Agency: Commerce, Community and Economic Development

Grants to Municipalities (AS 37.05.315)

Grant Recipient: Kodiak Island Borough **Federal Tax ID:** 92-0030845

Project Title: **Project Type:** Equipment and Materials

Kodiak Island Borough - Landfill Leachate Treatment Plant & Related Phase III Improvements

State Funding Requested: $4,529,000 **House District:** 35 / R

One-Time Need

Brief Project Description:

Purchase and installation of a waste water treatment plant

Funding Plan:

Total Project Cost:	$10,848,000
Funding Already Secured:	($6,319,000)
FY2014 State Funding Request:	($4,529,000)
Project Deficit:	$0

Funding Details:

The cost of Phase III is estimated to be $10,848,000. The funding already secured for Phase III consists of (1) approximately $500,000 in KIB revenue bonds; and (2) approximately $5.8 million in Alaska Clean Water Fund loan funds.

Detailed Project Description and Justification:

The Kodiak Island Borough is closing out the existing landfill footprint and creating a new lined cell in accordance with EPA/DEC requirements. The lined cell when in operation will generate leachate that will be treated by an on-site wastewater treatment plant. This structure is a stand-alone skid mounted piece of equipment. It will be installed as Phase III of our landfill expansion project. Phase III is estimated to cost $10,848,000.

Funding is in place for Phase I and Phase II, with local funds covering about 67% and state funds for the remaining 33%.

An on-site leachate treatment plant was chosen as the method to address leachate produced at the landfill after the alternative of piping it to the City of Kodiak Wastewater Treatment Facility was found not to be a feasible option. This wastewater treatment plant is required to treat wastewater to DEC drinking water standards. The borough also submitted a matching grant application through DEC for the maximum amount allowable for this plant; however, this project currently ranks below the fundable portion of the budget. The borough views this project as a basic infrastructure need for the community.

The purchase and installation of a wastewater treatment plant is the final phase of the Kodiak Landfill Lateral Expansion project. The estimated cost for the purchase, installation and associated equipment of the wastewater treatment plant is $10,848,000.

The Kodiak Island Borough has secured funding in the amount of $501,000 in revenue bonds and $5,818,548 in Alaska

Contact Name: Astrid Rose
Contact Number: 465-3271

For use by Co-chair Staff Only:

$4,529,000 Approved

2:01 PM 5/9/2013

Clean Water Fund loan funds for a total of $6,319,000. This amount of the local funding is approximately 58% of the estimated cost for this phase. KIB is requesting legislative funding in the amount of $4,529,000. This funding reduces the borough's need to further request loan funds or issue revenue bonds, both of which obligate the local citizens to higher use fees for repayment of the debt.

If this request is funded, the entire Kodiak Landfill Expansion Project will have be funded with 64% from local funds and 36% from the state once completed.

Project Timeline:

It is anticipated that the process for the purchase of the treament plant and associated equipment will begin in the summer of 2013 with intallation beginning in late 2013.

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Kodiak Island Borough

Grant Recipient Contact Information:

Name:	Charles E. Cassidy
Title:	Manager
Address:	710 Mill Bay Road
	Kodiak, Alaska 99615
Phone Number:	(907)486-9302
Email:	bcassidy@kodiakak.us

Has this project been through a public review process at the local level and is it a community priority? [X] Yes [ ] No

Contact Name: Astrid Rose
Contact Number: 465-3271

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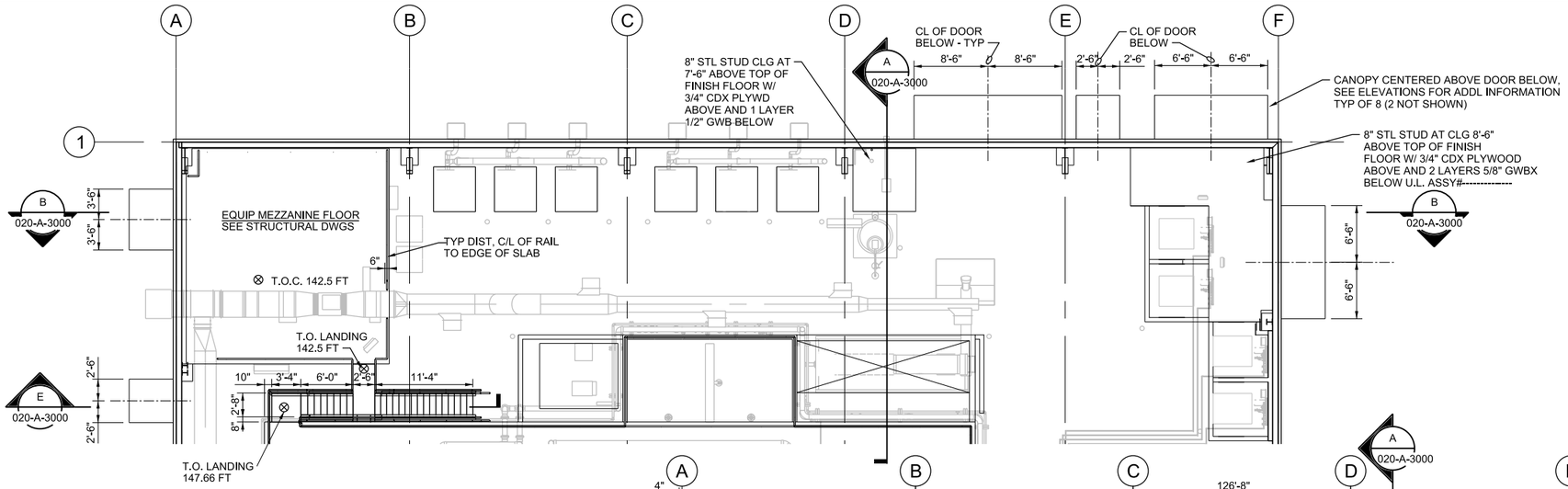
Kodiak Island Borough
Kodiak Landfill Lateral Expansion Project
Phase III: Waste Water Treatment Plant

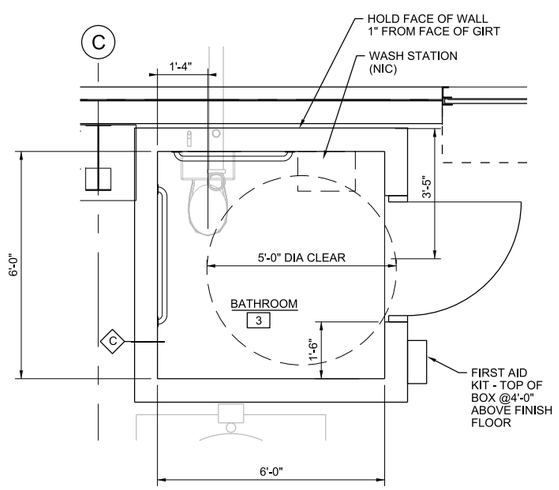
Estimated Cost

Site Work	1,500,000
Building	2,000,000
MBR System	2,650,000
Facility Mechanicals	1,500,000
Design Services	750,000
Eng. Services During Construction	350,000
Chemical Storage	290,000
Other:	
DEC Regulatory Requirement	
P & Z Conditions of Approval	$1,808,000.00
Storm Water Drainage	
Plant Start-up Costs	
	$10,848,000.00



EQUIPMENT MEZZANINE, CANOPIES AND CEILINGS

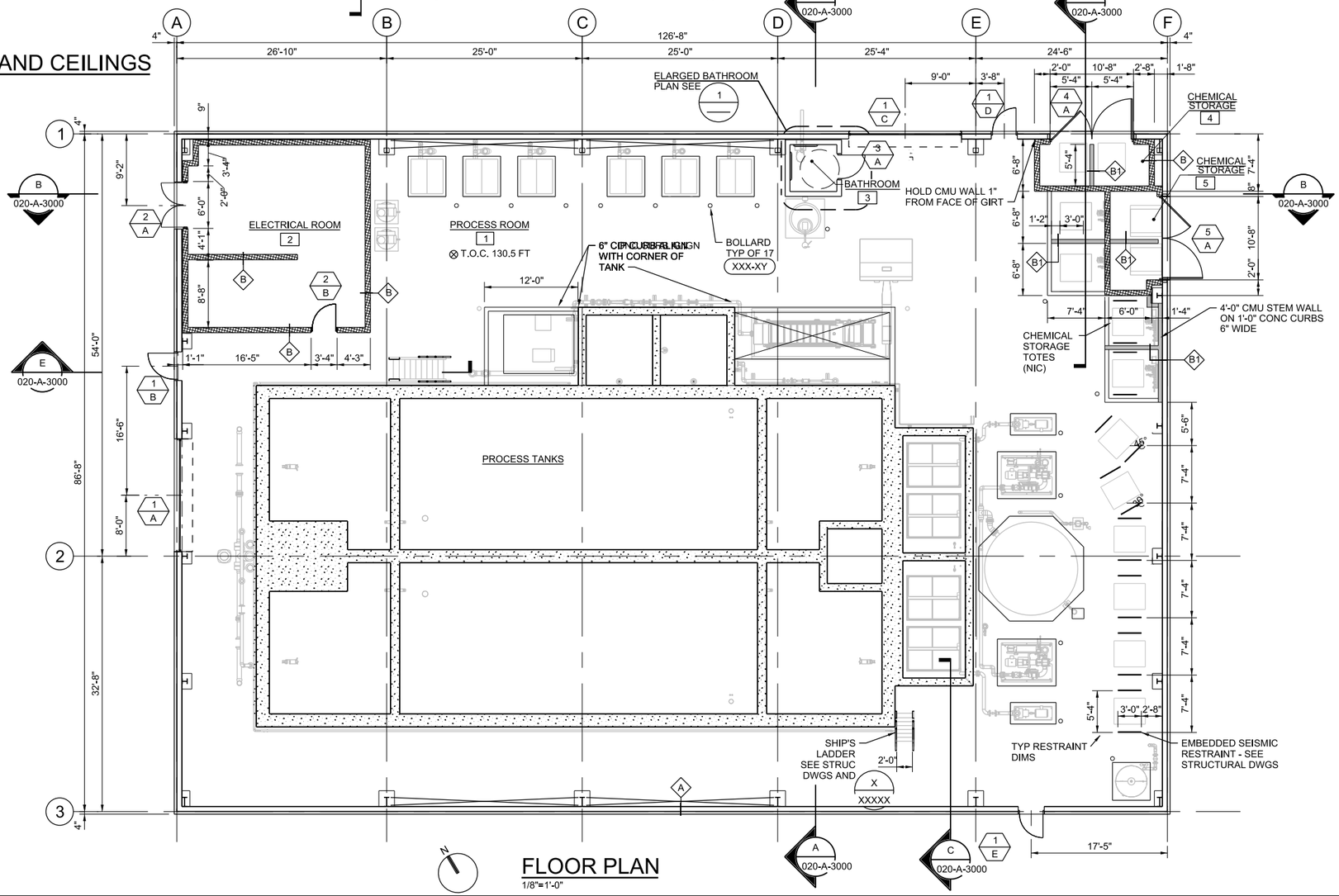
1/8"=1'-0"



NOTE:
SEE O20-A-5001 FOR ACCESSORY LOCATIONS AND MOUNTING HEIGHT

1 ENLARGED BATHROOM PLAN

1/2" = 1'-0"



FLOOR PLAN

1/8"=1'-0"

NO.	DATE	DR	REVISION	CHK	APVD	BY	APVD
DSGN	MF SHARP	GH BURLEY		SJ PAYNE		C HINDS	

KODIAK ISLAND BOROUGH

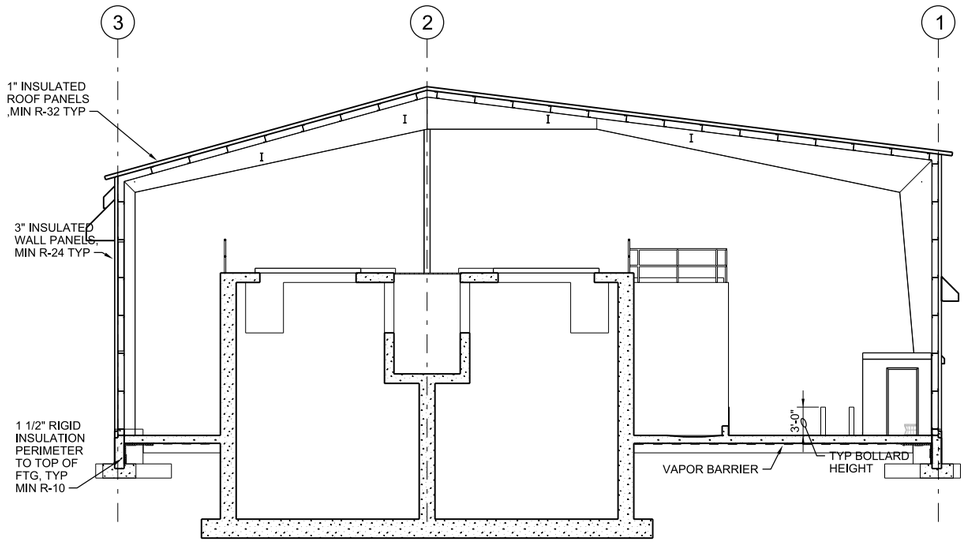
KODIAK LANDFILL
LATERAL EXPANSION PHASE 3
LEACHATE TREATMENT PLANT
KODIAK ISLAND, ALASKA

CH2MHILL®

LEACHATE TREATMENT PLANT
ARCHITECTURAL FLOOR PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

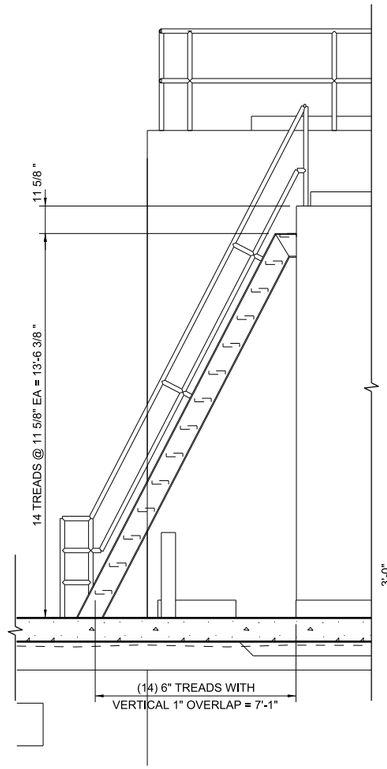
DATE	JANUARY 2013
PROJ	354650
DWG	020-A-2000
SHEET	of



A EAST BUILDING SECTION

1/8" = 1'-0"

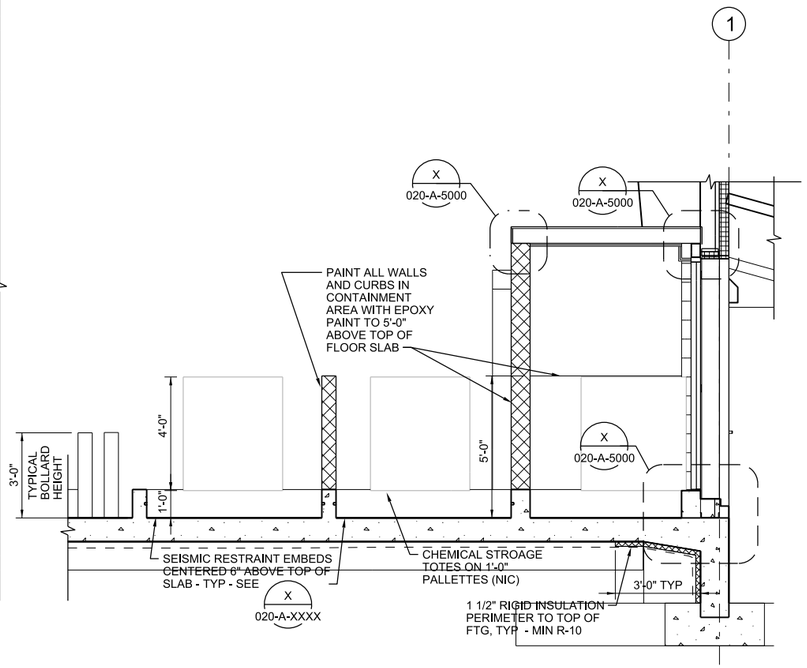
20-A-2000
20-A-3001
20-A-3002



C SHIPS LADDER

3/8" = 1'-0"

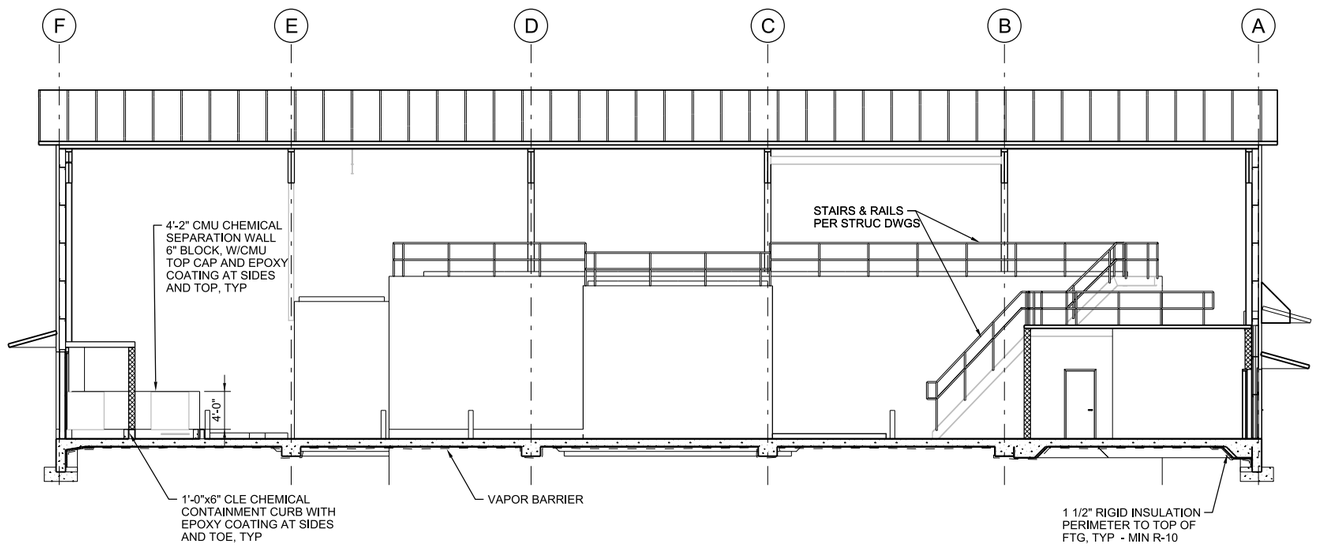
20-A-2000



D SECTION

3/8" = 1'-0"

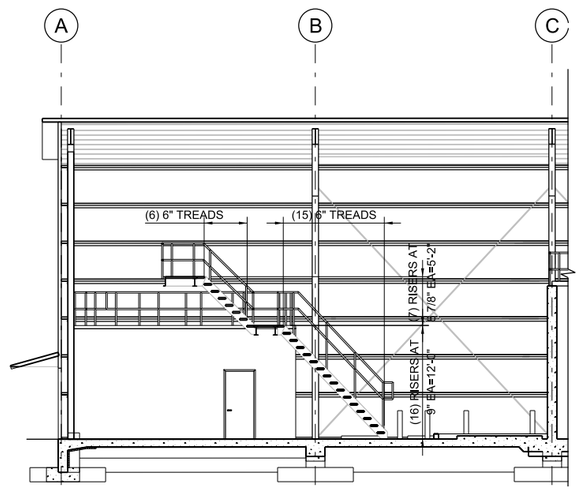
20-A-2000



B NORTH BUILDING SECTION

1/8" = 1'-0"

20-A-2000
20-A-3001
20-A-3002



E STAIR SECTION

1/8" = 1'-0"

20-A-2000
20-A-3001
20-A-3002

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		MF SHARP	GH BURLEY	SJ PAYNE	APVD	C HINDS	

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KODIAK LANDFILL
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KODIAK ISLAND, ALASKA

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ARCHITECTURAL SECTIONS

VERIFY SCALE
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0 1"

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DWG	020-A-3000
SHEET	of

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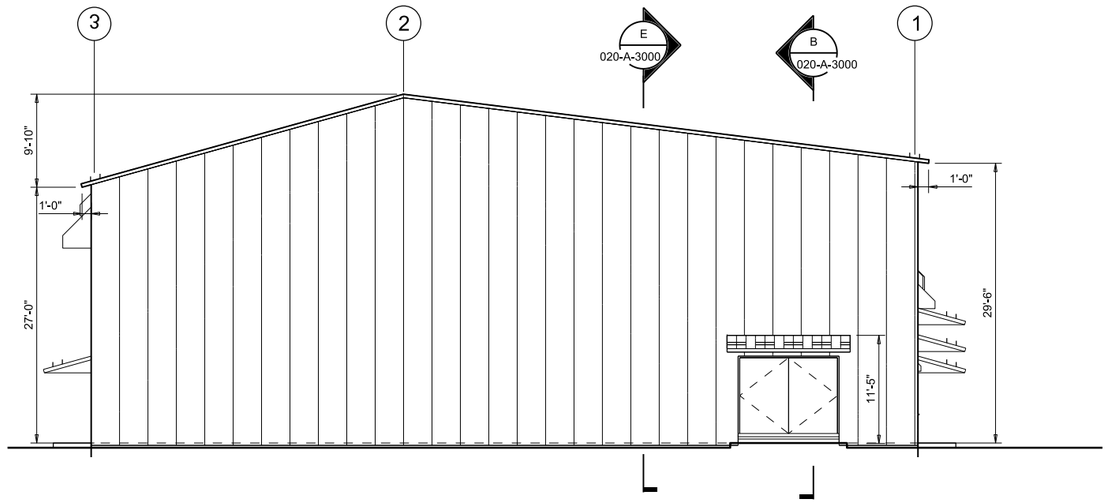
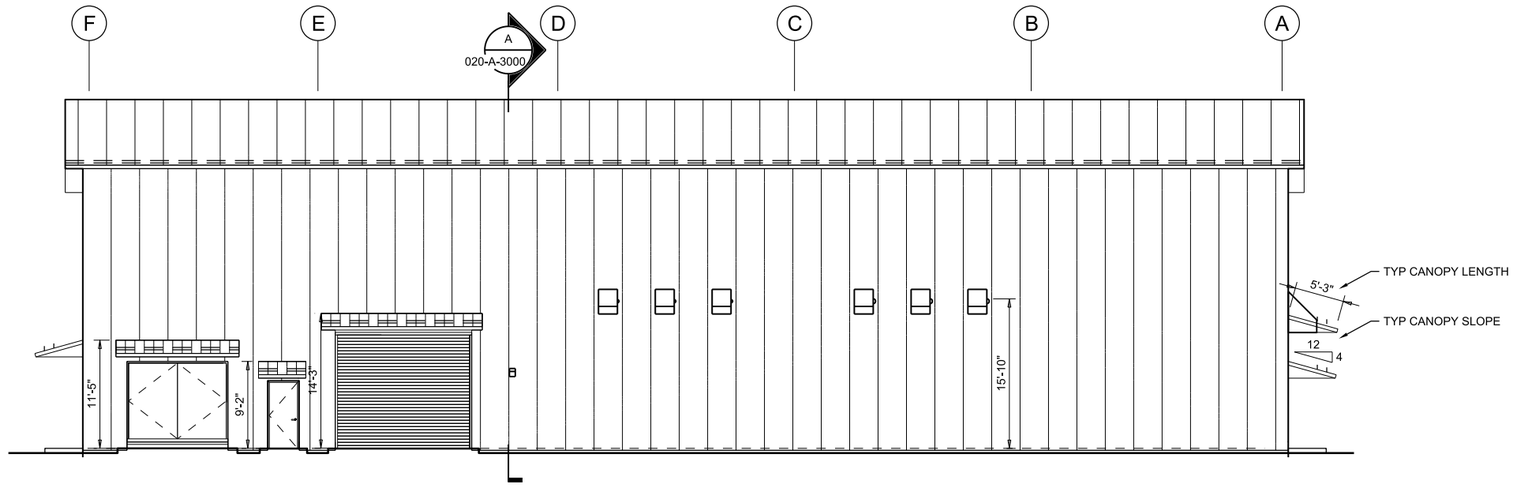


1 EAST BUILDING ELEVATION
1/8" = 1'-0"
X



2 NORTH BUILDING ELEVATION
1/8" = 1'-0"
X

NO.	DATE	DR	REVISION	CHK	APVD	BY	APVD
DSGN	MF SHARP		GH BURLEY		SJ PAYNE		C HINDS

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LATERAL EXPANSION PHASE 3
LEACHATE TREATMENT PLANT
KODIAK ISLAND, ALASKA

LEACHATE TREATMENT PLANT
ARCHITECTURAL
NORTH AND EAST ELEVATIONS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2013
PROJ	354650
DWG	020-A-3001
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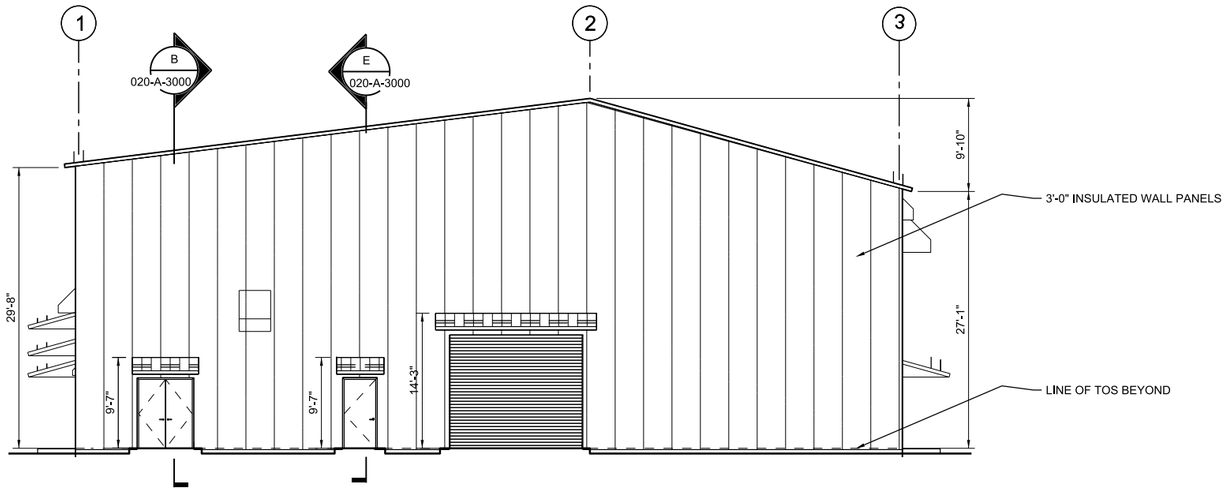
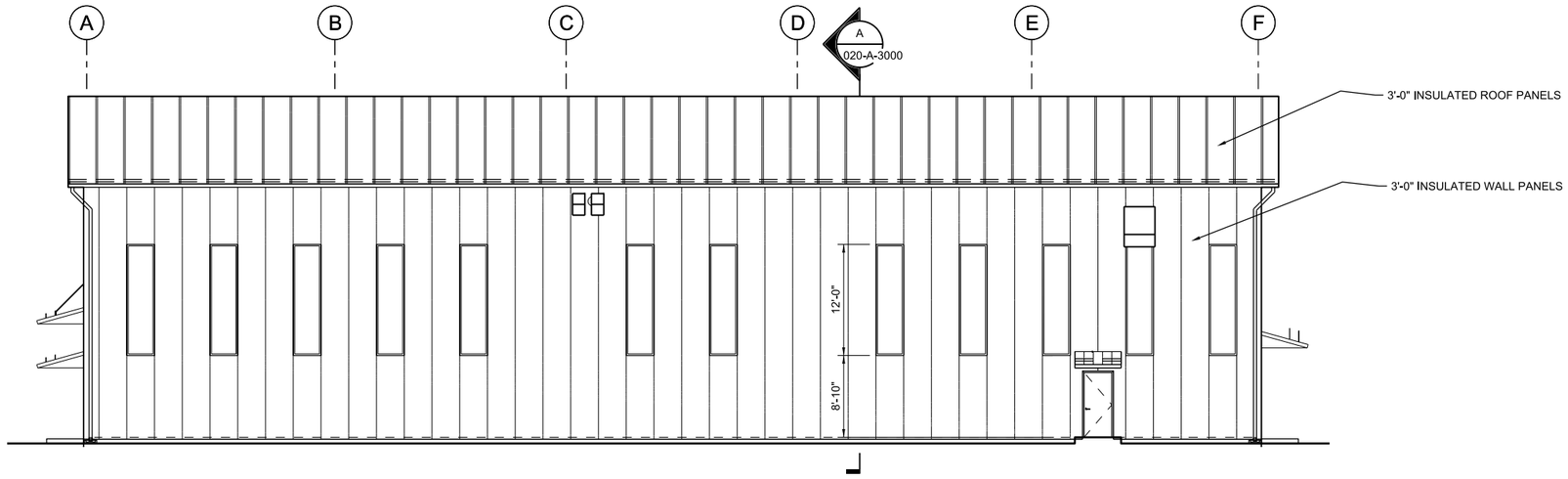


1 BUILDING ELEVATION
1/8" = 1'-0"
X



2 BUILDING ELEVATION
1/8" = 1'-0"
X

3'-0" INSULATED WALL PANELS

NO.	DATE	DR	REVISION	CHK	APVD	BY	APVD
DSGN	MF SHARP		GH BURLEY		SJ PAYNE		C HINDS

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LEACHATE TREATMENT PLANT
KODIAK ISLAND, ALASKA

LEACHATE TREATMENT PLANT
ARCHITECTURAL
SOUTH AND WEST ELEVATIONS

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
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PROJ	354650
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The MBR Treatment System

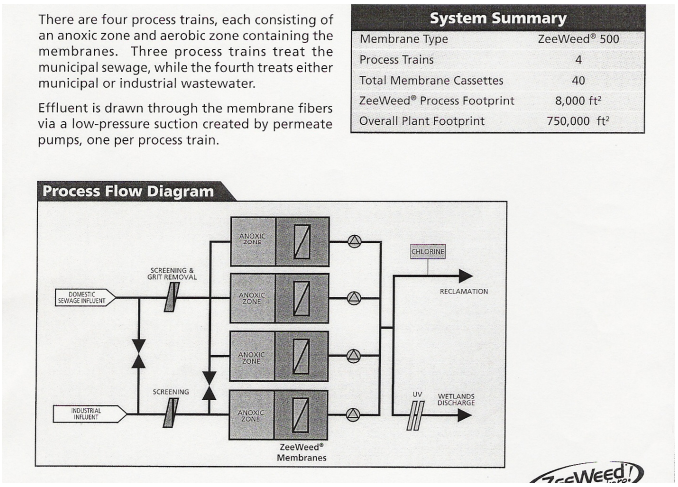
By David Branham, Wastewater Technician

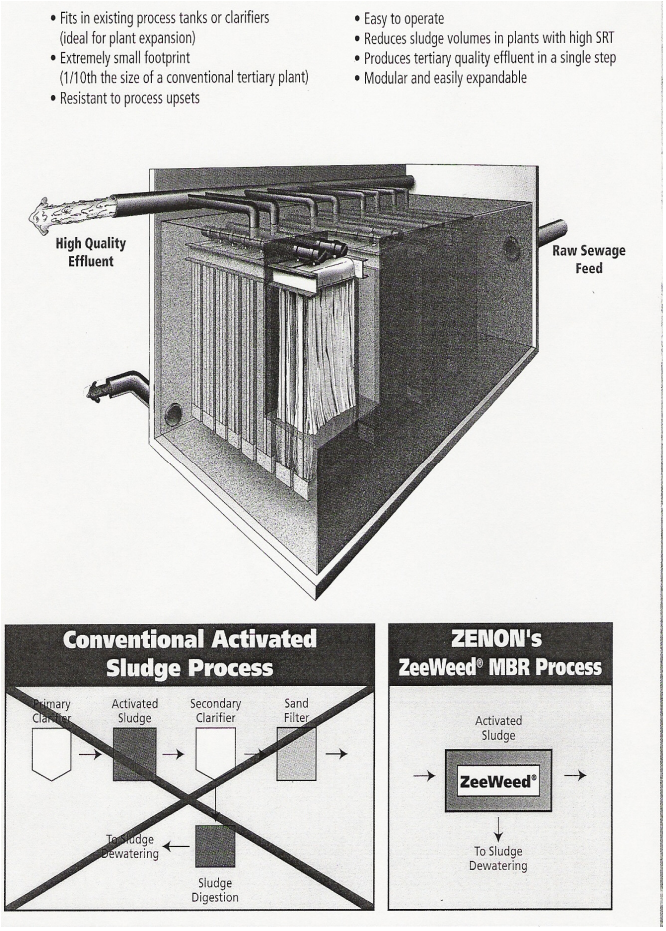
As promised I will dedicate this article to the membrane bioreactors (MBR) process.
A brief description of what it is and how it works is in order, so here goes. The particular illustrations I will be using are from the Zenon brand of membrane technologies. I will also be stating information out of an article printed in the March 2005, issue of WEFTEC.

The MBR system replaces conventional filtration and combines clarification, aeration, and sludge digestion into one simpler and smaller process step. The process incorporates immersing membranes directly in a process tank, thus reducing both capital and operating cost.

The immersed hollow-fiber membrane operates under a slight suction, drawing clean water to the inside of the membrane fiber, while leaving biomass and impurities in the process tank. The suction allows the membrane to be immersed directly inside a new tank or the membranes may be retrofitted into an existing aeration basin, clarifier, or steel tank thus saving the expense of building new process tanks.

Most of the systems mentioned in this article are modular. Individual membrane modules can be combined to form cassettes to meet the required treatment capacity. The advantage is that plant expansion can be in stride with actual community growth, drastically reducing up-front development costs.





Many studies of these types of systems have been performed; the study I will be quoting is from a grant issued by the U.S. Bureau of Reclamation. The project team of *Samer Adham, James DeCarolis, Jude Grounds, Larry Wasserman, and Bill Pearce* had two objectives in mind when they made their study of four different brands of MBRs. Goal One was to obtain operational and water quality data, and Goal Two was to assess MBR performance when treating advanced primary system effluent.

Four different manufactures of MBRs that were included in this study are as follows:

- **Kubota.** The Kubota system consisted of anoxic, pre-nitrification, and nitrification zones. It used 0.4-micron-pore flat-sheet membranes to separate activated sludge and water into solid and liquid. Mixed-liquor suspended solids (MLSS) were recycled from the aerobic tank to the anoxic tank at about four times the permeate rate to enable denitrification. The membranes were relaxed at set intervals to prevent membrane fouling.

- **Mitsubishi.** The Mitsubishi system included a permeate storage tank and an aerobic tank in which two membrane cassettes of 0.5-micron-pore hollow-fiber membranes were submerged. The membranes were relaxed at set intervals to prevent membrane fouling.

- **USFilter.** The USFilter system included an aerobic tank, a permeate storage tank, and a membrane tank containing four modules of 0.2-micron-pore hollow fiber membranes. During operation, air and MLSS were continuously injected into the membrane tank to scrub and shake the membrane fibers. Permeate water was frequently backwashed from the inside to the outside of the membrane fibers to prevent membrane fouling.

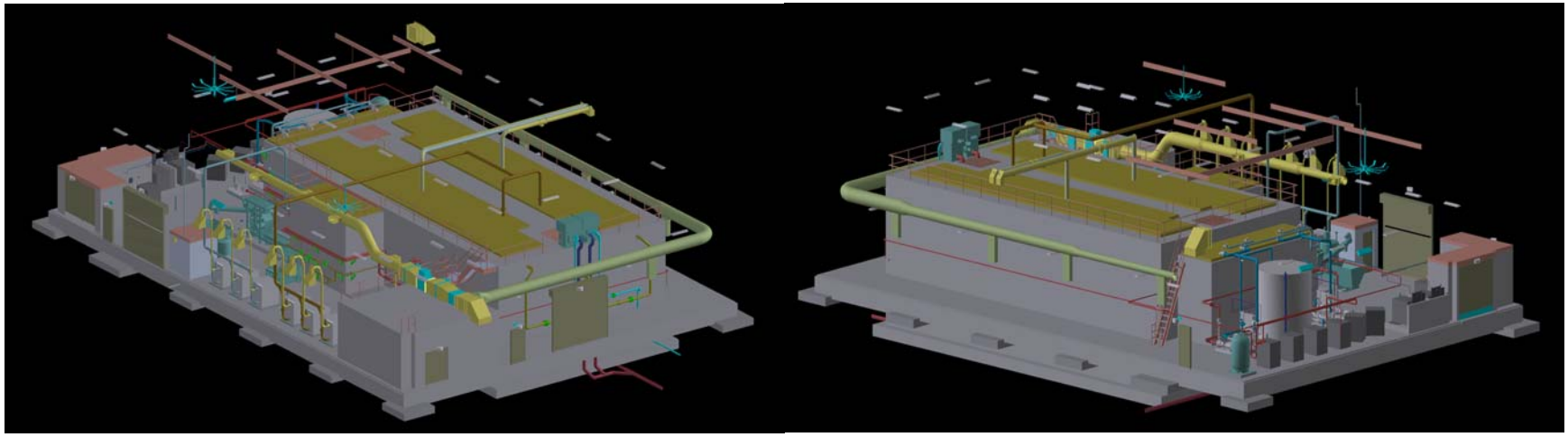
- **Zenon.** The Zenon system included an aerobic tank and membrane tank containing 0.1-micron-pore hollow-fiber membranes. MLSS was recirculated from the aerobic tank to the membrane tank. The membranes were relaxed at set intervals to prevent membrane fouling. At high flux rates, the membranes were also periodically cleaned with chlorine and acid to mitigate fouling.

The team's studies were quite conclusive and are highlighted in the aforementioned publication. The following table was taken from information supplied by Zenon Environmental, Inc. However, research of test results of the other three systems mentioned above also fell well within these parameters.

Typical Treated Water Results			
	Raw WQ	Treated WQ	
BOD (mg/L)	200	< 5	
TSS (mg/L)	220		< 2
Turbidity (NTU)	N/A		< 0.2

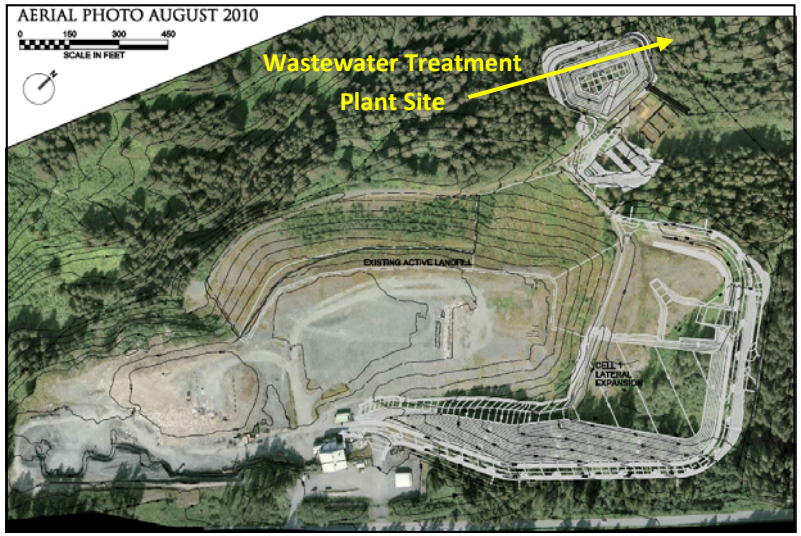
My conclusion is that these types of treatment systems are the future of the industry. As seen in the above table, all presently proposed TMDL restrictions can be met and/or exceeded with this type of technology. MBR treatment systems are much easier to control and operate, have smaller footprints to build, are resistant to process upsets, have reduction of sludge volumes, and being easily expandable are all big positive pluses for any town or wastewater district. I am looking forward to seeing many of you this summer. David Branham, Wastewater Technician.

Kodiak Island Borough
Kodiak Landfill Lateral Expansion
Phase III: Wastewater Treatment Plant



Phase III of the Kodiak Landfill Lateral Expansion Project will construct an onsite waste water treatment facility for treatment of the landfill's leachate.

The on-site treatment of the leachate stream will be accomplished with an Ultra Filtration facility. The system is designed to collect, contain and direct the raw wastewater stream (leachate) to a collection lagoon where it is pumped to the treatment facility.



The treatment process is based on a Membrane Bioreactor System (MBR) which currently is the best available technology for wastewater treatment facilities. MBR systems offer economic and operational advantages over conventional wastewater treatment facilities as the plants are more compact, have simplified operations and offer a higher quality discharge effluent at comparable lifecycle costs. Upon completion and start up the plant is designed to provide effluent discharge to "drinking water" standards.

Estimated Cost	
Site Work	1,500,000
Building	2,000,000
MBR System	2,650,000
Facility Mechanicals	1,500,000
Design Services	750,000
Eng. Services During Construction	350,000
Chemical Storage	290,000
Other: DEC Regulatory Requirement, P & Z Conditions of Approval, Storm Water Drainage, Plant Start-up Costs	1,808,000
Total	$10,848,000

Funding	
KIB Revenue Bonds	501,000
Alaska Clean Water Fund Loan	5,818,000
Sub-Total	$6,319,000
Legislative Request	**4,529,000**
Total	$10,848,000

Kodiak Island Borough

Phase III – Landfill

Waste Water Treatment Plant

Contact: Woody Koning, Director

Engineering & Facilities Department

Phone (907) 486-9340

E-mail: wkoning@kodiakak.us

About the Waste Water Treatment Plant...

- Treats leachate generated from the Kodiak Island Borough Landfill.
- Treatment of the landfill's leachate is required by ADEC and EPA to meet drinking water standards.
- A properly operating landfill is an essential piece of community infrastructure for residential, commercial and industrial use.
- Construction of the Waste Water Treatment Plant is the ***final phase*** of the Kodiak Island Landfill Lateral Expansion project.
- A State contribution of $4,529,000 will reduce landfill user rates which have already been increased by the project.
- Kodiak Island Borough's local contribution to the total project will remain significant at 64 % if the legislative request is funded.