CITY OF ST. PAUL, ALASKA

ELLERMAN HEIGHTS SEWER SYSTEM IMPROVEMENTS FEASIBILITY STUDY

ST. PAUL ISLAND, ALASKA

JULY 2005

35% DESIGN

SCOPE OF WORK:
THE PROJECT IS TO UPGRADE SEWER COLLECTION INFRASTRUCTURE IN THE SOUTH ELLERMAN AND POLOVINA AREAS, UPGRADE THE ELLERMAN AND OLD TOWN / SANDY LANE LIFT STATIONS, AND CONSTRUCT NEW SEPTIC TANKS AT EAST LANDING TO SERVE THE ENTIRE COMMUNITY.

SCOPE OF WORK:

1. UPGRADE EXISTING OLD TOWN/SANDY LANE LIFT STATION. ABANDON DRY WELL, CONSTRUCT NEW PUMP BUILDING OVER EXISTING WET WELL. INSTALL NEW PUMPS, PUMP CONTROLS, AND VALVING TO MODERNIZE SYSTEM AND INCREASE WORKER SAFETY.

2. UPGRADE EXISTING SEWER MAINS ALONG SOUTH ELLERMAN BELOW MANHOLE #12 AND ALONG POLOVINA TURNPIKE BETWEEN MANHOLE #4D1 AND MANHOLE #7D. ABANDON EXISTING SOUTH ELLERMAN SEPTIC TANKS AND SEWERS, BUILD NEW SEWERS DESIGNED TO ACCOMODATE BLACK WATER FLOWS AT FULL DEVELOPMENT OF THE SERVICE AREA.

3. ABANDON EXISTING NORTH ELLERMAN SEPTIC TANKS, RE-ROUTE BLACK WATER TO UPGRADED ELLERMAN LIFT STATION.

4. ABANDON/REMOVE EXISTING OLD TOWN AND HARBOR SEPTIC TANKS AT EAST LANDING. CONSTRUCT NEW SEPTIC TANK AT EAST LANDING DESIGNED TO ACCOMODATE DESIGN FLOWS FOR THE ENTIRE COMMUNITY.

EXISTING AND PROJECTED DESIGN FLOWS FOR SAINT PAUL SEWER SYSTEM

Service Area	Existing Flows (gallons per minute)		Full Development Flows (gallons per minute) [2]	
	Average	Peak [3]	Average	Peak [3]
South Ellerman [1]	6.5	19.5	7.7	23.8
South Polovina [1]	0.6	1.8	4.1	12.6
North Ellerman, Lukanin Hills, and Public Works [1]	8.4	25.1	16.9	52.5
Ellerman Lift Station	15	46.4	28.7	88.9
South Old Town [1]	4.8	14.4	6.6	20.5
North Old Town [1]	8	24	9.4	29.1
Sandy Lane [1]	4.4	13.2	4.9	15.2
Sandy Lane Lift Station	17.2	51.6	20.9	64.9

Existing flows in Ellerman Lift Station and Old Town / Sandy Lane Lift Station are based upon actual flows.
1. Existing wastewater flows for individual service areas are interpolated from measured flows at lift stations using existing development patterns in individual service areas.
2. Wastewater flows for full development are extrapolated from measured flow at lift stations using existing development and full development under current zoning within the existing service area. Per capita wastewater
3. Peaking factor of 3.1 times average flow was observed in Ellerman Lift Station. This peaking factor was used for estimating flows in all service areas. The lower peaking factor observed in Sandy Lane Lift Station

DESIGN BASIS FOR EAST LANDING COMMUNITY SEPTIC TANK

SERVICE AREA	Existing Average Daily Flow (gpd)	Buildout Average Daily Flow (gpd)
Ellerman Lift Station	21,400	41,300
Sold Town / Sandy lane Lift Station	27,600	30,100
Harbor Lift Station	40,000	80,000
AVERAGE DAILY FLOW, ENTIRE SYSTEM	60,800	151,400
SEPTIC TANK SIZE		
Minimum Septic Tank Size as per ADEC REGS (gallons)	46,600	114,700
Minimum Tank Size using 0.9 day Hydraulic Residence Time at Average Daily Flow (gallons)	50,000	140,000

Alaska Dept. of Environmental Conservation (ADEC) regulations, 18AAC72.035(a)(3)(C.), require septic tank to be sized by 1,125 gal + 0.75 x design daily flow.

SHEET INDEX

STATE OF ALASKA
DEPT. OF ENV. CONSERVATION
VILLAGE SAFE WATER
GRANT # 74906

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PHONE (907) 258-2420
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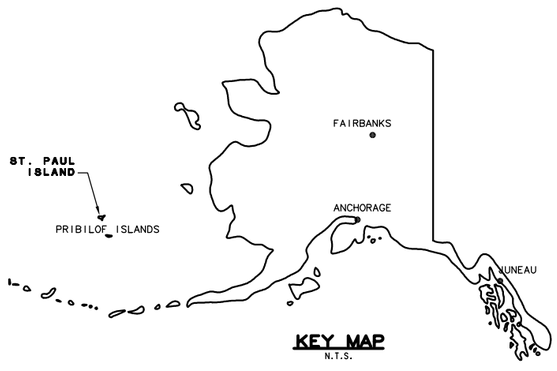
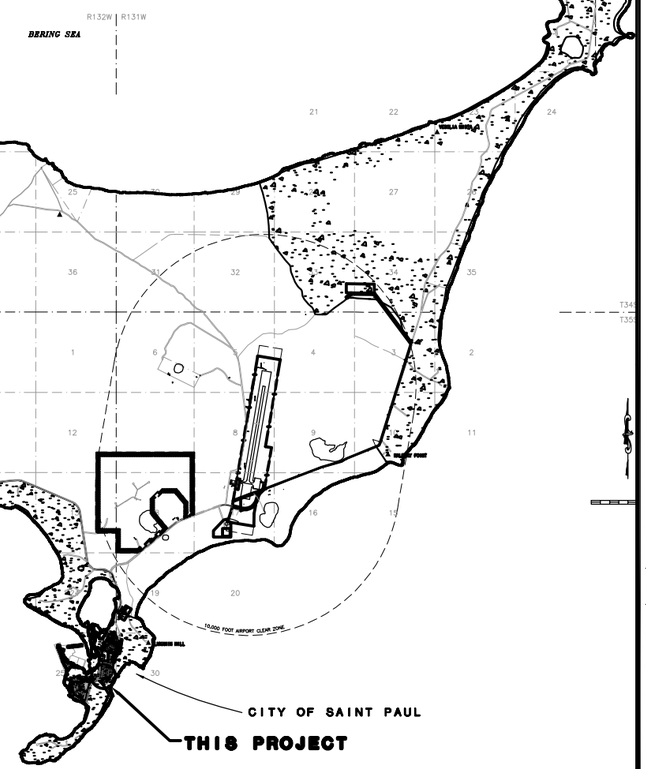
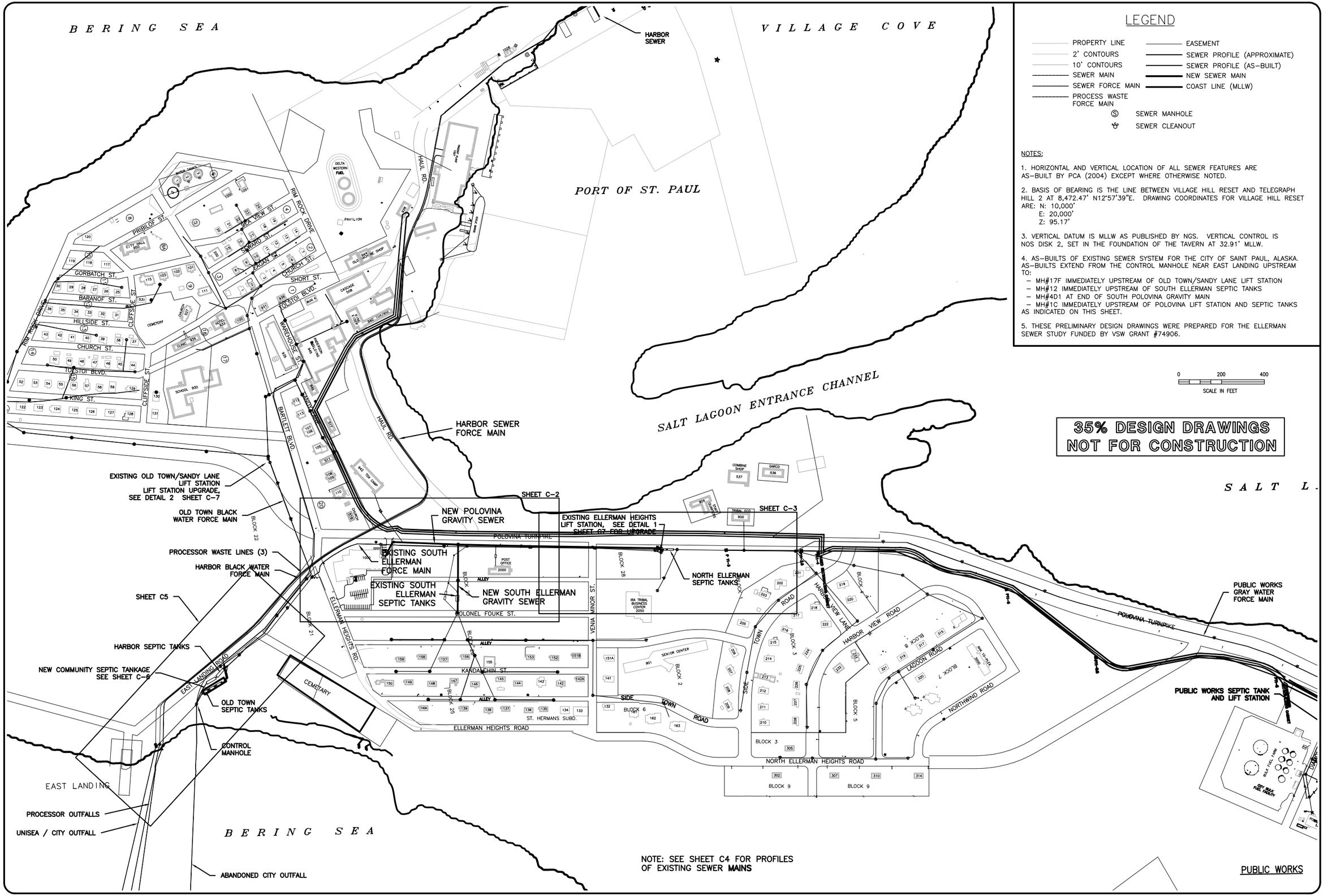


KEY MAP
N.T.S.



NATIONAL HISTORIC LANDMARK BOUNDARY
ARCHAEOLOGICAL SITE
SHORELINE (1967, 1983, 1984 BLM MEANDERS)
LAKE (1983 BLM MEANDERS)
LAKE (DIGITIZED OFF NOAA CHART)
SURVEYED SECTION LINES (1983 BLM)
UNSURVEYED SECTION LINES
PROPERTY LINES (1967, 1983, 1984 BLM SURVEYS)
60 FOOT ROAD RIGHT OF WAYS
25 FOOT TRAIL EASEMENTS
TRAILS (NO EASEMENT)

04003 Ellerman Swr Feas Study\dwgs\ES_UPGRADE_COVER.DWG



NOTE: SEE SHEET C4 FOR PROFILES OF EXISTING SEWER **MAINS**

LEGEND

- PROPERTY LINE
- 2' CONTOURS
- 10' CONTOURS
- SEWER MAIN
- SEWER FORCE MAIN
- PROCESS WASTE FORCE MAIN
- EASEMENT
- SEWER PROFILE (APPROXIMATE)
- SEWER PROFILE (AS-BUILT)
- NEW SEWER MAIN
- COAST LINE (MLLW)
- SEWER MANHOLE
- SEWER CLEANOUT

NOTES:

1. HORIZONTAL AND VERTICAL LOCATION OF ALL SEWER FEATURES ARE AS-BUILT BY PCA (2004) EXCEPT WHERE OTHERWISE NOTED.

2. BASIS OF BEARING IS THE LINE BETWEEN VILLAGE HILL RESET AND TELEGRAPH HILL 2 AT 8,472.47' N12°57'39"E. DRAWING COORDINATES FOR VILLAGE HILL RESET ARE: N: 10,000'
E: 20,000'
Z: 95.17'

3. VERTICAL DATUM IS MLLW AS PUBLISHED BY NGS. VERTICAL CONTROL IS NOS DISK 2, SET IN THE FOUNDATION OF THE TAVERN AT 32.91' MLLW.

4. AS-BUILTS OF EXISTING SEWER SYSTEM FOR THE CITY OF SAINT PAUL, ALASKA. AS-BUILTS EXTEND FROM THE CONTROL MANHOLE NEAR EAST LANDING UPSTREAM TO:
- MH#17F IMMEDIATELY UPSTREAM OF OLD TOWN/SANDY LANE LIFT STATION
- MH#12 IMMEDIATELY UPSTREAM OF SOUTH ELLERMAN SEPTIC TANKS
- MH#4D1 AT END OF SOUTH POLOVINA GRAVITY MAIN
- MH#1C IMMEDIATELY UPSTREAM OF POLOVINA LIFT STATION AND SEPTIC TANKS

AS INDICATED ON THIS SHEET.

5. THESE PRELIMINARY DESIGN DRAWINGS WERE PREPARED FOR THE ELLERMAN SEWER STUDY FUNDED BY VSW GRANT #74906.

0 200 400
SCALE IN FEET

35% DESIGN DRAWINGS NOT FOR CONSTRUCTION

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NO.	REVISIONS	DATE

Drawing: SITE PLAN

Project: SAINT PAUL SEWER UTILITY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
St. Paul Island, Alaska

DATE: 7/8/05
DESIGNED: MD
DRAWN: JG
CHECKED:
SCALE: 1"=200'-0"
FILE: ES_UPGRADE

Sheet C-1 OF 7

PUBLIC WORKS

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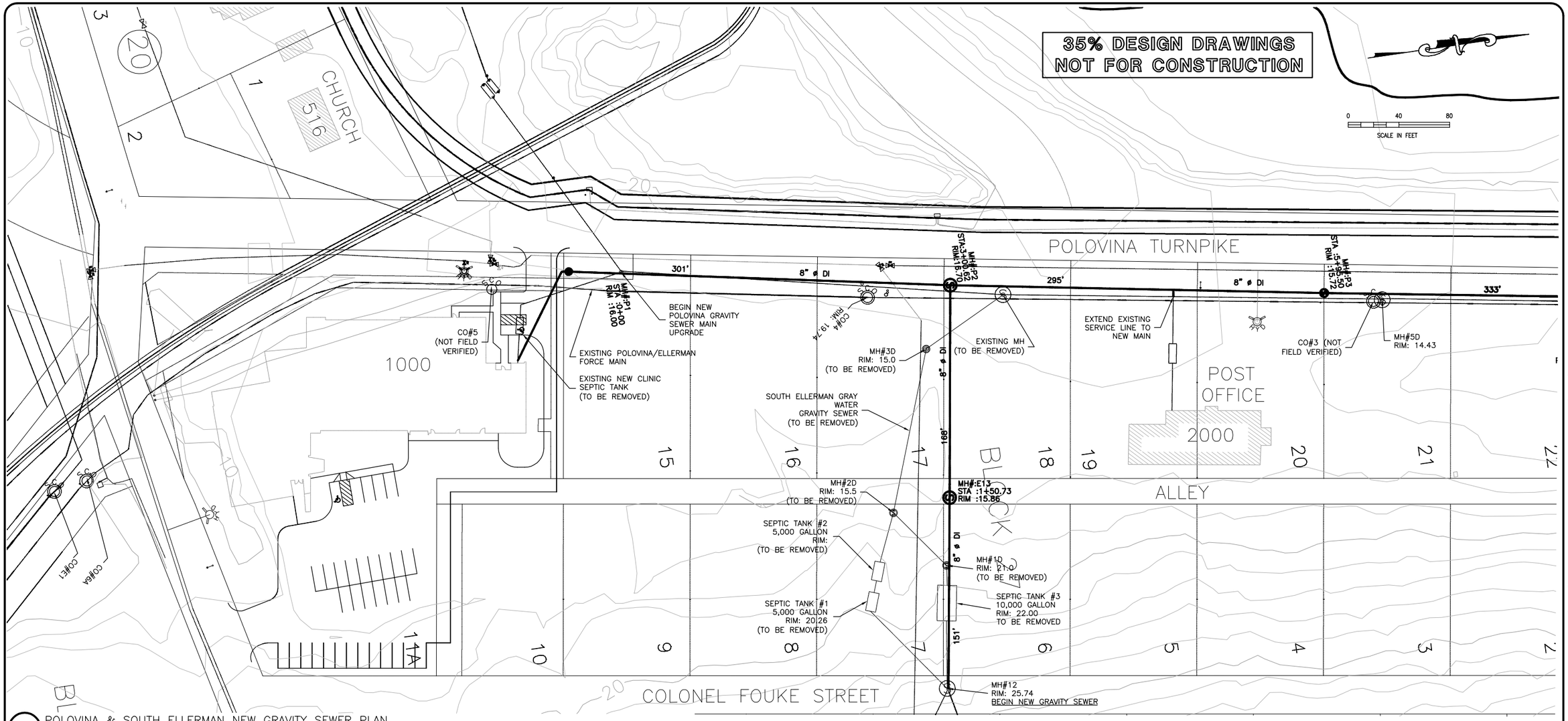
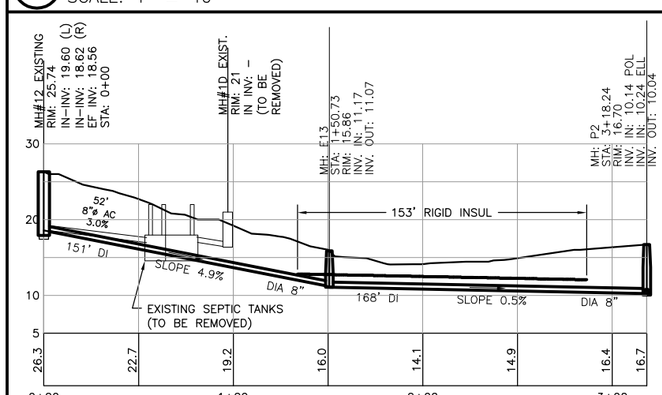
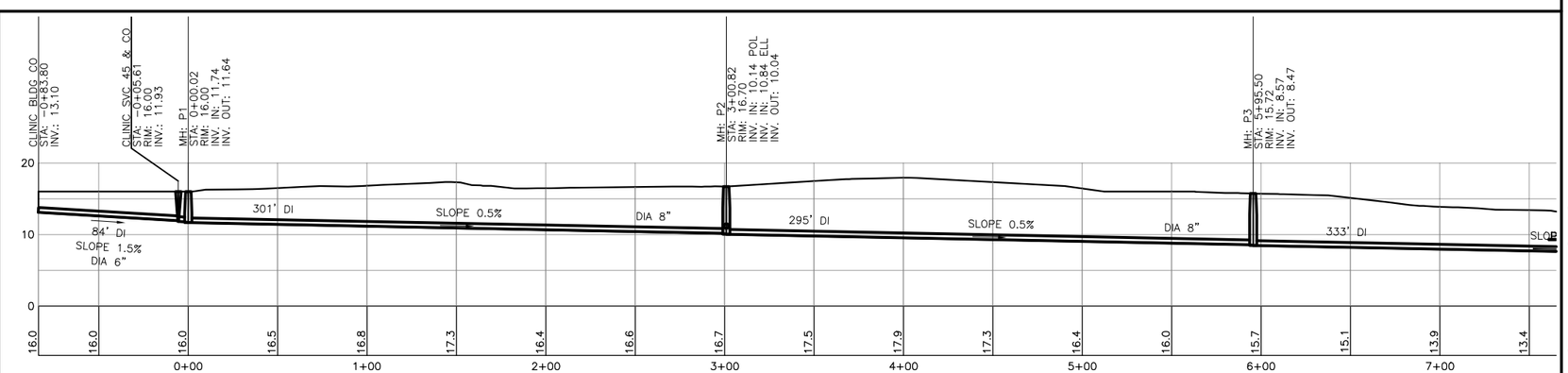


1 POLOVINA & SOUTH ELLERMAN NEW GRAVITY SEWER PLAN
SCALE: 1" = 40'



2 SOUTH ELLERMAN – NEW GRAVITY SEWER PROFILE
SCALE: 1" = 40' HORIZONTAL / 1" = 20' VERTICAL



3 POLOVINA – NEW GRAVITY SEWER PROFILE
SCALE: 1" = 40' HORIZONTAL / 1" = 20' VERTICAL

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NO.	DATE	REVISIONS

Drawing: POLOVINA NEW GRAVITY SEWER & SOUTH ELLERMAN NEW GRAVITY SEWER

Project: SAINT PAUL SEWER UTILITY ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS St. Paul Island, Alaska

DATE: 7/8/05
DESIGNED: MD
DRAWN: JG
CHECKED:
SCALE: 1"=40'-0"
FILE: ES_UPGRADE

Sheet C-2 OF 7

35% DESIGN DRAWINGS
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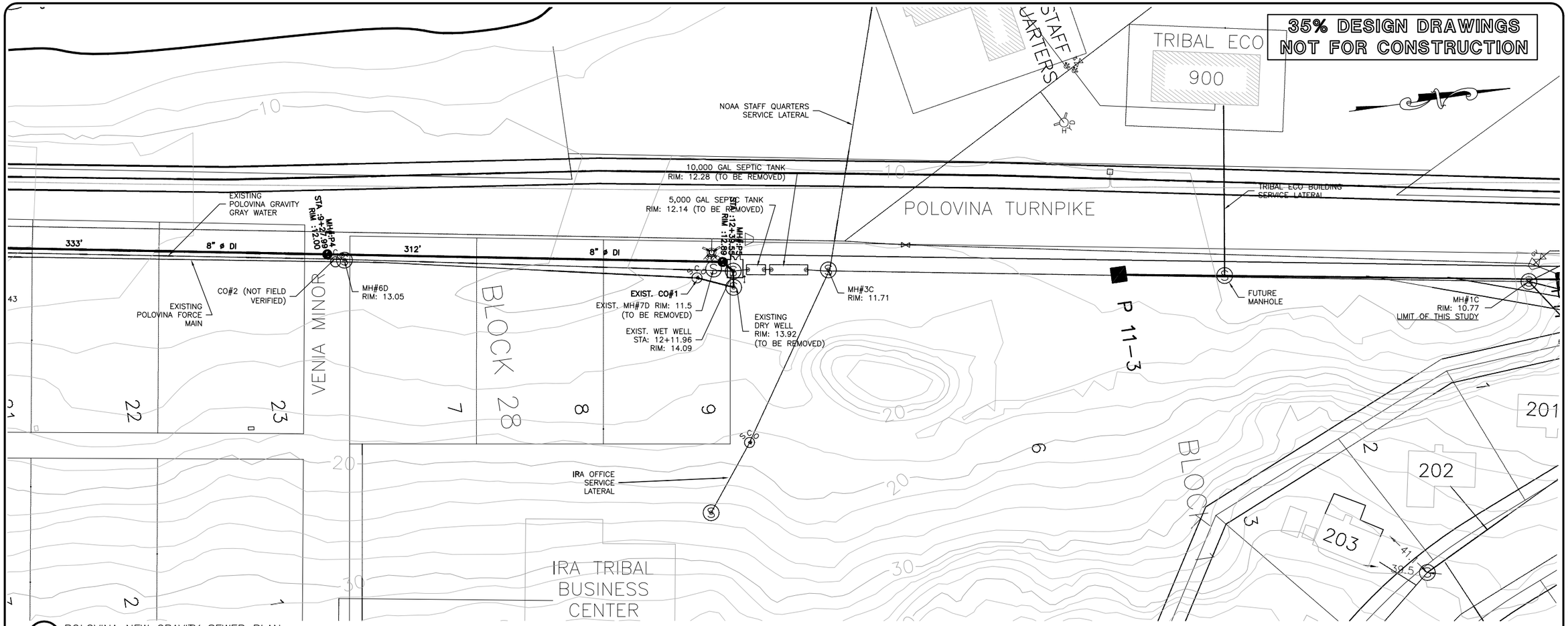
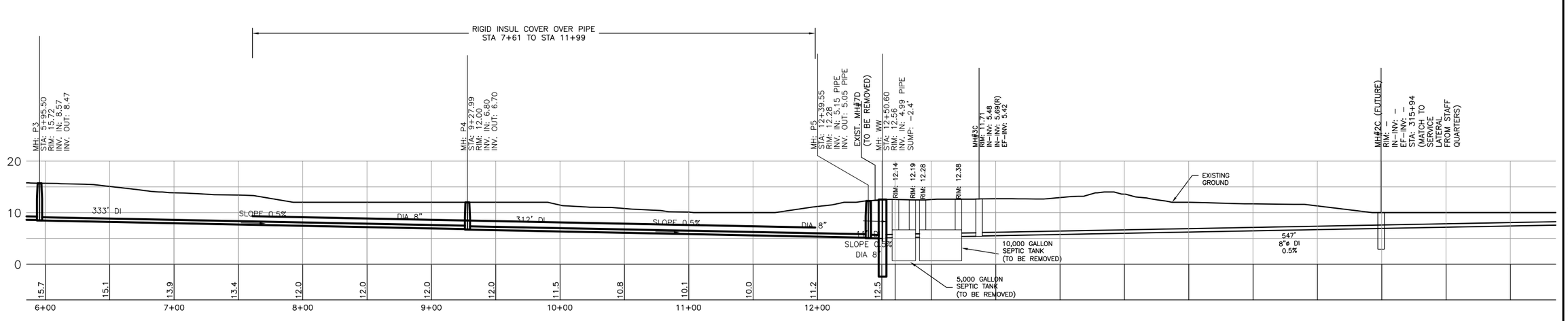


1 POLOVINA NEW GRAVITY SEWER PLAN
SCALE: 1" = 40'

0 40 80
SCALE IN FEET



2 POLOVINA – NEW GRAVITY SEWER PROFILE
SCALE: 1" = 40' HORIZONTAL / 1" = 20' VERTICAL

0 40 80
HORIZONTAL SCALE IN FEET

POLOVINA – EXISTING GRAVITY SEWER PROFILE

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1		

Drawing: POLOVINA GRAVITY SEWER

Project: SAINT PAUL SEWER UTILITY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
St. Paul Island, Alaska

DATE: 7/8/05
DESIGNED: MD
DRAWN: JG
CHECKED:
SCALE: 1"=40'-0"
FILE: ES_UPGRADE

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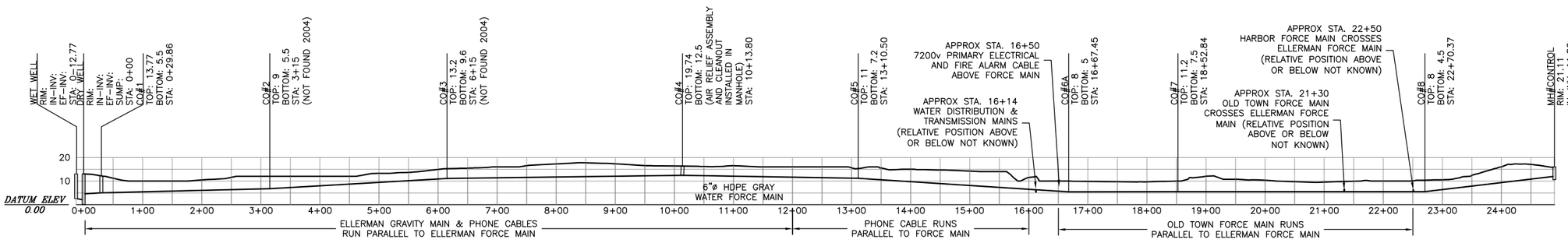
OF 7



1 EXISTING ELLERMAN SEWER FORCE MAIN PROFILE
SCALE: 1" = 100' HORIZONTAL / 1" = 50' VERTICAL

0 100 200
HORIZONTAL SCALE IN FEET

35% DESIGN DRAWINGS
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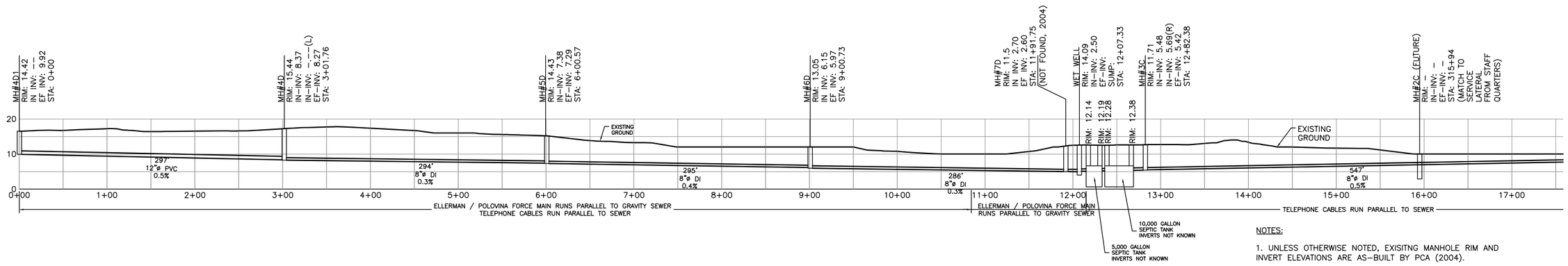


2 EXISITNG POLOVINA GRAVITY SEWER PROFILE
SCALE: 1" = 60' HORIZONTAL / 1" = 30' VERTICAL

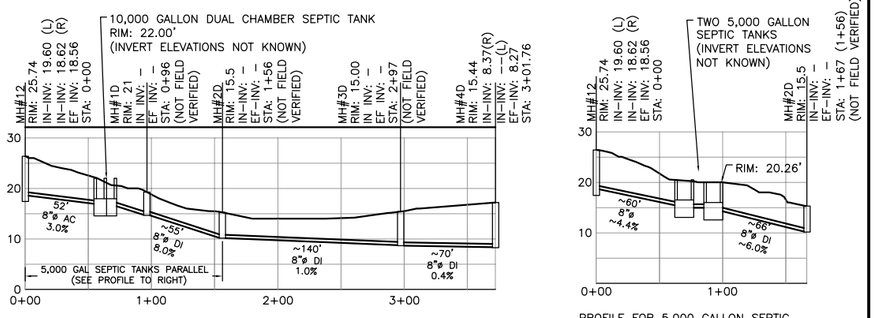
0 60 120
HORIZONTAL SCALE IN FEET

NOTES:

1. UNLESS OTHERWISE NOTED, EXISITNG MANHOLE RIM AND INVERT ELEVATIONS ARE AS–BUILT BY PCA (2004).

2. VERTICAL DATUM IS MLLW AS PUBLISHED BY NGS. VERTICAL CONTROL IS NOS DISK 2, SET IN THE FOUNDATION OF THE TAVERN AT 32.91' MLLW.

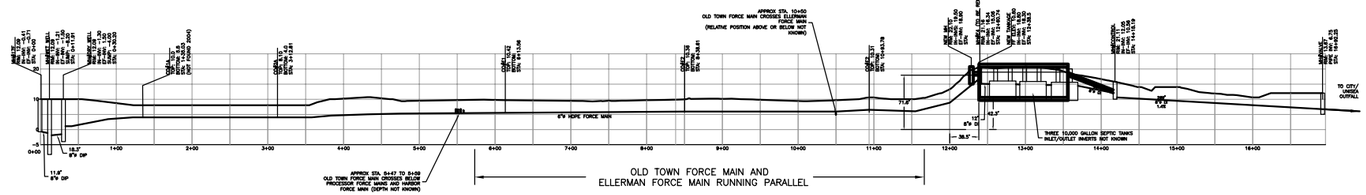
3. VERTICAL ELEVATION FOR SOUTH ELLERMAN SEWER (MH#1D, 2D, 3D AND SEPTIC TANKS) ARE BASED UPON AS–BUILT INVERT AT MH#4D (PCA 2004) AND GRADES FROM RECORD DRAWINGS (PHS PROJECT 84–285).



PROFILE FOR 5,000 GALLON SEPTIC TANKS AND SEWER LINES INSTALLED PARALLEL TO 10,000 GALLON TANK.

3 EXISTING SOUTH ELLERMAN GRAVITY SEWER PROFILE
SCALE: 1" = 60' HORIZONTAL / 1" = 30' VERTICAL

0 60 120
HORIZONTAL SCALE IN FEET



1 EXISTING OLD TOWN SEWER FORCE MAIN PROFILE
SCALE: 1" = 100' HORIZONTAL / 1" = 50' VERTICAL

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Drawing: EXISTING SEWER SYSTEM PROFILES

Project: SAINT PAUL SEWER UTILITY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
St. Paul Island, Alaska

DATE: 7/8/05
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CHECKED:
SCALE: AS NOTED
FILE: ES_UPGRADE

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OF 7

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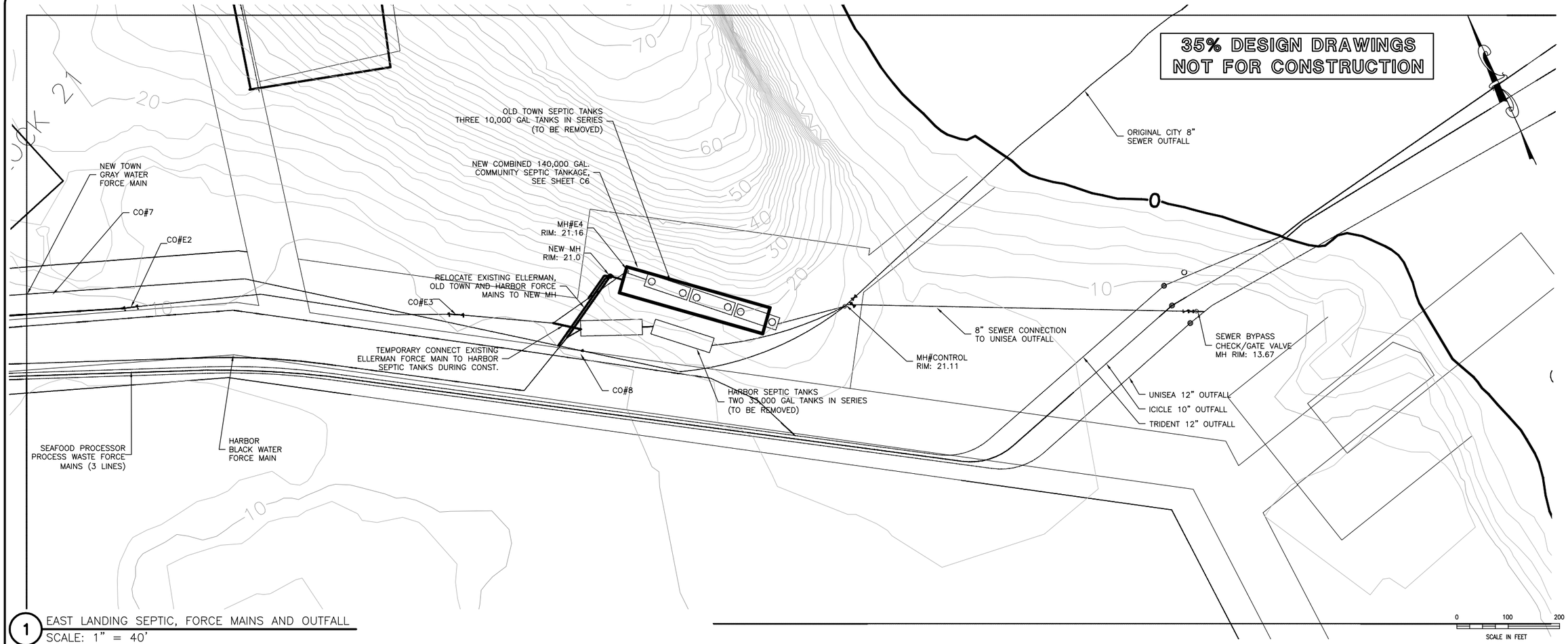
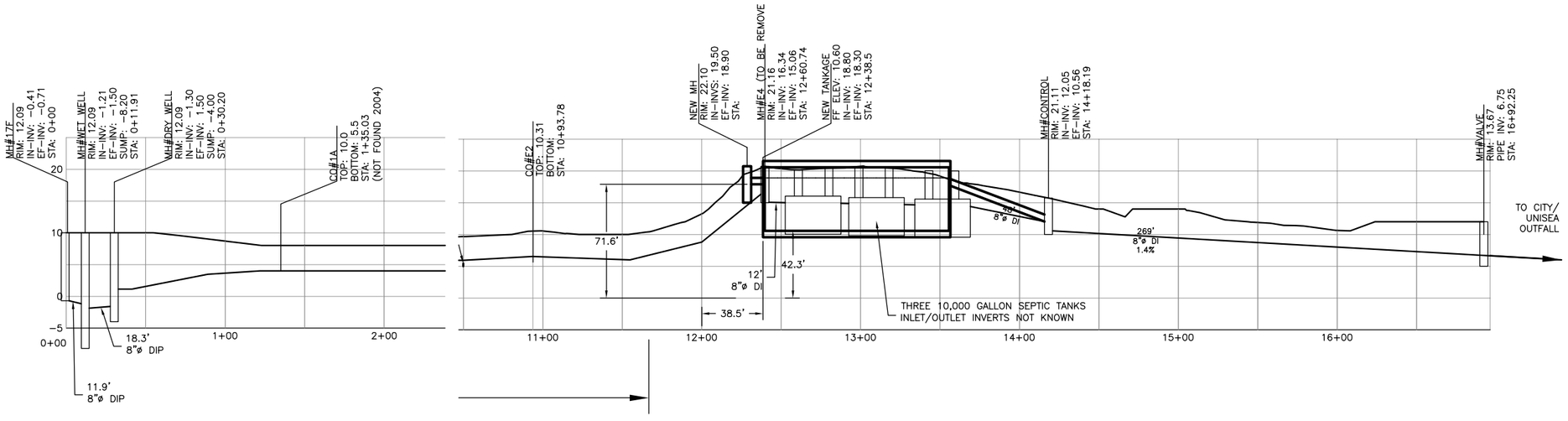


1 EAST LANDING SEPTIC, FORCE MAINS AND OUTFALL
SCALE: 1" = 40'



2 OLD TOWN BLACK WATER FORCE MAIN, SEPTIC TANKS AND OUTFALL BYPASS PROFILE
SCALE: 1" = 40' HORIZONTAL / 1" = 20' VERTICAL

NOTES:

1. UNLESS OTHERWISE NOTED, CLEANOUT TOP ELEVATIONS ARE AS-BUILT BY PCA (2004). CLEANOUT BOTTOM ELEVATIONS ARE TAKEN FROM ORIGINAL PROJECT RECORD DRAWINGS (PHS 84-285), AND HAVE NOT BEEN FIELD VERIFIED.

2. UNLESS OTHERWISE NOTED, ALL MANHOLE RIM AND INVERT ELEVATIONS ARE AS-BUILT BY PCA (2004).

3. ELEVATION OF FORCE MAIN FROM STATION 0+00 TO 12+60 IS ASSUMED. NO AS-BUILT INFORMATION IS AVAILABLE.

4. UNLESS OTHERWISE NOTED, THE HORIZONTAL LOCATION OF ALL SEWER FEATURES INCLUDED IN THIS STUDY ARE AS-BUILT BY PCA (2004).

5. VERTICAL DATUM IS MLLW AS PUBLISHED BY NGS. VERTICAL CONTROL IS NOS DISK 2, SET IN THE FOUNDATION OF THE TAVERN AT 32.91' MLLW.

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NO.	DATE	REVISIONS

Drawing: EAST LANDING COMMUNITY SEPTIC

Project: SEWER IMPROVEMENT STUDY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
St. Paul Island, Alaska

DATE: 7/8/05
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SCALE: 1"=40'-0"
FILE: ES_UPGRADE

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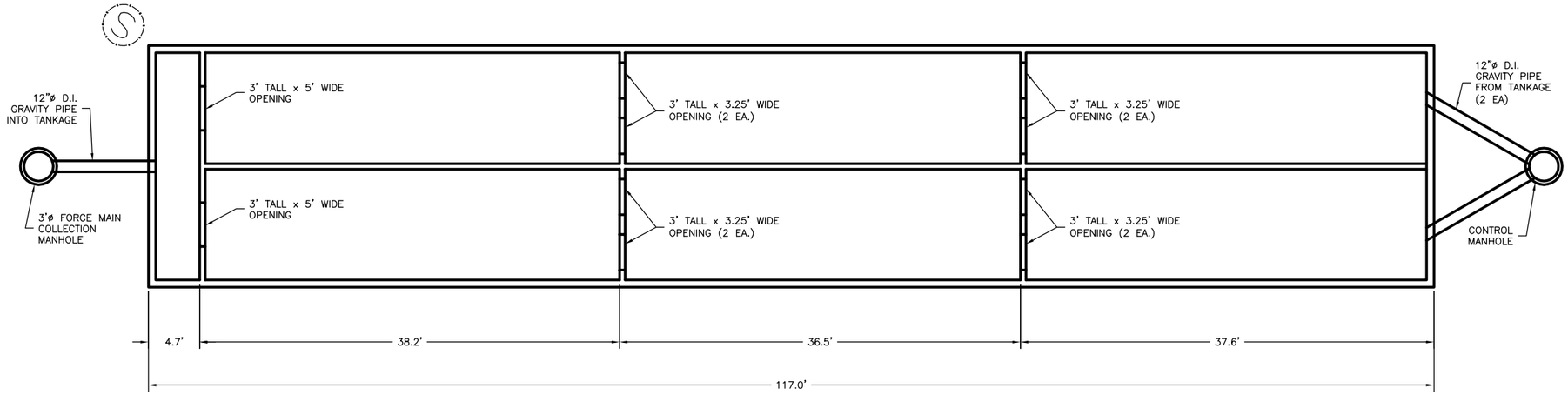
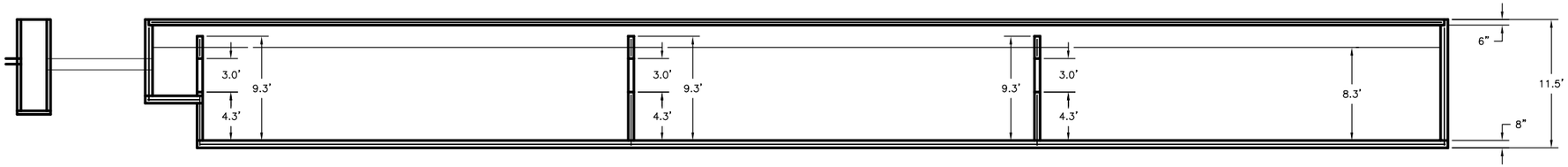


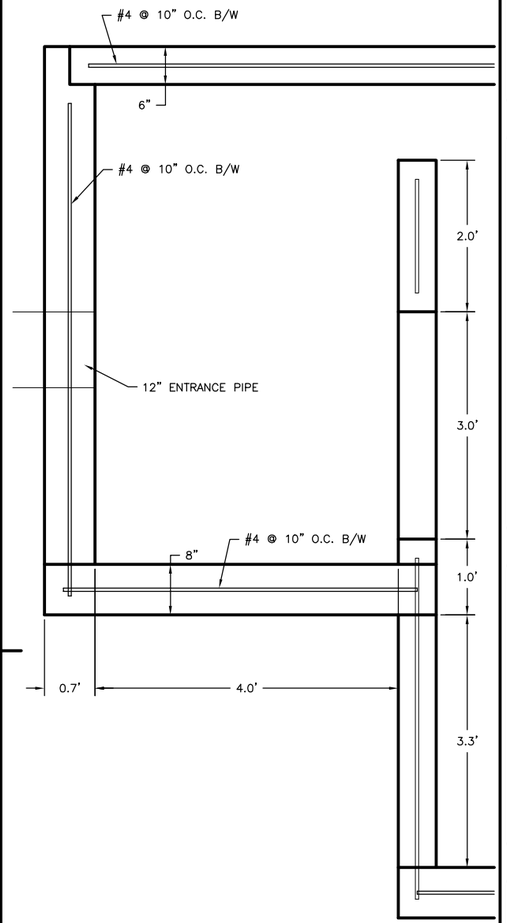
1 EAST LANDING NEW CONSOLIDATED SEPTIC TANK – PLAN VIEW
SCALE: 1" = 6'

0 6 12
SCALE IN FEET



2 EAST LANDING NEW CONSOLIDATED SEPTIC TANK – SECTION VIEW
SCALE: 1" = 6'

0 6 12
HORIZONTAL SCALE IN FEET



3 TYP WALL SECTION
SCALE: 1" = 1'

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REVISIONS

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Drawing: EAST LANDING COMMUNITY SEPTIC TANK

Project: SEWER IMPROVEMENT STUDY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
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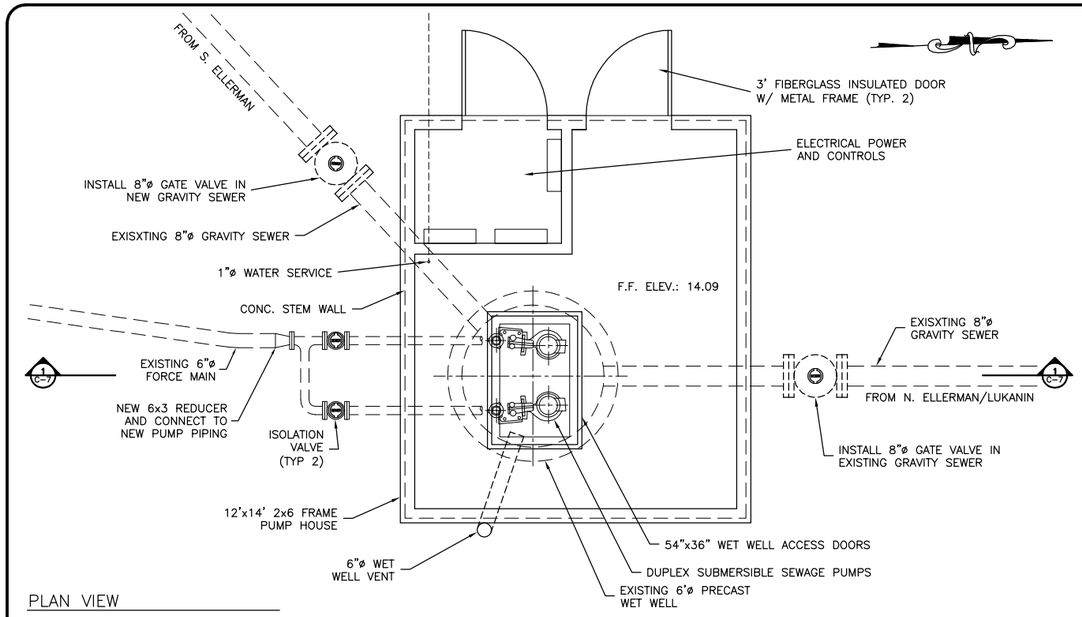
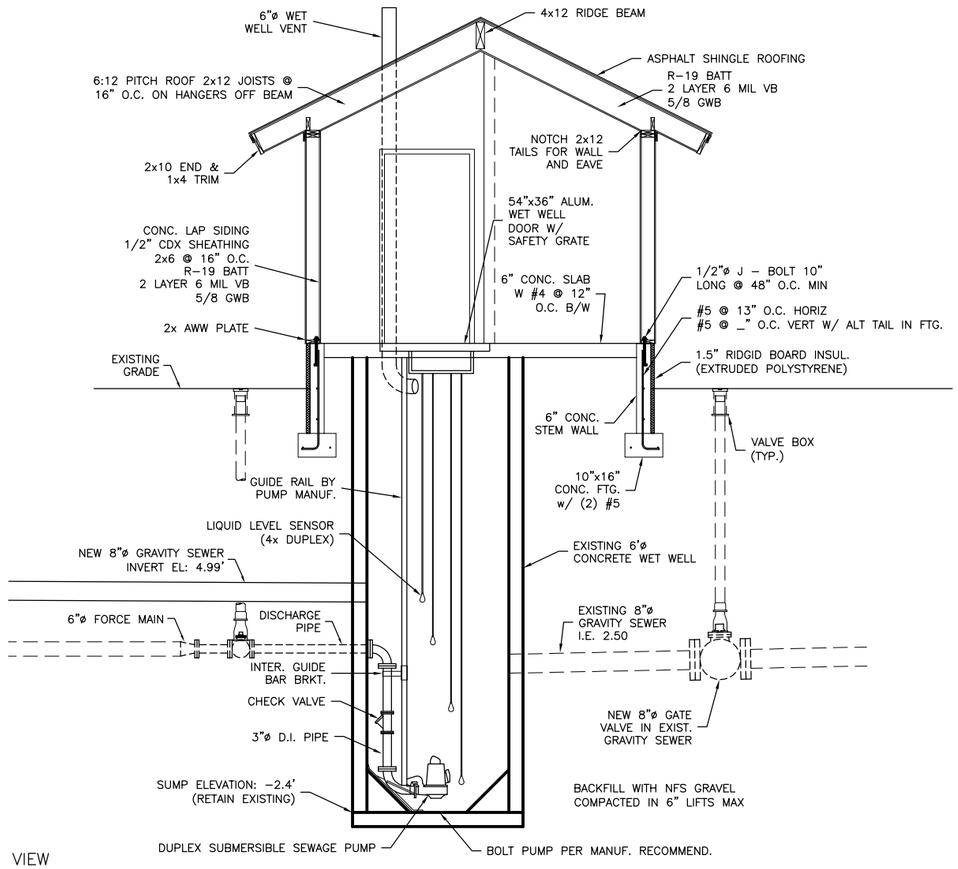


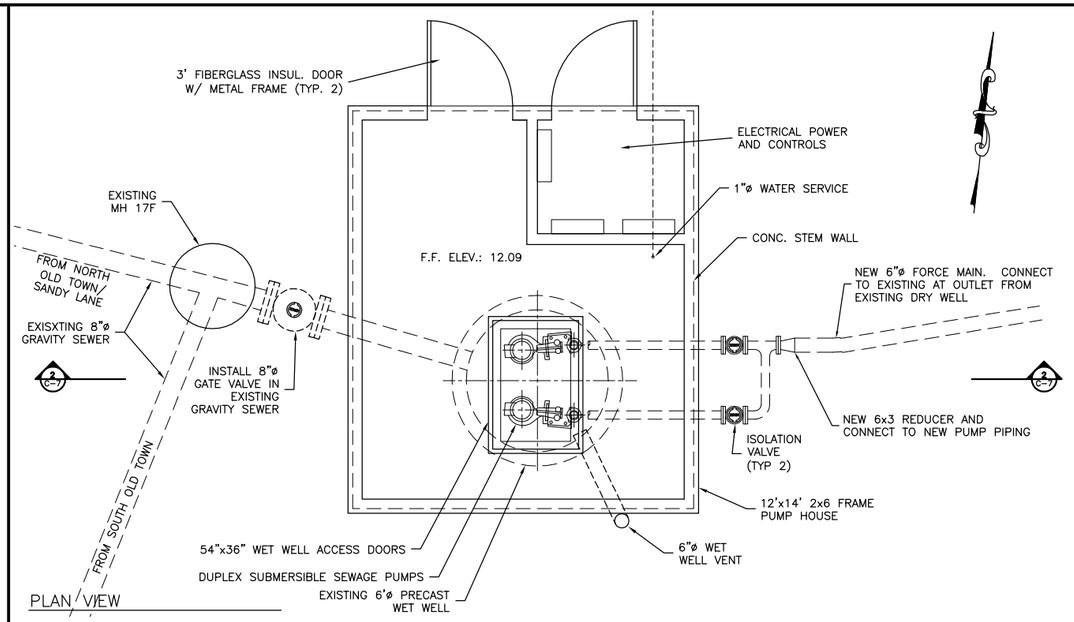
PLAN VIEW



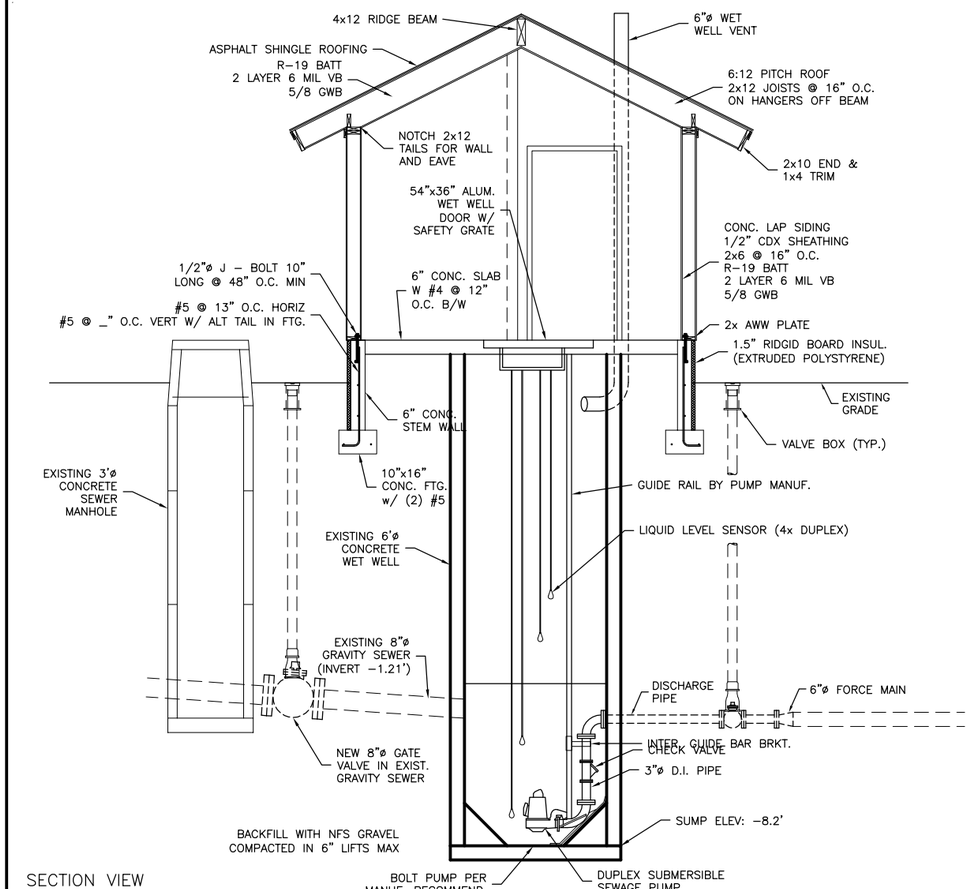
SECTION VIEW

1 ELLERMAN HEIGHTS LIFT STATION

SCALE: 3/8" = 1'-0"



PLAN VIEW



SECTION VIEW

2 SANDY LANE LIFT STATION

SCALE: 3/8" = 1'-0"

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NO.	DATE	REVISIONS

Drawing: LIFT STATIONS

Project: SEWER IMPROVEMENT STUDY
ELLERMAN HEIGHTS SYSTEM IMPROVEMENTS
St. Paul Island, Alaska

DATE: 7/8/05
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FILE: ES_UPGRADE

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OF 7