - - - RAW WATER MAIN
- REDEVELOPMENT AREA BOUNDARY

**PORT OF BELLINGHAM
BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
EXISTING WATER SYSTEM
AREAS 2-9**

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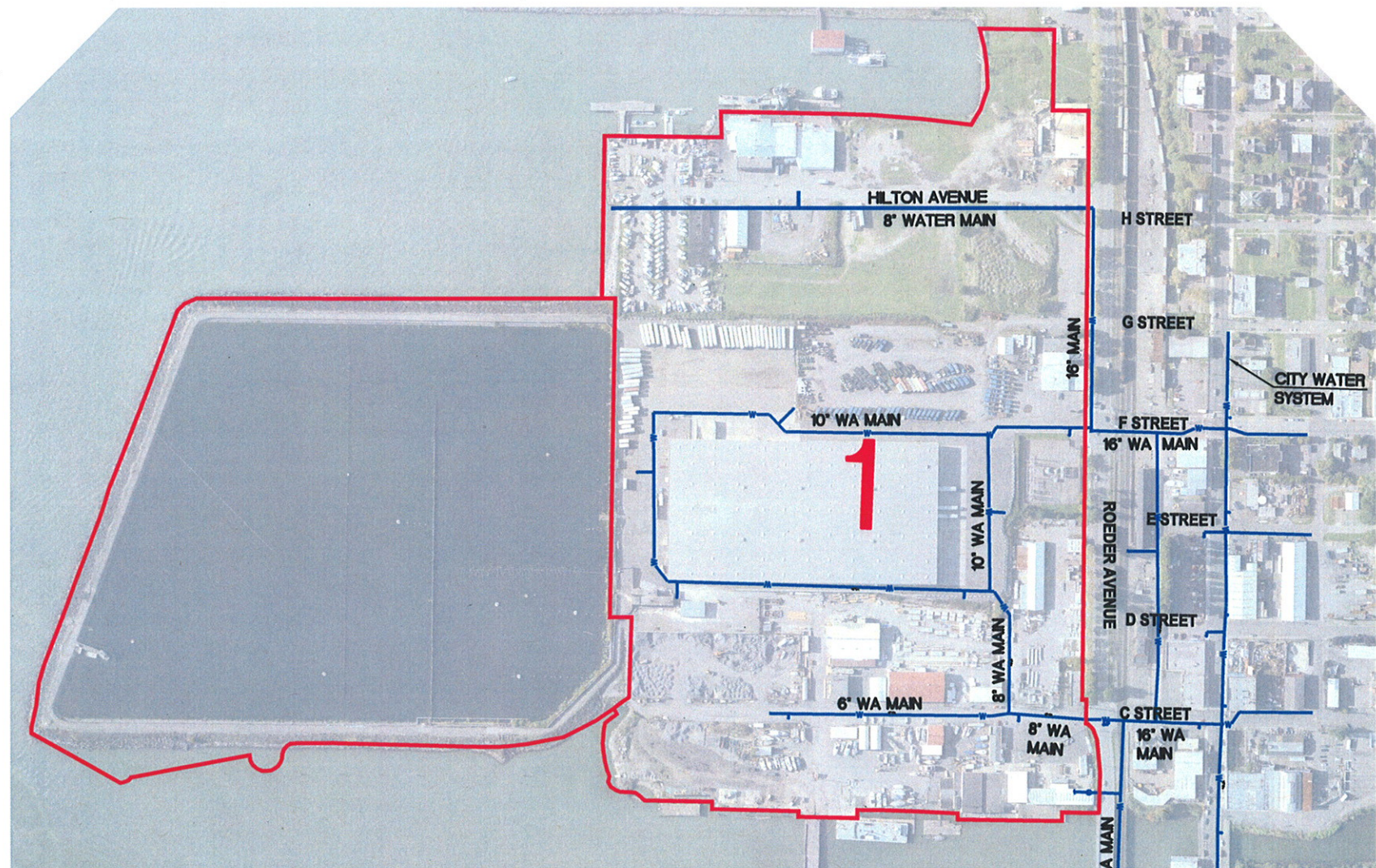
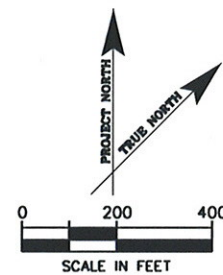
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1A

DE

**DAVID EVANS
AND ASSOCIATES INC.**

115 Grand Avenue, Suite D
Bellingham, Washington 98225
Phone: 360.647.7151
Fax: 360.647.7160

NO.	REVISIONS:	APPD.



LEGEND

— POTABLE WATER MAIN

— REDEVELOPMENT AREA BOUNDARY

**PORT OF BELLINGHAM
BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
EXISTING WATER SYSTEM
AREAS 1 AND 10**

**DAVID EVANS
AND ASSOCIATES INC.**
119 Grand Avenue, Suite D
Bellingham, Washington 98225
Phone: 360.847.7151
Fax: 360.847.7160

PROJECT NUMBER:
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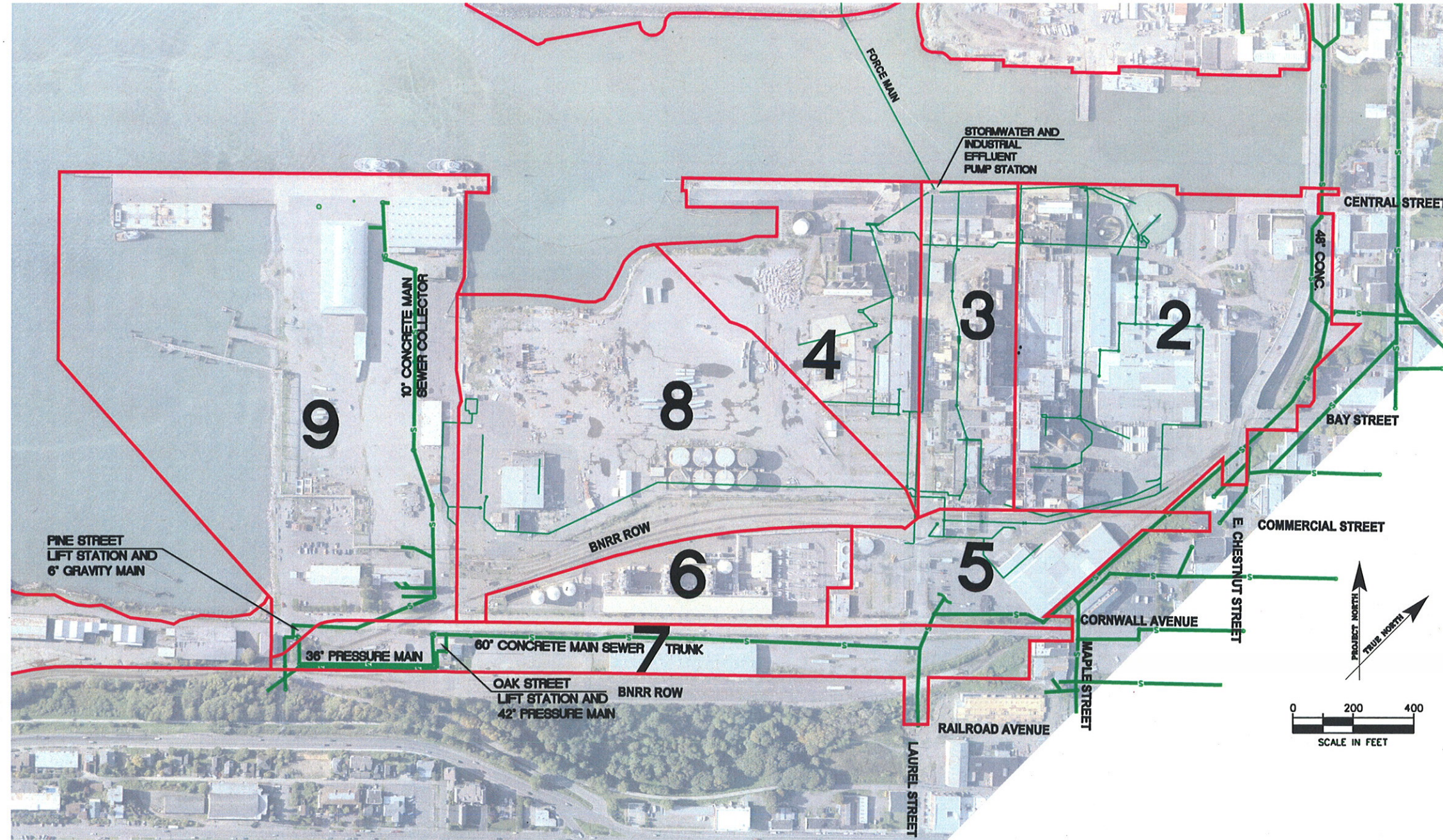
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SHEET NO.

1B

NO.	REVISIONS:	APPD.



- LEGEND**
- SANITARY SEWER LINE
 - COMBINED STORM AND WASTEWATER LINES
 - REDEVELOPMENT AREA BOUNDARY

**PORT OF BELLINGHAM
BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
EXISTING SEWER SYSTEM
AREAS 2-9**

**DAVID EVANS
AND ASSOCIATES INC.**
119 Grand Avenue, Suite D
Bellingham, Washington 98225
Phone: 360.647.1151
Fax: 360.647.7160

PROJECT NUMBER:
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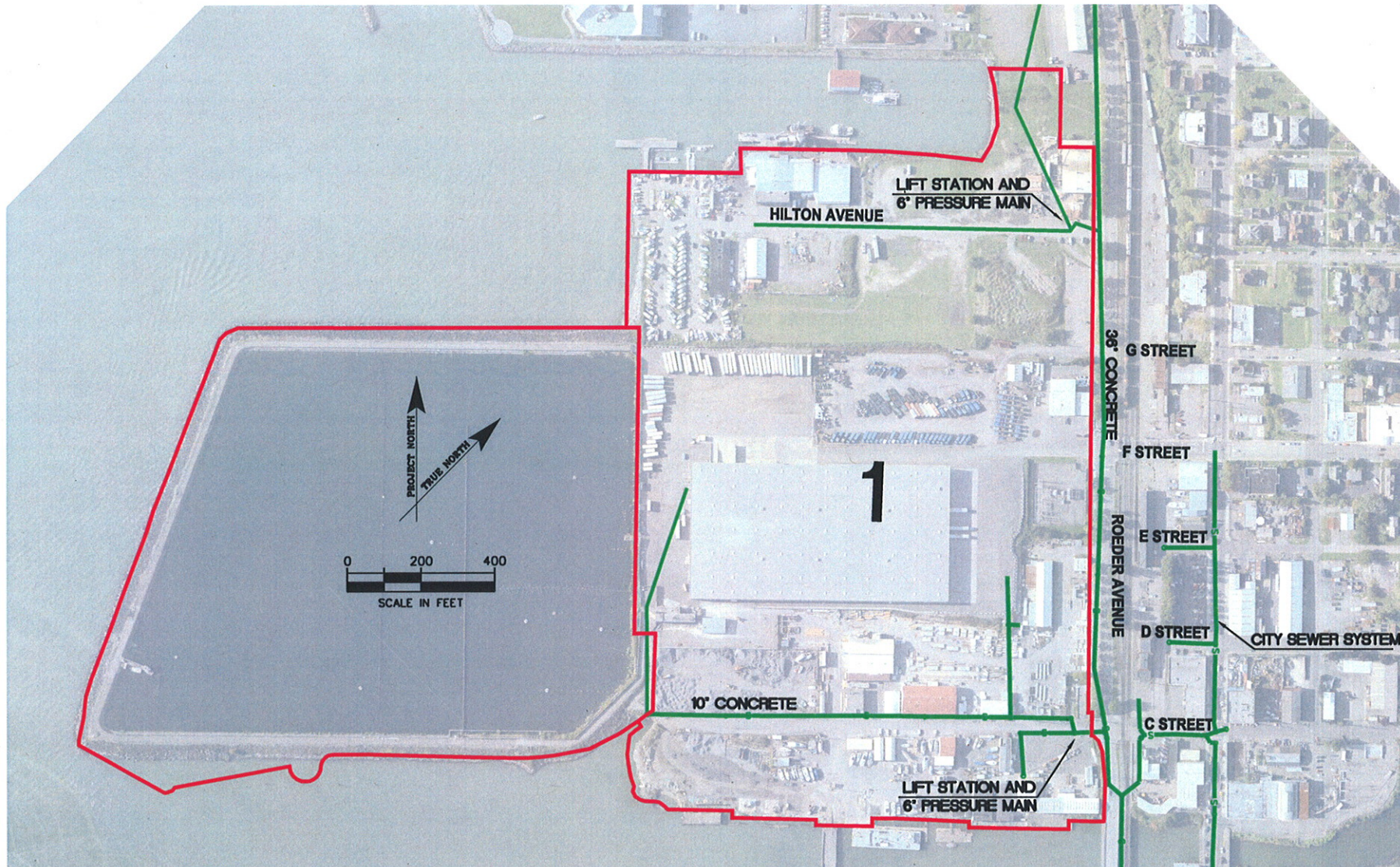
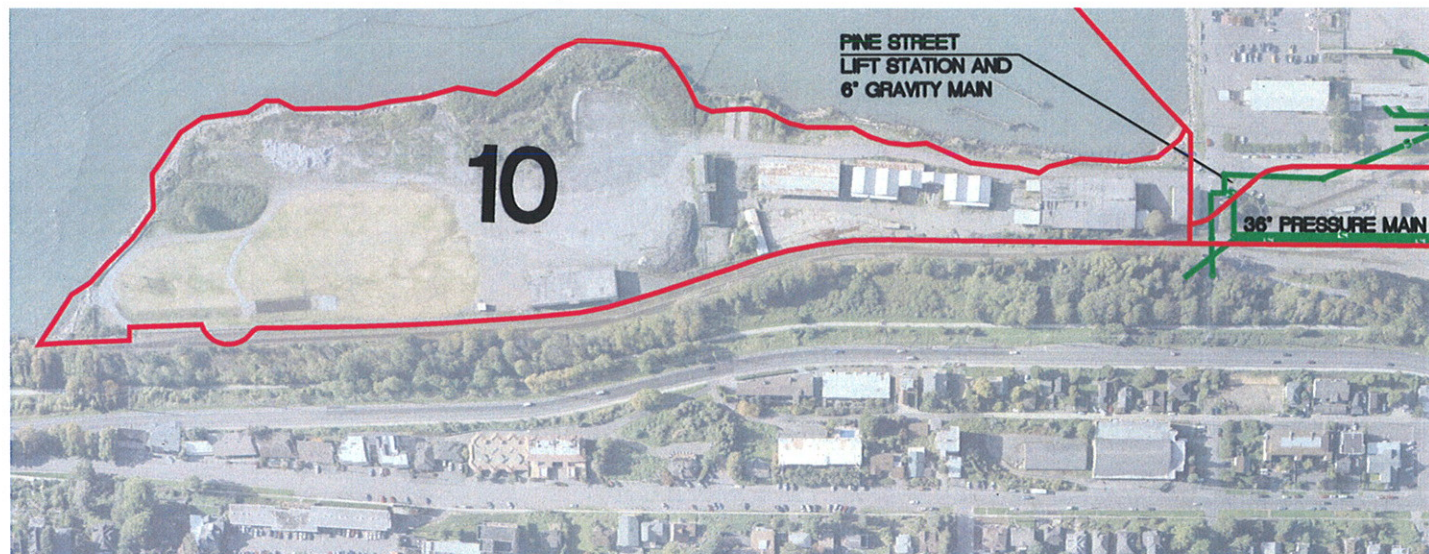
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2A

OF



LEGEND

— SANITARY SEWER LINE
 — REDEVELOPMENT AREA BOUNDARY

**PORT OF BELLINGHAM
 BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
 EXISTING SEWER SYSTEM
 AREAS 1 AND 10**

**DAVID EVANS
 AND ASSOCIATES INC.**

119 Grand Avenue, Suite D
 Bellingham Washington 98225
 Phone: 360.647.7151
 Fax: 360.647.7160

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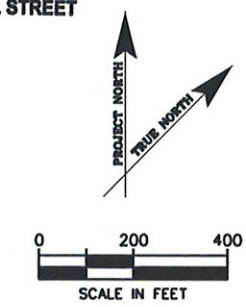
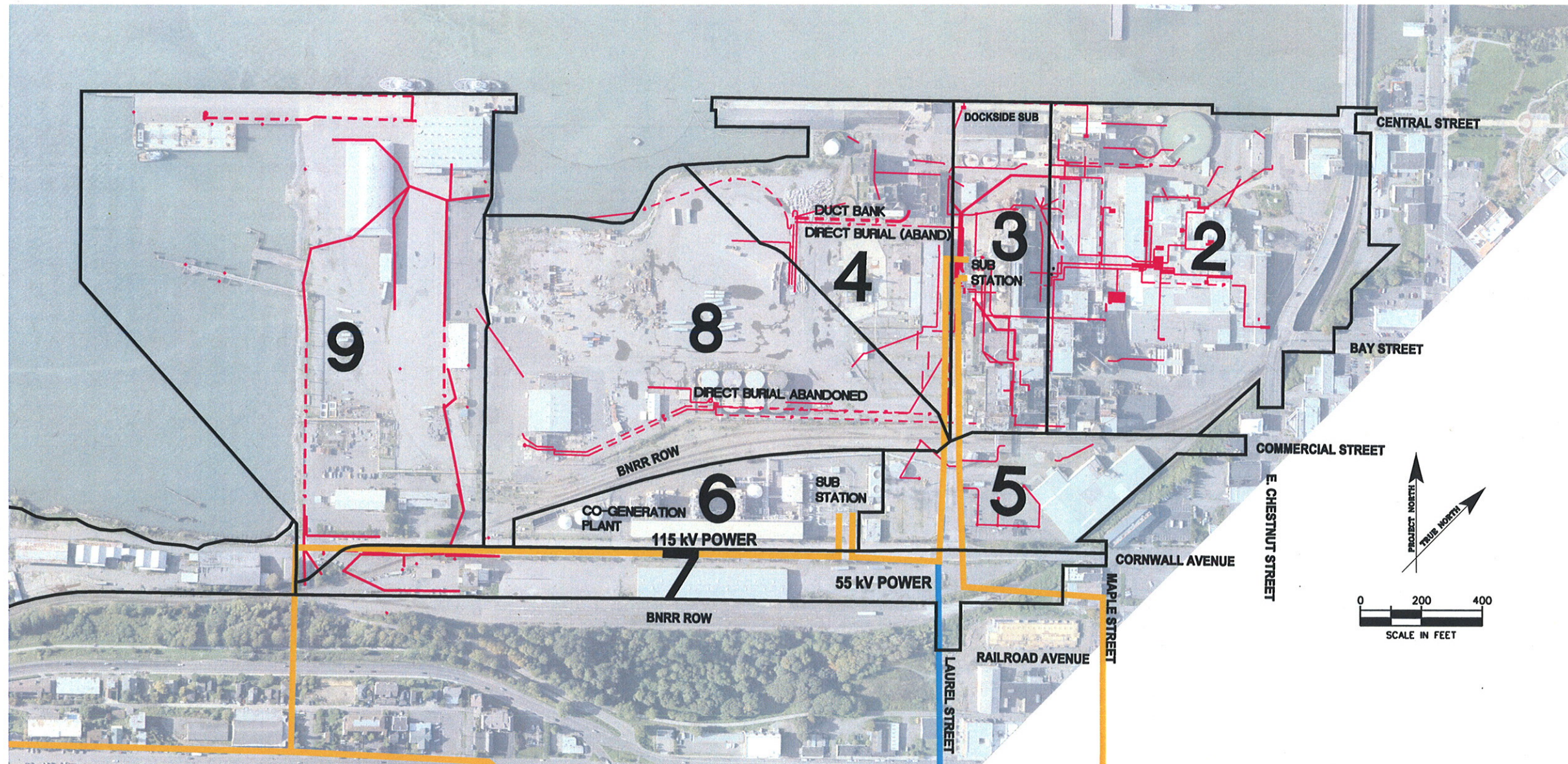
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2B

OF

NO. REVISIONS:

APPD.



- LEGEND**
- ELECTRICAL LINE
 - 55 kV ELECTRIC TRANSMISSION LINE
 - 115 kV ELECTRIC TRANSMISSION LINE
 - REDEVELOPMENT AREA BOUNDARY

DAVID EVANS AND ASSOCIATES INC.
 119 Grand Avenue, Suite D
 Bellingham, Washington 98225
 Phone: 360.647.7151
 Fax: 360.647.7160

**PORT OF BELLINGHAM
 BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
 EXISTING ELECTRIC SYSTEM
 AREAS 2-9**

PROJECT NUMBER:
 CWOE0002

DATE: 12-07-07
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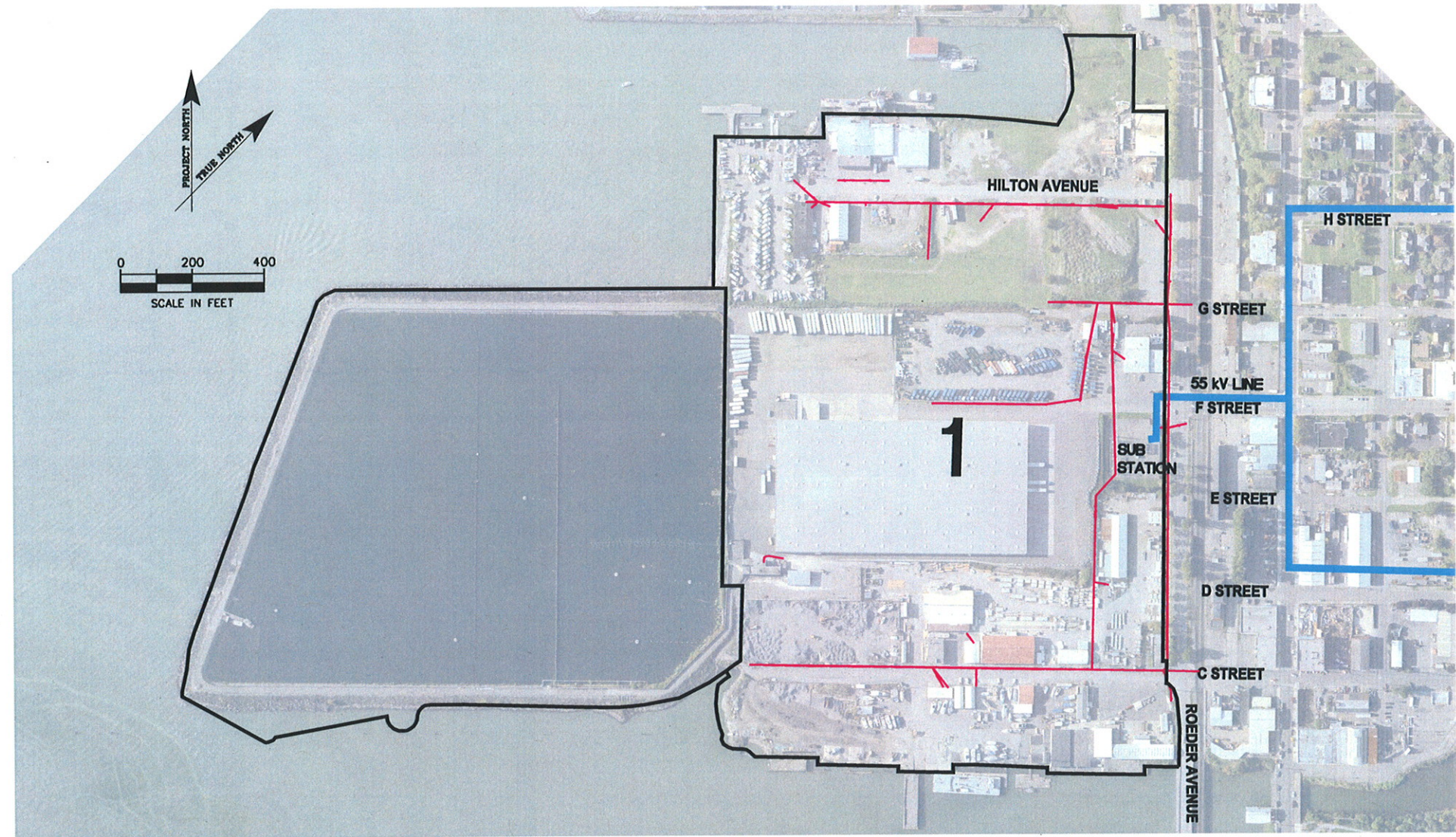
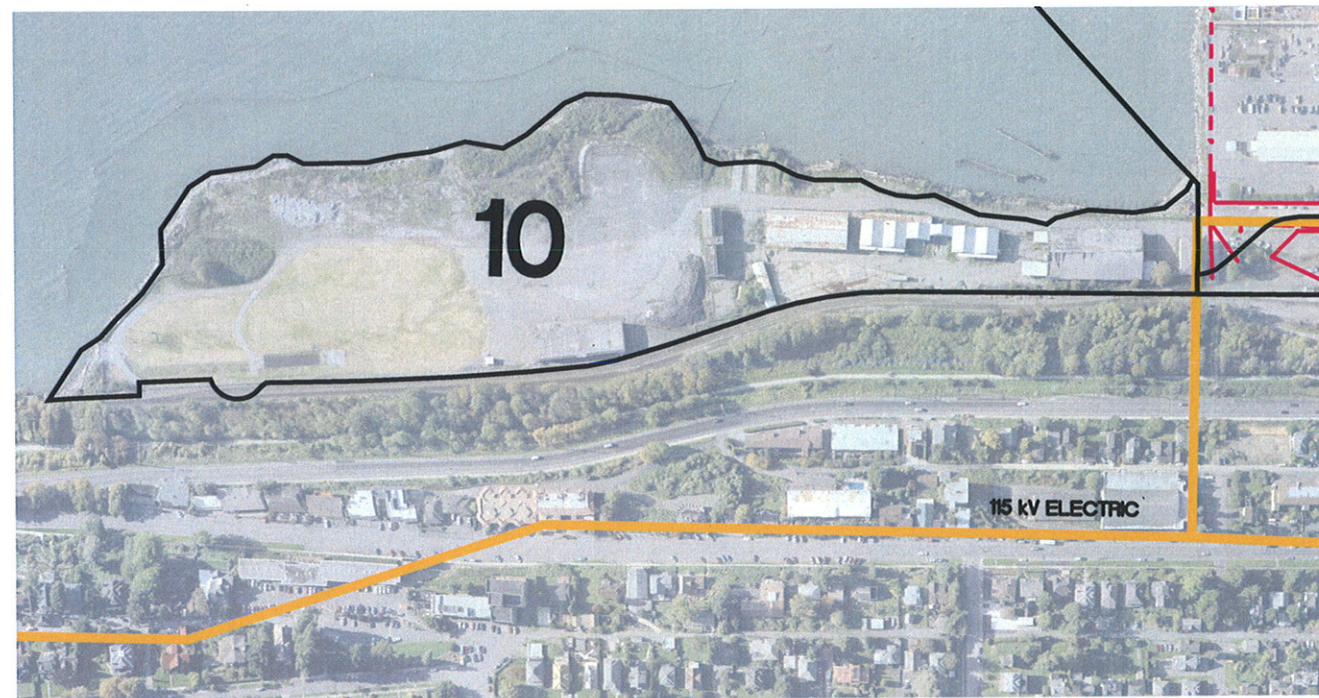
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3A

OF

NO. REVISIONS:

APPD.



LEGEND

- ELECTRIC LINE
- 55 kV ELECTRIC TRANSMISSION LINE
- 115 kV ELECTRIC TRANSMISSION LINE
- REDEVELOPMENT AREA BOUNDARY

PORT OF BELLINGHAM BELLINGHAM, WA NEW WHATCOM REDEVELOPMENT EXISTING ELECTRIC SYSTEM AREAS 1 AND 10

PROJECT NUMBER:
CW0E0002

DATE: 12-07-07
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SCALE: 1" = 200'

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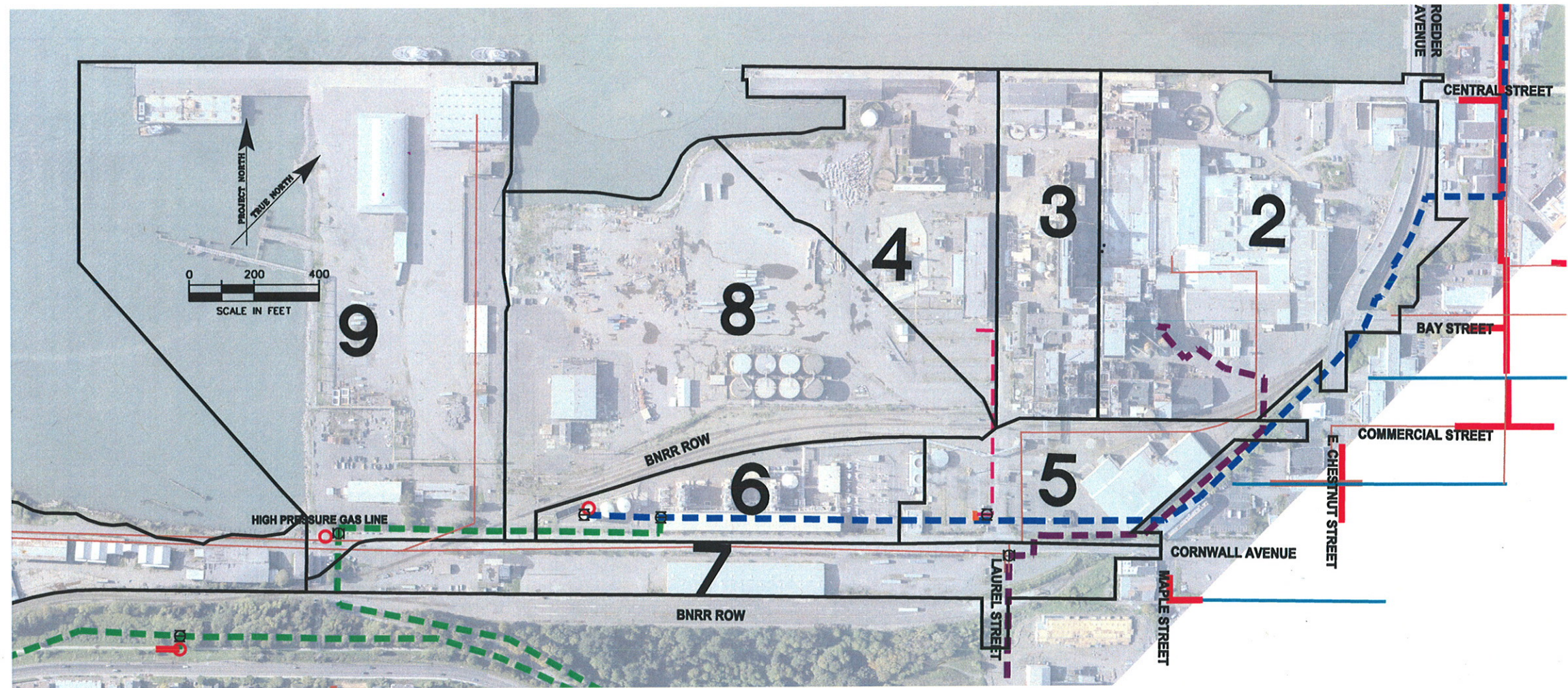
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OF

**DAVID EVANS
AND ASSOCIATES INC.**
119 Grand Avenue, Suite D
Bellingham Washington 98225
Phone: 360.647.7151
Fax: 360.647.7160

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- GAS VALVE
 GAS REGULATOR
- GAS LINE-16 INCH HIGH PRESSURE (Plastic)
- GAS LINE-10 INCH
- GAS LINE-4 INCH (Plastic)
- GAS LINE-2 INCH
- GAS LINE-ABANDONED
- GAS LINE-UNKNOWN SIZE (Plastic)
- GAS LINE-UNKNOWN SIZE

REDEVELOPMENT AREA BOUNDARY

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 CWOE0002
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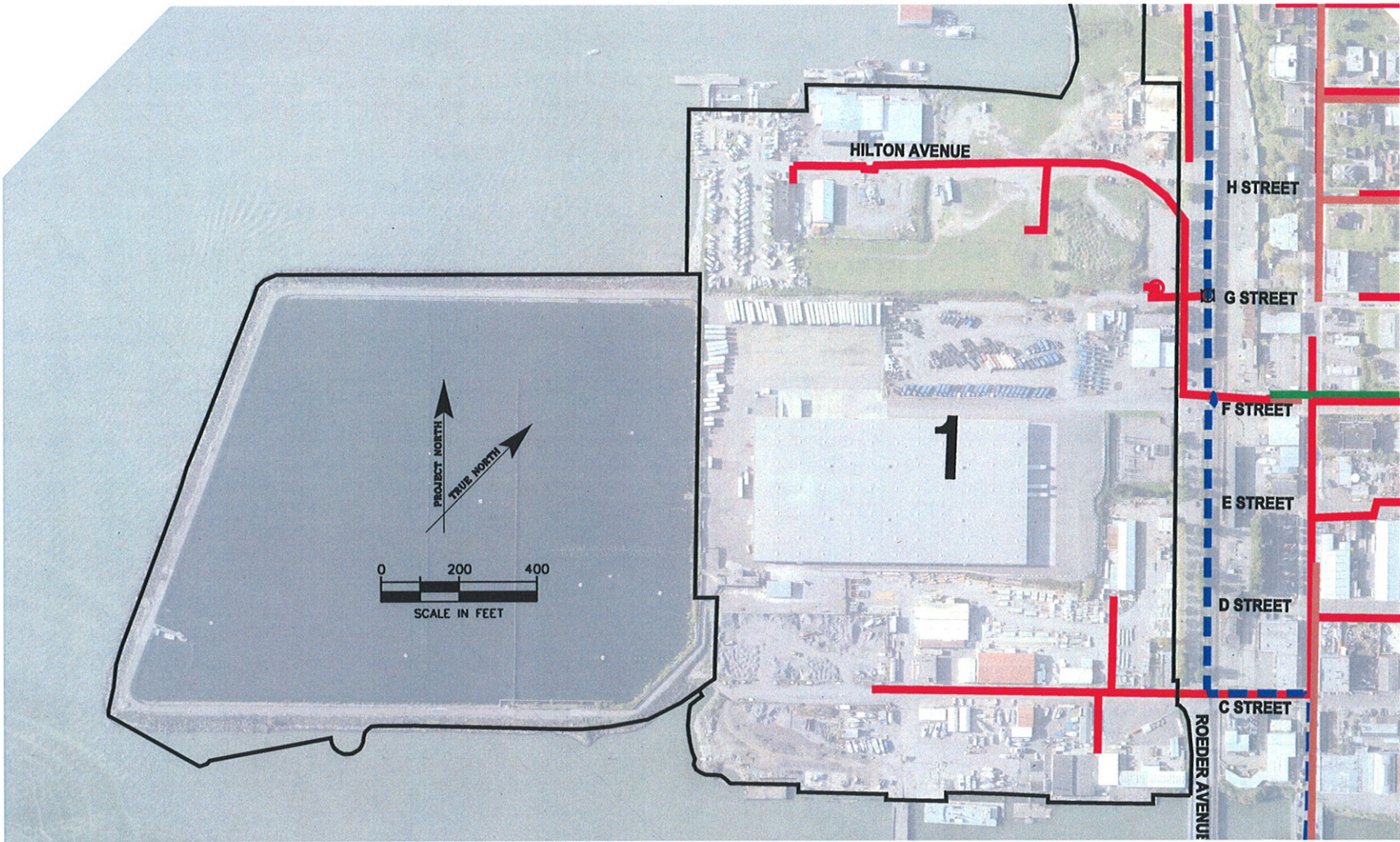
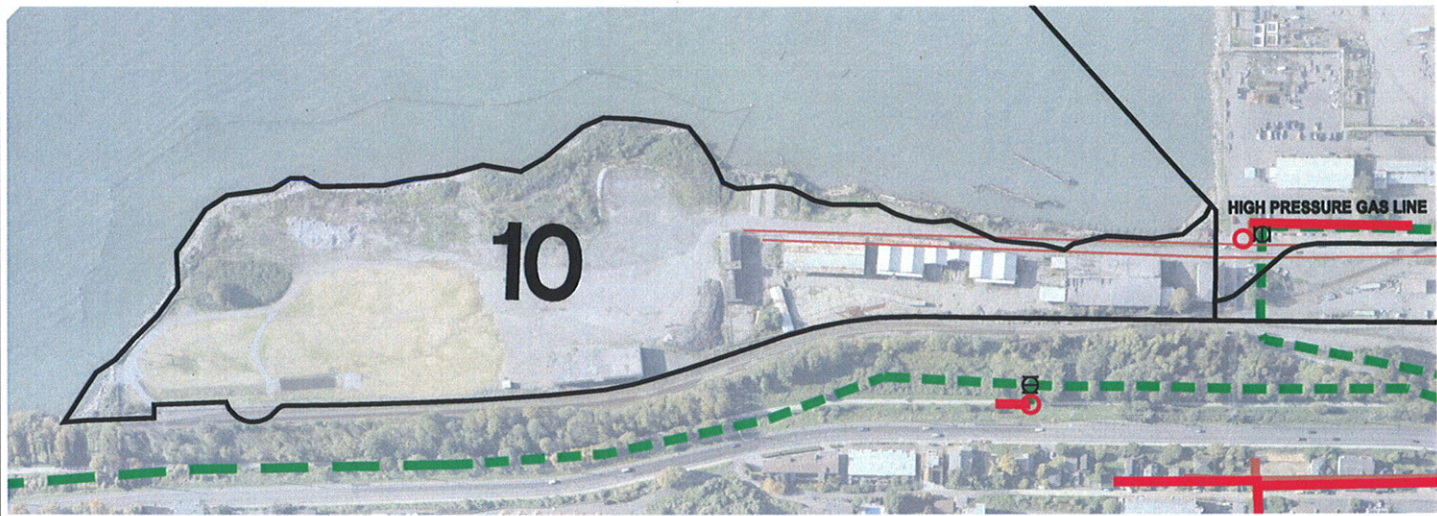
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4A

OF

NO. REVISIONS:

APPD.



- GAS LINE-16 INCH HIGH PRESSURE (Plastic)
- GAS LINE-4 INCH (Plastic)
- GAS LINE-2 INCH
- GAS LINE-ABANDONED

--- REDEVELOPMENT AREA BOUNDARY

**PORT OF BELLINGHAM
BELLINGHAM, WA**

**NEW WHATCOM REDEVELOPMENT
EXISTING GAS SYSTEM
AREAS 1 AND 10**

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AND ASSOCIATES INC.**

119 Grand Avenue, Suite D
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DESIGN: MJD
DRAWN: HJC/TEP
CHECKED:

SCALE: 1"= 200'

SHEET NO.

4B

OF

NO. REVISIONS:

APPD.