

GW – 028

**PERMITS,
RENEWALS,
& MODS
Application**

**New Construction &
Underground Sewer Lines**

February 2008

Chavez, Carl J, EMNRD

From: Moore, Darrell [Darrell.Moore@hollycorp.com]
Sent: Wednesday, November 10, 2010 9:05 AM
To: Chavez, Carl J, EMNRD
Cc: Lackey, Johnny
Attachments: Artesia Septic Systems.pdf; Effluent Leaks.pdf; Lewis Lake Liner.pdf; Whaley Pond.pdf; Lewis Lake.JPG; Lewis Lake 2.JPG; Whaley Pond.JPG

Carl,

Our submittal to your requests from our meeting of October 6, 2010 is included. I have broken down the requests into the two Discharge Permits GW-014 and GW-028 and will address them in two separate emails. In your email of October 12, 2010 there are some misunderstandings regarding the two permits and I will point those out below.

NAVAJO ARTESIA REFINERY PERMIT GW-028

Section 14: Provide summary of the number and volume of underground sanitary tanks that were decommissioned and material and volume used during the process. **Section 17(iv):** Sanitary waste water and closure of underground tanks. OCD requests documentation verifying the number, tank volume, materials used, etc. to decommission tanks. OCD needs documentation that confirms work was actually performed. **Navajo decommissioned 9 septic tanks by knocking a 3" hole in the bottom of each tank and filling with "flowable fill" which is cement with a little more water added to make it more flowable. Each tank was filled to the top with "flowable fill" as per directions from NMED Liquid Waste Bureau. Attached above, labeled "Artesia Septic Systems" is all the supporting documentation that verifies the work was done.**

Section 16: OCD requests final reports with analytical data and photos verifying contaminated soils from releases at the effluent line were cleaned-up. **Attached above, titled "Effluent Leaks" is the documentation for these leaks including bottom hole samples, TCLP analysis, manifests of dirt hauled off and C-141's. There are still 4 bins from the most recent spill that have not been hauled yet because they were overfilled and can not be lifted. These bins will need to be lightened so they can be hauled. They will probably turn into 6 bins total. Also, attached above are three photos labeled "Clean Up at Effluent Leak" that show the area that has been cleaned up. All the leaks were in basically the same area.**

- **Section 17(i)** According to the operator, liners were placed in 2 of the 3 ponds with discharge permit allowing this to be completed by the expiration date of the permit.

OCD requests details (i.e., engineering design and construction "as built" details, date installed and photos, etc.) and location of the ponds that were lined.

The attachments above titled "Lewis Lake Liner" and "Whaley Pond" are the documentation for this section. Also included are photos of the two lined ponds. This same request is included in the Lovington Requests. There are NO ponds at Lovington.

- **Section 20C(iii):** Confirm that secondary containment was installed at the former waste water API or that the operator is working to schedule work to be completed before the expiration date (10/21/2011) of the permit. **To date, the secondary containment has not been installed in the waste water API but it will be added by October 2011.**

- Section 22: A "Recommendations" sections needs to be added to the Annual Report from now on. This will be added.
- Section 24: The financial assurance (FA) deadline of 9/30/2009 was missed. OCD verified that the FA was for facility decommissioning and 30 year post ground water monitoring period. OCD requires that similar to the Lovington Refinery, the operator shall submit an FA estimate to the OCD by December 31, 2010 for OCD review and a determination of final bond amount to satisfy this section of the permit. A bond submittal shall be submitted within 1 month of the OCD final assessed amount. This will be done.

OCD inquired about two potential spill locations from a recent Google Earth GIS view of the facility near Tank 1214 and southeast of MW-2. OCD Requests that the operator inspect these areas to verify that spills/releases exist or are not present in the field. The operator should respond to this item within 4 weeks of the meeting date or by COB on November 5, 2010. This request is actually for a tank and monitor well at Lovington. It will be addressed in the Lovington Section.

Darrell Moore
Environmental Manager for Water and Waste
Navajo Refining Company, LLC
Phone Number 575-746-5281
Cell Number 575-703-5058
Fax Number 575-746-5451

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COMPLETION REPORT ON AUTHORIZATIONS

DEPARTMENT: **ENGINEERING**

DATE: **September 22, 2010**
AUTHORIZATION NUMBER: **NRC/10-C/042**
COST CENTER: **201140**

DATE AUTHORIZATION APPROVED: **06/03/10**

DATE WORK COMPLETE (IN SERVICE DATE): **08/27/10**

(IN-SERVICE DATE MEANS THE DATE THE PROJECT WAS ACTUALLY PLACED IN SERVICE)

DESCRIPTION OF WORK: Project will include the following:
1. Installation of sanitary sewer lift stations at the Main Control Rooms in the North and South plant. Approximately 1300 lf of 2" SDR-11 piping will be installed to tie the lift stations into the city of Artesia's sanitary sewer system. Installation of approximately 375 lf of 4" PVC to tie the Blender Control Room lavatory facilities into the city of Artesia's sanitary sewer system.
2. Decommission all abandoned lavatory facilities and septic tank systems.
3. Install all needed electrical for the two lift stations. All conduit, wiring, and hardware needed for electrical work is included.

LOCATION OF WORK: **ARTESIA, NM**

FINAL COST: (To be subdivided in later funding by authorization)						
EQUIPMENT CODE	DESCRIPTION		ESTIMATED COST	ACTUAL COST	DIFFERENCE	
1	CIVIL	(L)	125,000.00	187,153.66	(62,153.66)	
		(M)	55,000.00		55,000.00	
2	ELECTRICAL	(L)	10,000.00	18,045.02	(8,045.02)	
		(M)	4,000.00		4,000.00	
3	WASTE DISPOSAL	(L)	10,000.00	175.23	9,824.77	
		(M)				
4	CONTINGENCY	(L)	26,000.00		26,000.00	
		(M)	10,000.00		10,000.00	
XC: LD/ORIGINAL, PT/HOLLY,			TOTALS	\$240,000.00	\$205,373.91	
					\$34,626.09	

DISPOSITION OF EXPENDITURES	
ADD TO INVESTMENT ACCT NO	205,373.91
ADD TO INVESTMENT ACCT NO	
ADD TO MAINTENANCE ACCT NO	
ADD TO MAINTENANCE ACCT NO	
TOTAL	\$205,373.91

REMARKS CAPITALIZATIONS

APPROVAL SIGNATURES

John Roberson 10/13/10
JOHN ROBBERSON SPONSOR
Jeffrey D. Schmitt 10/13/10
JEFFREY D. SCHMITT DEPARTMENT HEAD
Michael Whitley
MICHAEL WHITLEY MANAGER

AUTHORITY FOR EXPENDITURE (AFE)

AFE Title: <u>Facility Sewer System Upgrade</u>	Project No: <u>NRC/10-C/042</u>
Company Name: <u>NRC - Nampa Refining Company</u>	Document Date: <u>5/22/2010</u>
Physical Location: <u>Artesia</u>	Click to choose Original or Supplemental: <u>Original</u>
<u>9/1/2010</u> End Date: <u>7/30/2010</u>	Type of AFE: <u>C: Capital</u>
Original Authorization Amt: <u>\$240,000</u> (Only type in the amount above if this is a supplemental AFE, otherwise, this field will be automatically populated using the totals from the cost details tab)	Company No: <u>2000</u>
Supplemental Amount: _____	Cost Center No: <u>20140</u> Profit Center: <u>20000</u>
Total Amount Authorized: <u>\$240,000</u>	Plant No: <u>8900</u>
	Project Sponsor: <u>John Robertson</u>

Brief Description of Project (Add attachments if necessary):

(Project will include the following)

1. Installation of sanitary sewer lift stations at the Main Control Rooms in the North and South Plant. Approximately 1200 ft of 2" SDR-11 piping will be installed to tie the lift stations into the city of Artesia's sanitary sewer system. Installation of approximately 375 ft of 4" PVG to tie the Blender Control Room lavatory (sewer) into the city of Artesia's sanitary sewer system.
2. Decommission all abandoned lavatory facilities and septic tank systems.
3. Install all needed electrical for the two lift stations. All conduit, wiring, and hardware needed for electrical work is included.

Project Justification (Add attachments if necessary):

Nampa is currently phasing out the use of existing septic systems in the Artesia refinery. There are three new sewer lines that need to be installed in order to accomplish this. All three of the lines will tie into existing city sewer lines that are located in the refinery. There are two lines coming from the Main Control Rooms that require the use of lift stations due to the contour of the surrounding area. The remaining line coming from the Blender Control Room will be a gravity flow sanitary sewer line. Once the new sewer lines are tied into the city's sewer system the existing lavatories and septic systems will be decommissioned. The existing septic systems will be decommissioned by rupturing the bottoms and filling them with flowable fill. The dollar amount given in this AFE covers non hazardous waste disposal only.

Click to choose Yes or No:

Is this project provided for in the current budget? Yes No, enter amount: \$250,000

Does this project include an asset retirement obligation (ARO)? No

Is the project constructed on or acquiring company owned land/ROW? Yes

Does the project require removal of hazardous materials? No

Accounting Review for Proper Classification? No

Date Sent to Data Integrity Group: _____

Project Approvals		Department Review of Project			
Supervisor Approval:	<u>John Robertson</u> 6/3/10 Signature	Department	Initials	Date	Required
Department Head Approval:	<u>Jeffrey D. Schmitt</u> 6/3/10 Signature	Accounting	<u>EE</u>	<u>6.9.10</u>	X
Manager Approval:	<u>Michael Whalley</u> Signature	Treasury	<u>GI</u>	<u>6.9.10</u>	X
VP/President Approval:	<u>N/A</u> Signature	Legal			X
		Operations			X
		Executive			X
		HR/HR	<u>NA</u>	<u>6/9/10</u>	X

Ernie Piles 6.9.10
Amelia

JP
6-9-10

NRC/10-C/042

AUTHORITY FOR EXPENDITURE (AFE)									
AFETION:		Facility Name/Address/Zip			Type of AFE:		G. Code:		
Company Name:		NRC-Navy/Refinery/Company			Outstanding No.:		2000		
Document Date:		000000			Cost Center No.:		201100 Plant No. 0000		
LEVEL	WBS LINE ITEM			DESCRIPTION	PERC CODE	LABOR	MATERIAL	TOTAL	
	Line 1	2	3		6	1			
	NRC/10-C/	141		Refinery Asset - Unit 40					
2			1	CMR 492373		\$ 125,000	\$ 55,000	\$	180,000
2			2	Electrical 492374		\$ 10,000	\$ 4,000	\$	14,000
2			3	Waste Disposal 492375		\$ 10,000		\$	10,000
2		000		Contingency 492376		\$ 20,000	\$ 10,000	\$	30,000
TOTALS Proposed for the current budget						\$	175,000	\$ 69,000	\$ 244,000

Subtotal
204,000



P.O. Box 390
Artesia, NM: 88211-0390
Office # (505) 748-2142
Fax # (505) 748-2142
NM License # 81259

8667

Navajo Refining Co.
P. O. Box 159
Artesia, NM 88211-0159
Attn: John Roberson

April 12, 2010

ESTIMATE

We propose to furnish labor, material, equipment, supervision and all things necessary, except as noted below, to install (1) Sanitary Sewer Lift Station at North Plant Main Control Room, approx. 650 lf of 2" SDR-11 piping, and tie into existing 4" PVC sewer line located on the North side of Moseley Avenue.

Install (1) Sanitary Sewer Lift Station at the South Plant Main Control Room, approx. 650 lf of 2" SDR-11 piping, and tie into existing 4" PVC sewer line located on East side of Freeman Street.

Install approx. 375 lf of 4" PVC piping from Oil Movements Control Building and tie into existing 6" sewer line located on East 5th Street near Electrical shop in order to replace existing septic systems with Gravity Flow Sanitary Sewer Line.

Decommission (9) septic tanks by knocking a 3" diameter hole in bottom of tank floor and filling tanks with flow fill as instructed. Also remove existing toilets and urinals at locations listed below:

Central Control Room
FCC Operator Shelter (Pig Pen)
Pipeline Office Building
Shift Foreman's Office
Blender Control Room
TCC Operator Shelter
S.P. Main Control Room
West Crude Comfort Station
N.P. Comfort Station (orange doors)

Replace approx. 2000 ft² of asphalt paving on Texas St. and sewer line at Oil Movements (Blender) Building.

FOR THE SUM OF: \$ 161,423.00 NMGRT

Notes: Any underground obstructions or unsuitable soil conditions encountered would be dealt with at the owner's direction and expense.

Does not include electrical wiring for lift station

Thank You

Thomas S. Giles
Giles Incorporated
NM #81259

Accepted by,

Navajo Refining Co.



P.O. Box 390
Artesia, NM: 88211-0390
Office # (505) 748-2142
Fax # (505) 748-2142
NM License # 81259

8999

Navajo Refining Co.
P. O. Box 159
Artesia, NM 88211-0159
Attn: John Roberson

July 13, 2010

PROPOSAL

Due to unforeseen underground obstacles it is no longer possible to install a gravity fed Sanitary Sewer line at your Blender product movement building. However, we are prepared to install a new Lift Station and 2" SDR-7 Poly-pipe in order to provide bathroom services at this time.

FOR THE SUM OF: \$ 13,181.00 plus NMGR

Notes: Does not included electrical required for pumps and alarms.

Thank You

A handwritten signature in black ink, appearing to read 'Thomas S. Giles', written over a horizontal line.

Thomas S. Giles
Giles Incorporated
NM #81259

Accepted by:

A handwritten signature in black ink, appearing to read 'John Roberson', written over a horizontal line. To the right of the signature is the date '7/13/10'.

Navajo Refining Co.

JHK-104411

Loudon Electric LLC 2

PO Box 780

Artesia, NM 88211-0780

Invoice

3172

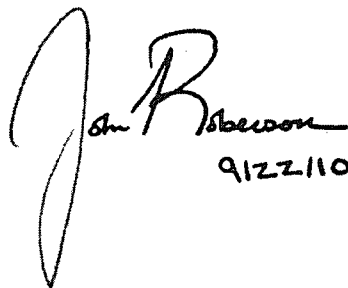
SCANNED

SEP 16 2010

Date: 9/14/2010

Bill To
NAVAJO REFINING CO Attn: Vendor Payables Group PO Box 1490 Artesia, NM 88211-1490

P.O. Number		Project		Terms	
95151		6110-Sewer System Upgrade		Due on receipt	
Quantity	Item Code	Description	Price Each	Serviced	Amount
	AS PER BID	Sewer System Upgrade - Blender	1,500.00		1,500.00T
	AS PER BID	All electrical to Power Lift Station of Sewer System Upgrade	3,720.00		3,720.00T
	AS PER BID	CCR Control Room Lift Station conduit, breakers, etc..	4,819.00		4,819.00T
	AS PER BID	South Plant Control Room Lift Station conduit & skid treater	6,796.00		6,796.00T
					16,835.00
"REC'D IN AP" SEP 15 2010					
				Sales Tax (7.1875%) \$1,210.02	
				Total \$18,045.02	
				Payments/Credits \$0.00	
				Balance Due \$18,045.02	


 9122/10



P.O. Box 390
Artesia, NM 88211-0390
Office # (505) 748-2142
Fax # (505) 748-2142
NM License # 81259

"REC'D IN AP"
AUG 23 2010

9073

Navajo Refining Co.
P.O. Box 159
Artesia, NM 88211-0159
Attn: John Roberson

August 19, 2010

INVOICE

We are pleased to report completion of the facility sewer system upgrade and request payment per our proposal # 8667 and your PO # 95137 (copies attached):

Quotation:	\$ 161,423.00
NMGRT:	\$ <u>11,602.28</u>

TOTAL THIS INVOICE: \$ 173,025.28

Thank you

Thomas S. Giles
Giles Incorporated
NM #81259

Approved By,

Navajo Refining Co.

8126110

SCANNED

AUG 24 2010



P.O. Box 284
Artesia, NM 88211-0284
Office # (505) 748-2142
Fax # (505) 748-2142
NM License # 81259

8667

April 12, 2010

Navajo Refining Co.
P. O. Box 159
Artesia, NM 88211-0159
Attn: John Roberson

ESTIMATE

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FOR THE SUM OF: \$ 161,423.00 NMGR

Notes: Any underground obstructions or unsuitable soil conditions encountered would be dealt with at the owner's direction and expense.

Does not include electrical wiring for lift station

Thank You

Accepted by,

Thomas S. Giles
Giles Incorporated
NM #81259

Navajo Refining Co.

Navajo Ref

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, September 10, 2010 2:30 PM
To: 'Moore, Darrell'
Cc: Lackey, Johnny; VonGonten, Glenn, EMNRD
Subject: RE: Liquid Waste Sewers

Darrell and Johnny:

Please submit your engineering drawings with the exact locations of the below-ground sewer tank system(s) with a detailed engineering specifications and procedures for closing out the tanks for the OCD to review, confirm that the conditions of the discharge permit were met, and make a final determination that they were properly closed. NRC should reference any approved work plans (see links to information related to the refinery sewer line project, etc. below).

Renewals, Mods & Application New Construction & Underground Sewer Lines
http://ocdimage.emnrd.state.nm.us/Imaging/FileStore/SantaFeAdmin/AO/62756/pENV000GW00029_146_AO.tif

Engineering Drawings Sanitary Waste Water Proposal
http://ocdimage.emnrd.state.nm.us/Imaging/FileStore/SantaFeAdmin/AO/65500/pENV000GW00029_152_AO.tif

OCD is the lead on the sanitary sewer project and has determined that the brief summary sent by Darrell Moore falls short of OCD expectations. Please submit the information within 30 days or by COB October 8, 2010 of the date of this message.

Please contact me if you have questions. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: <http://www.emnrd.state.nm.us/ocd/index.htm>
(Pollution Prevention Guidance is under "Publications")

File: OCD Online "GW-28 Engineering Drawings Sanitary Waste Water Proposal" and "GW-28 Permits, Renewals, and Mods Application New Construction & Underground Sewer Lines"

From: Moore, Darrell [<mailto:Darrell.Moore@hollycorp.com>]
Sent: Tuesday, September 07, 2010 2:35 PM
To: Chavez, Carl J, EMNRD
Cc: Lackey, Johnny; VonGonten, Glenn, EMNRD
Subject: RE: Liquid Waste Sewers

Carl

We are indeed bringing closure to Section 17 (iv) of Discharge Permit GW-028. All below ground sanitary effluent tanks have been closed per NMED guidelines. The tanks were closed in place by knocking a hole in the bottom of the tank and then filling the tank with flowable fill (basically cement). The sanitary effluent from each facility is now tied into the City of Artesia POTW thru sewer pipe that runs thru the refinery. We did **NOT** pipe this waste to the refinery's injection wells as we had discussed with OCD during the finalizing of the Discharge Permit. The logistics of that proposal did not fit in with our long term goals.

From: Chavez, Carl J, EMNRD [<mailto:CarlJ.Chavez@state.nm.us>]
Sent: Friday, September 03, 2010 9:29 AM

To: Moore, Darrell
Cc: Lackey, Johnny; VonGonten, Glenn, EMNRD
Subject: RE: Liquid Waste Sewers

Darrell:

Please send OCD the details of the underground sewage tank closures implemented by the Navajo Refining Company (NRC). As I indicated in my 8/25 e-mail, I think Navajo is attempting to bring closure to Section 17(iv) of the discharge permit? I found NRC correspondence dated May 16, 2008 associated with the Waste Water Treatment/Sanitary Effluent Recycle Project.

Please reference and/or identify the basis or intent of your communication. Thank you.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3490
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: <http://www.emnrd.state.nm.us/ocd/index.htm>
(Pollution Prevention Guidance is under "Publications")

From: Moore, Darrell [<mailto:Darrell.Moore@hollycorp.com>]
Sent: Wednesday, August 25, 2010 2:31 PM
To: Wells, John, NMENV; Chavez, Carl J, EMNRD
Subject: Liquid Waste Sewers

Gentlemen

As of August 18, 2010, all of Navajo Refining Company's septic tanks have had the bottoms bored thru and filled with flowable fill. All bathrooms in the plant are now hard piped to the City of Artesia POTW.

Darrell Moore
Environmental Manager for Water and Waste
Navajo Refining Company, LLC

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NAVAJO REFINING COMPANY

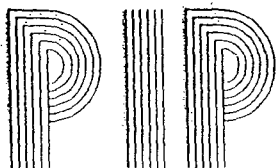
NEW CONSTRUCTION

AND

UNDERGROUND SEWER LINES

FEBRUARY, 2008





PROCESS INDUSTRY PRACTICES
FABRICATION/INSTALLATION DETAILS

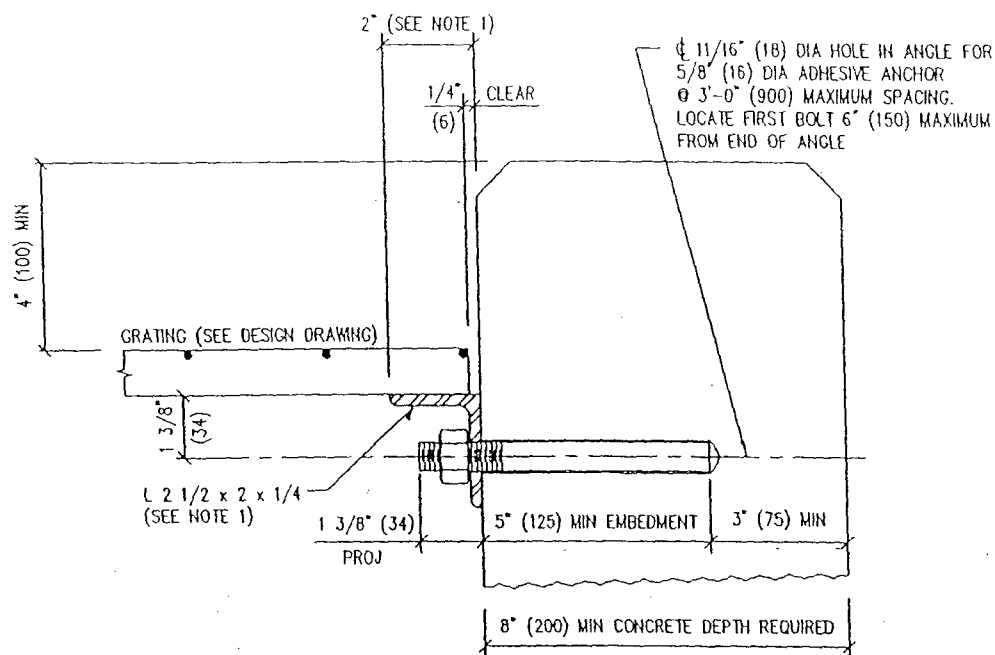
CIVIL DETAILS
GRATING LEDGER AND CURB ANGLES

CVI02000-09

JUNE 2006

PAGE 1 OF 1

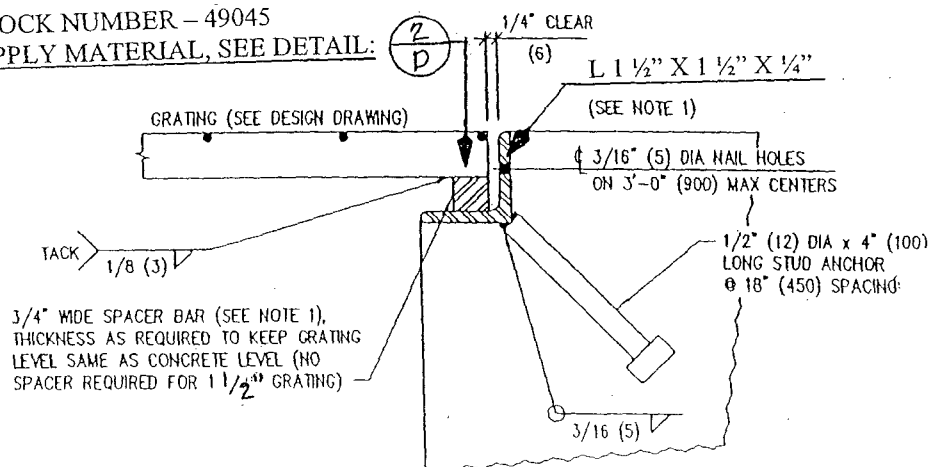
CVI02000



BOLTED LEDGER ANGLE FOR 1" TO 1 3/4" GRATING

NAVAJO STOCK NUMBER - 49045

NRC TO SUPPLY MATERIAL, SEE DETAIL:

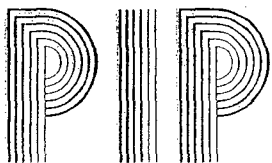


EMBEDDED CURB ANGLE FOR 1" TO 1 3/4" GRATING

NOTES:

1. WHERE REQUIRED, METRIC EQUIVALENT ANGLES, BARS AND GRATING SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS.
2. ANGLE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION.
3. LEDGER AND CURB ANGLES FOR GRATING OVER 1 3/4" THICK SHALL BE AS SHOWN ON DESIGN DRAWINGS.
4. FOR CIVIL GENERAL NOTES, SEE PIP CVI02000-00.

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS
IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.



PROCESS INDUSTRY PRACTICES
FABRICATION/INSTALLATION DETAILS

CONCRETE
GENERAL NOTES

STI03310-00

JUNE 2005

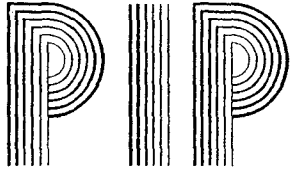
PAGE 1 OF 1

STI03310-00

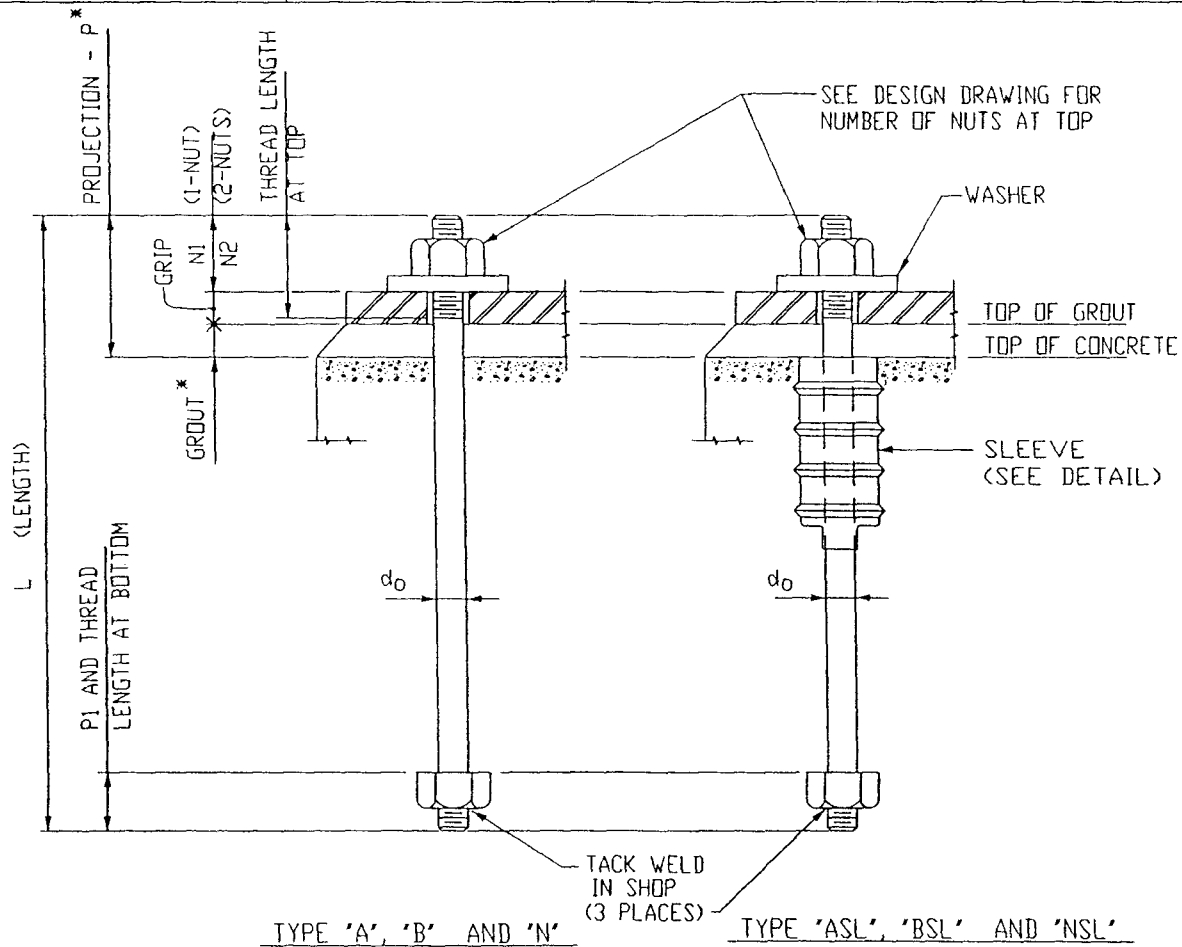
CONCRETE GENERAL NOTES

1. Materials, construction, and workmanship shall be in accordance with the latest edition of applicable federal, state, and local codes; and PIP STS03001, ACI 301, and ACI SP-66.
2. Unless noted otherwise, concrete shall have a minimum compressive strength of 4000 psi (28 MPa) at 28 days. Deformed reinforcing steel shall be in accordance with ASTM A615, Grade 60.
3. Welded wire fabric shall be in accordance with ASTM A185.
4. Reinforcing steel is measured out to out of bar. Hooks and bends shall be in accordance with ACI SP-66.
5. Lap splices for reinforcing steel shall be as shown on design drawings.
6. All exposed corners of concrete above grade shall have minimum 3/4" (20) x 45 degree chamfer finished edge.
7. Anchor bolts and sleeves shall be as indicated on design drawings and PIP STF05121. All other steel embedded items shall be ASTM A36 hot dip galvanized in accordance with ASTM A123, unless noted otherwise in the contract documents. Welding shall be per AWS D1.1.
8. All conduits, ground wires, drains, anchor bolts, other embedded items, etc. shall be in place before concrete placement.
9. Unless noted otherwise, structural base plates and non-machinery equipment shall be grouted with non-shrink cementitious grout in accordance with PIP STS03600.
10. Unless noted otherwise, all machinery equipment, including pumps and compressors, shall be grouted with epoxy grout in accordance with PIP STS03601.
11. Provide 1" (25) grout under structural base plates and equipment bases unless noted otherwise on design drawings.
12. When total number of reinforcing bars is shown on design drawings and spacing is not specified, bars shall be equally spaced.

DIMENSIONS ARE GIVEN IN FEET AND/OR INCHES. METRIC DIMENSIONS
IN PARENTHESES ARE IN MILLIMETERS, UNLESS NOTED OTHERWISE.



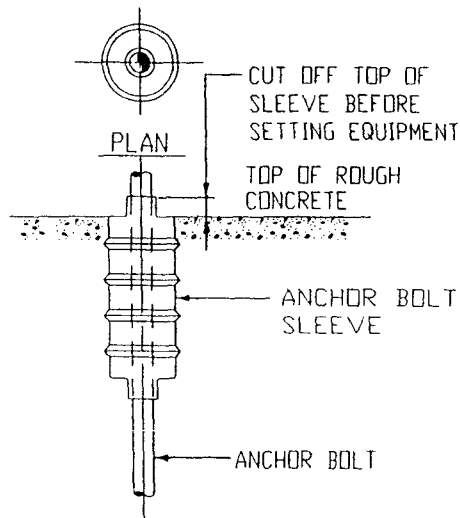
ANCHOR BOLT
DETAILS



ANCHOR BOLT DETAILS

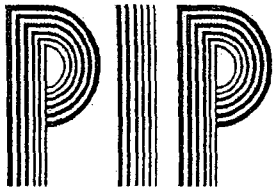
(FOR DIMENSIONS, SEE "ANCHOR BOLT DATA TABLE")

* PROJECTION - P AND GROUT THICKNESS AS SPECIFIED ON THE DESIGN DRAWINGS



ELEVATION

ANCHOR BOLT SLEEVE DETAIL



Process Industry Practices
Structural

PIP STF05121
Fabrication and Installation of
Anchor Bolts

PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determinations concerning fitness for purpose and particular matters or application of the Practice to particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

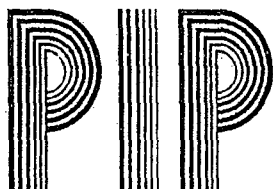
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Process Industry Practices Structural

PIP STF05121 Fabrication and Installation of Anchor Bolts

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1. Introduction

1.1 Purpose

This Practice provides details and requirements for anchor bolt fabricators and installers. This Practice also provides information for the design engineer to standardize bolt lengths. The intent of this Practice is to minimize the use of non-standard bolt lengths.

1.2 Scope

This Practice provides the details and requirements for anchor bolt fabrication and installation. Two standard lengths are shown for each diameter anchor bolt. This Practice also provides requirements for non-standard bolt lengths.

2. References

Applicable requirements in the following Practices and industry codes and standards shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles will be used herein where appropriate.

2.1 Process Industry Practices (PIP)

- PIP STS03001 - *Plain and Reinforced Concrete Specification*

2.2 Industry Codes and Standards

- American Society of Testing and Materials (ASTM)
 - ASTM A153/A153M - *Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
 - ASTM A563 - *Standard Specification for Carbon and Alloy Steel Nuts*
 - ASTM F436 - *Standard Specification for Hardened Steel Washers*
 - ASTM F1554 - *Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength*
- American Society of Mechanical Engineers (ASME)
 - ASME B18.2.1 - *Square and Hex Bolts and Screws*

3. Requirements

3.1 General

- 3.1.1 Unless a non-standard bolt length is required, the design engineer shall specify one of the two standard length anchor bolts shown for each anchor bolt diameter in the Anchor Bolt Data Table.
- 3.1.2 Non-standard bolt lengths may be required for the following reasons:

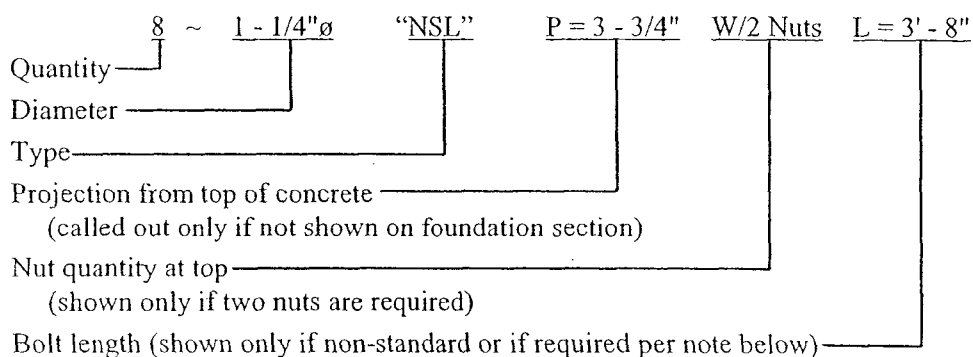
- a. A longer than necessary bolt length may cause the foundation to be deeper than practical.
 - b. A longer than necessary bolt length may cause the anchor bolt to project into the foundation (mat), which would increase construction costs.
 - c. To properly transfer load to the reinforcing steel, the anchor bolt may need to be longer than the standard bolt.
- 3.1.3 If a non-standard bolt length is required, it should be an even dimension (an even number of inches) and should be significantly different in length than the standard length bolt (at least 6 inches shorter or longer than the closest standard length bolt).

3.2 Materials

- 3.2.1 Bolts shall conform to *ASTM F1554*, Grade 36, with UNC-2A threads except as otherwise specified on the design drawing.
- 3.2.2 Nuts shall conform to *ASTM A563*, Grade A, heavy hex with UNC-2B threads. Washers shall be *ASTM F436*.
- 3.2.3 Headed bolts (conforming to Section 3.2.1) of at least the same length above the bottom nut (see "Anchor Bolt Details") are an acceptable substitution. Bolt head style shall be heavy hex in accordance with *ASME B18.2.1*.

3.3 Bolt Callout

Anchor bolts shall be identified on design drawings as follows:



Comment: For record purposes, lengths of standard length anchor bolts shall be noted either in the call-out or in notes on the drawings. The engineer may duplicate the Anchor Bolt Data Table (this Practice) on the design drawing.

3.4 Fabrication

- 3.4.1 Unless otherwise specified, all bolts (total bolt length), nuts, and washers shall be hot-dip galvanized after fabrication in accordance with *ASTM A153*, Class C.
- 3.4.2 Excess galvanizing material shall be removed from the threaded portions of the bolts by the use of a centrifuge or by mechanical chasing of the threads.

3.4.3 The fit of nuts on threads of anchor bolts shall be verified before shipment.

3.5 Assemblies

3.5.1 Type "A," "B," and "N" bolt assemblies shall consist of anchor bolt with tack-welded nut at bottom and nut(s) and washer at top. Refer to "Anchor Bolt Details."

3.5.2 Type "ASL," "BSL," and "NSL" bolt assemblies shall consist of anchor bolt with tack-welded nut at bottom and sleeve, nut(s), and washer at top. Refer to "Anchor Bolt Details."

3.6 Installation

3.6.1 Unless noted otherwise on the design drawings, tolerances shall be as specified in *PIP STS03001*.

3.6.2 Unless noted otherwise on design drawings, anchor bolt sleeves for stationary equipment and structural base plates shall be filled with grout after the column or equipment is in place and the anchor bolts are aligned. Water or other loose particles shall not be allowed to collect in the sleeve before the sleeve is grouted.

3.6.3 Unless noted otherwise on the design drawings, anchor bolt sleeves for machinery shall be filled with nonbonding moldable material before grouting.

3.6.4 Anchor bolt threads shall be covered with duct tape or other suitable means to keep them clean and to prevent any damage that might occur during the preparation of the foundation for grouting and the actual grouting of the foundation.

3.6.5 Unless specified otherwise on design drawings, anchor bolts shall be tightened to a snug-tight condition, defined as the tightness that is attained with a few impacts of an impact wrench or with the full effort of a man using an ordinary spud wrench.

3.6.6 At slide plate locations, two top nuts are required. The lower nut shall be hand tightened and then backed off a half turn leaving approximately 1/16-inch clearance between lower nut and base plate. The upper nut shall be installed and jammed against the first nut.

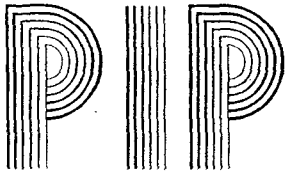
Appendix

Anchor Bolt Data Table –
Types "A," "B," "N,"** "ASL," "BSL," and "NSL"*** Bolts
(See "Anchor Bolt Details" for locations of dimensions.)

Bolt Diameter d _o	Allowance for Nuts			Thread Length at Top	Sleeve Shell Size	"A" & "ASL" Bolts*	"B" & "BSL" Bolts*	Bolt Diameter d _o
	N1	N2	P1 & Thread Length at Bottom			Std. Length L	Std. Length L	
1/2"	1"	1 1/2"	1"	2 1/4"	2" x 5"	1'-0"	2'-4"	1/2"
5/8"	1 1/4"	2"	1"	2 3/4"	2" x 7"	1'-3"	2'-5"	5/8"
3/4"	1 1/2"	2 1/4"	1 1/4"	3"	2" x 7"	1'-4"	2'-6"	3/4"
7/8"	1 1/2"	2 1/2"	1 1/4"	3 1/4"	2" x 7"	1'-5"	2'-7"	7/8"
1"	1 3/4"	2 3/4"	1 1/2"	3 1/2"	3" x 10"	1'-10"	2'-11"	1"
1 1/4"	2 1/4"	3 1/2"	1 3/4"	4 1/4"	3" x 10"	2'-0"	3'-6"	1 1/4"
1 1/2"	2 1/2"	4"	2"	4 3/4"	4" x 15"	2'-8"	4'-5"	1 1/2"
1 3/4"	3"	4 3/4"	2 1/4"	5 1/2"	4" x 15"	2'-10"	5'-0"	1 3/4"
2"	3 1/4"	5 1/4"	2 1/2"	6"	4" x 18"	3'-4"	5'-2"	2"
2 1/4"	3 3/4"	6"	2 3/4"	6 3/4"	4" x 18"	3'-6"	5'-5"	2 1/4"
2 1/2"	4"	6 1/2"	3"	7 1/4"	6" x 24"	4'-2"	5'-7"	2 1/2"
2 3/4"	4 1/2"	7 1/4"	3 1/4"	8"	6" x 24"	4'-4"	5'-8"	2 3/4"
3"	4 3/4"	7 3/4"	3 1/2"	8 1/2"	6" x 24"	4'-6"	6'-0"	3"

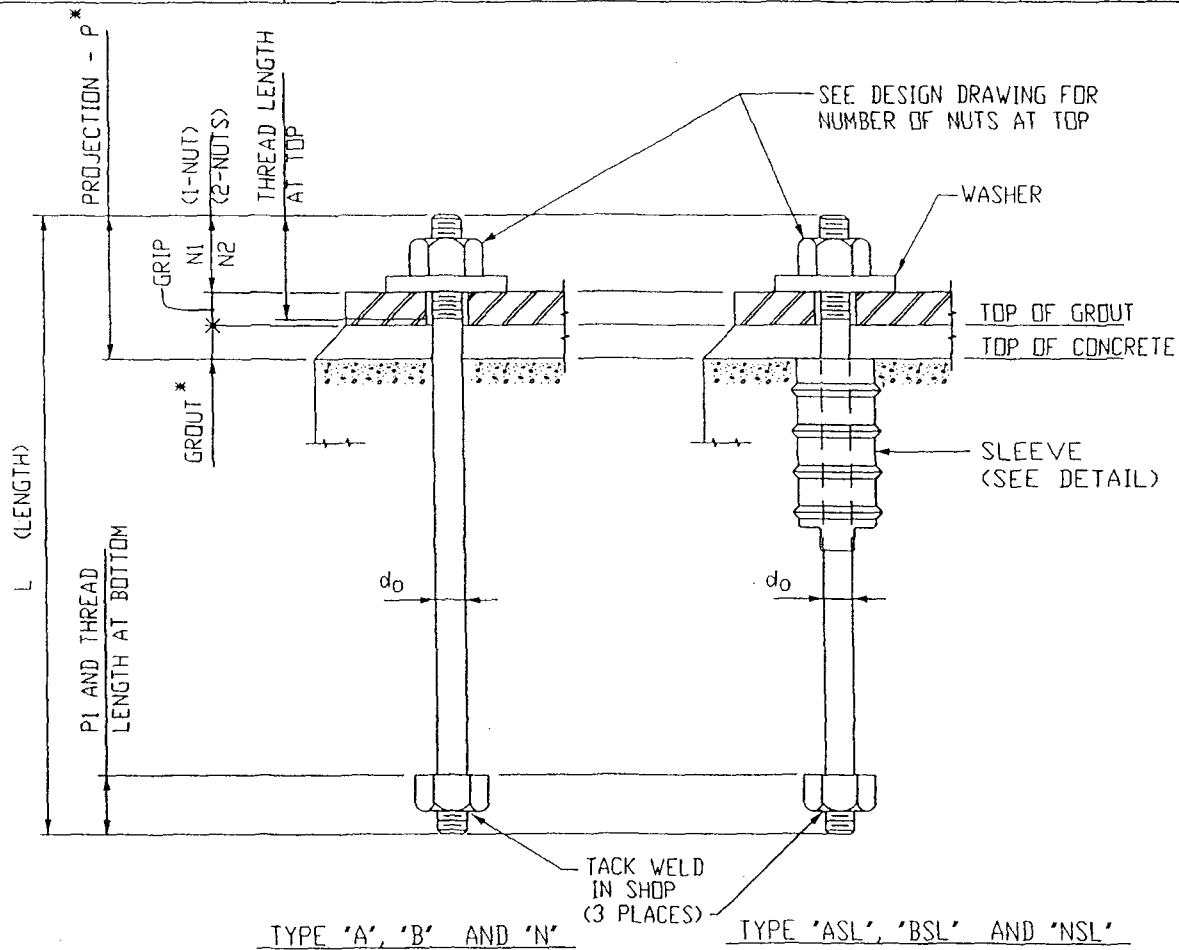
*Note to designer: It is intended that the "A" and "ASL" bolts be used unless a longer length is required. If a longer length is required, use the "B" and "BSL" bolts. If neither is suitable, designate the bolt as type "N" (no sleeves required) or as type "NSL" (sleeves required), and specify the required length on the design drawing.

**Note to fabricator: Type "N" and "NSL" bolts have no standard length. See the design drawings for anchor bolt length.



ANCHOR BOLT
DETAILS

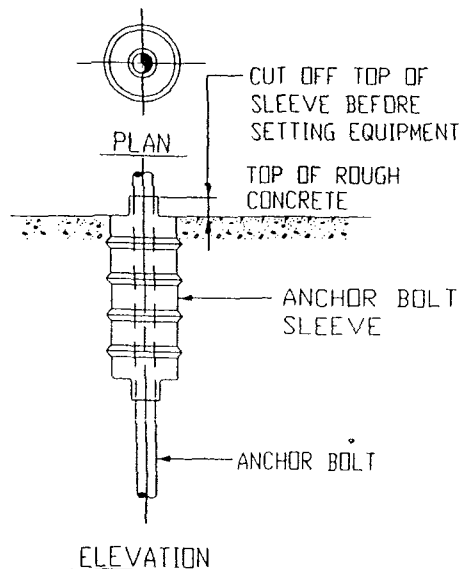
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ANCHOR BOLT DETAILS

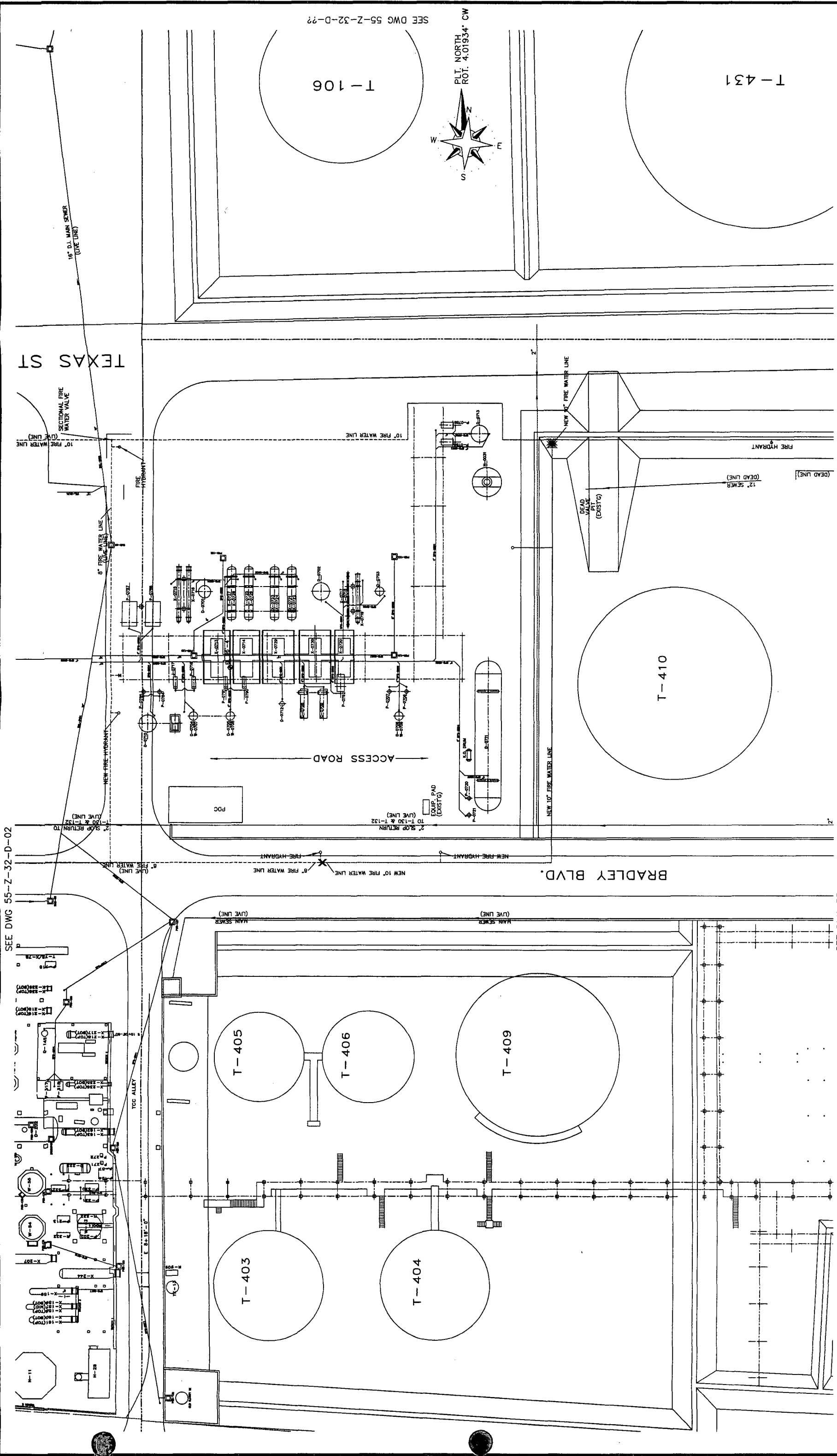
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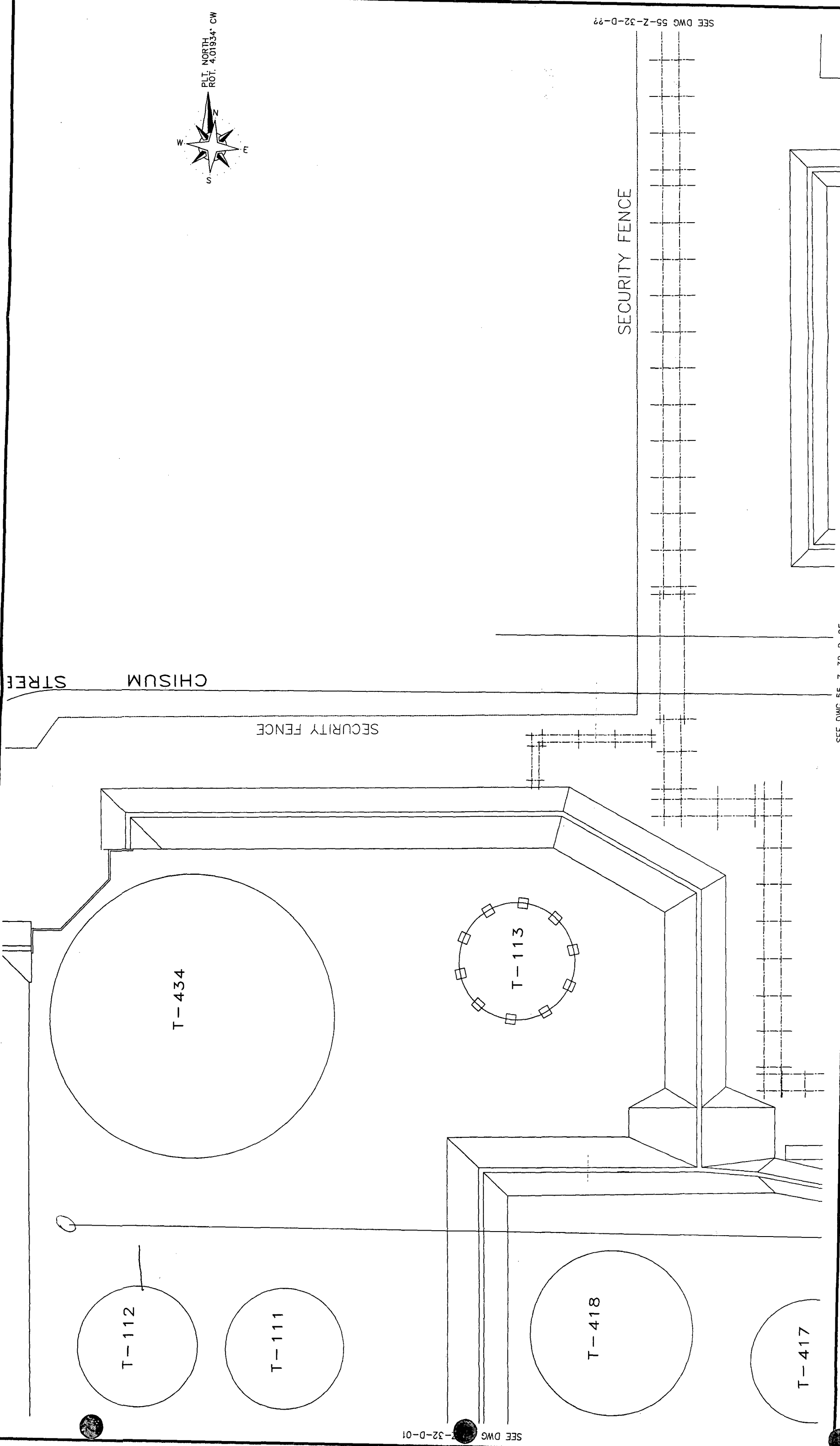
* PROJECTION - P AND GROUT THICKNESS AS SPECIFIED ON THE DESIGN DRAWINGS



ANCHOR BOLT SLEEVE DETAIL

SEE DWG 5





SEE DWG 55-Z-32-D-01

SEE DWG 55-Z-32-D-22

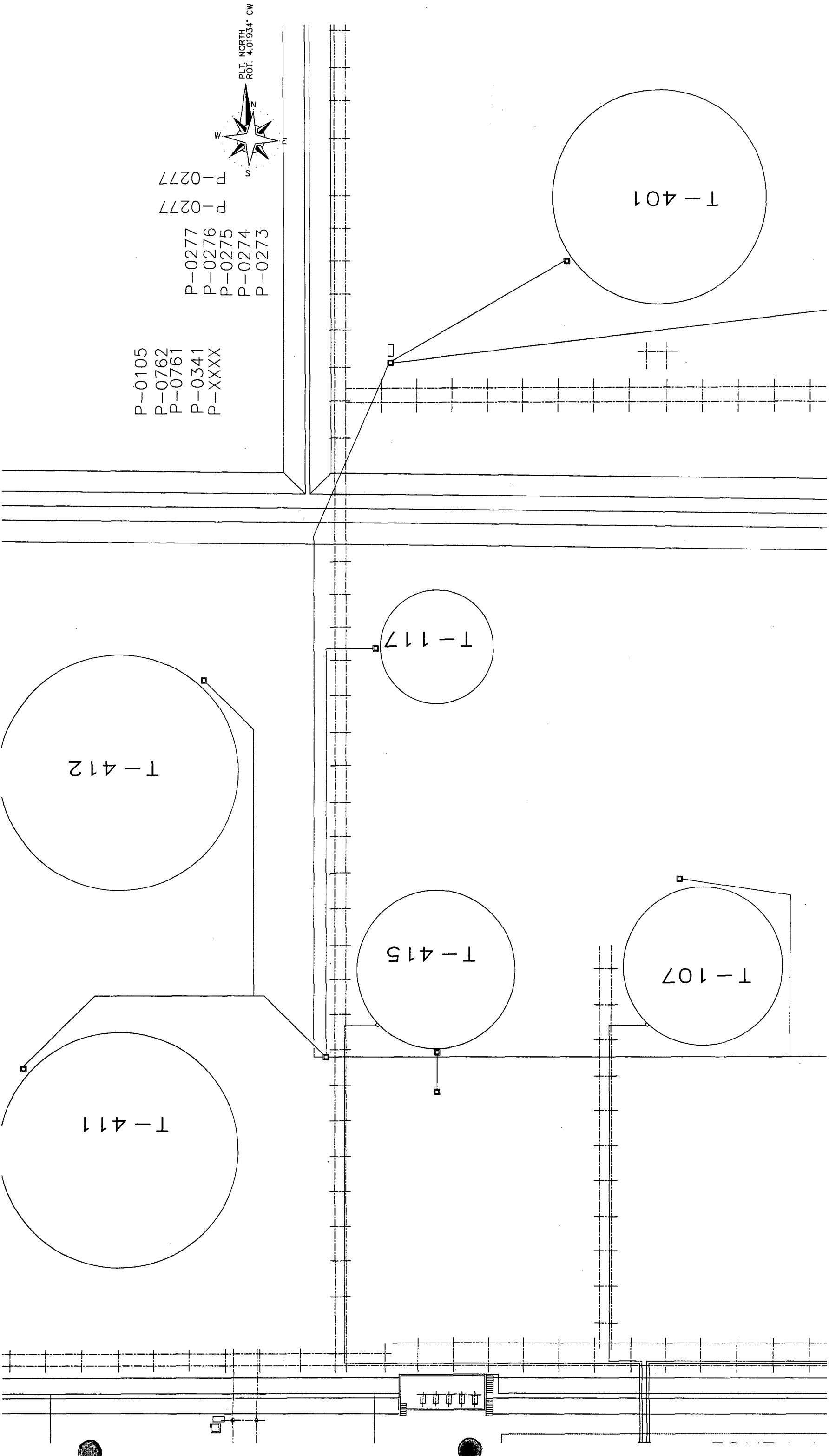
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DRAWING TITLE PLOT PLAN NAVAJO REFINERY UNDERGROUND SEWER PIPING		DRAWN BY SLW	CHECKED BY SLW	DATE 1/11/08	DESIGNED BY DGJ
REVISIONS		BY	CHK.	DATE	APPR.
NO.		REVISIONS			

SEE DWG 55-Z-32-D-04</

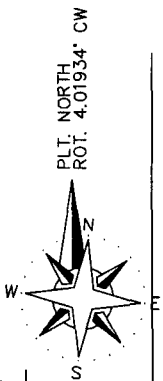
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P-0105
P-0762
P-0761
P-0341
P-XXXX

P-0277
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P-0273

P-0277
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SEE DWG 55-Z-32-D-08

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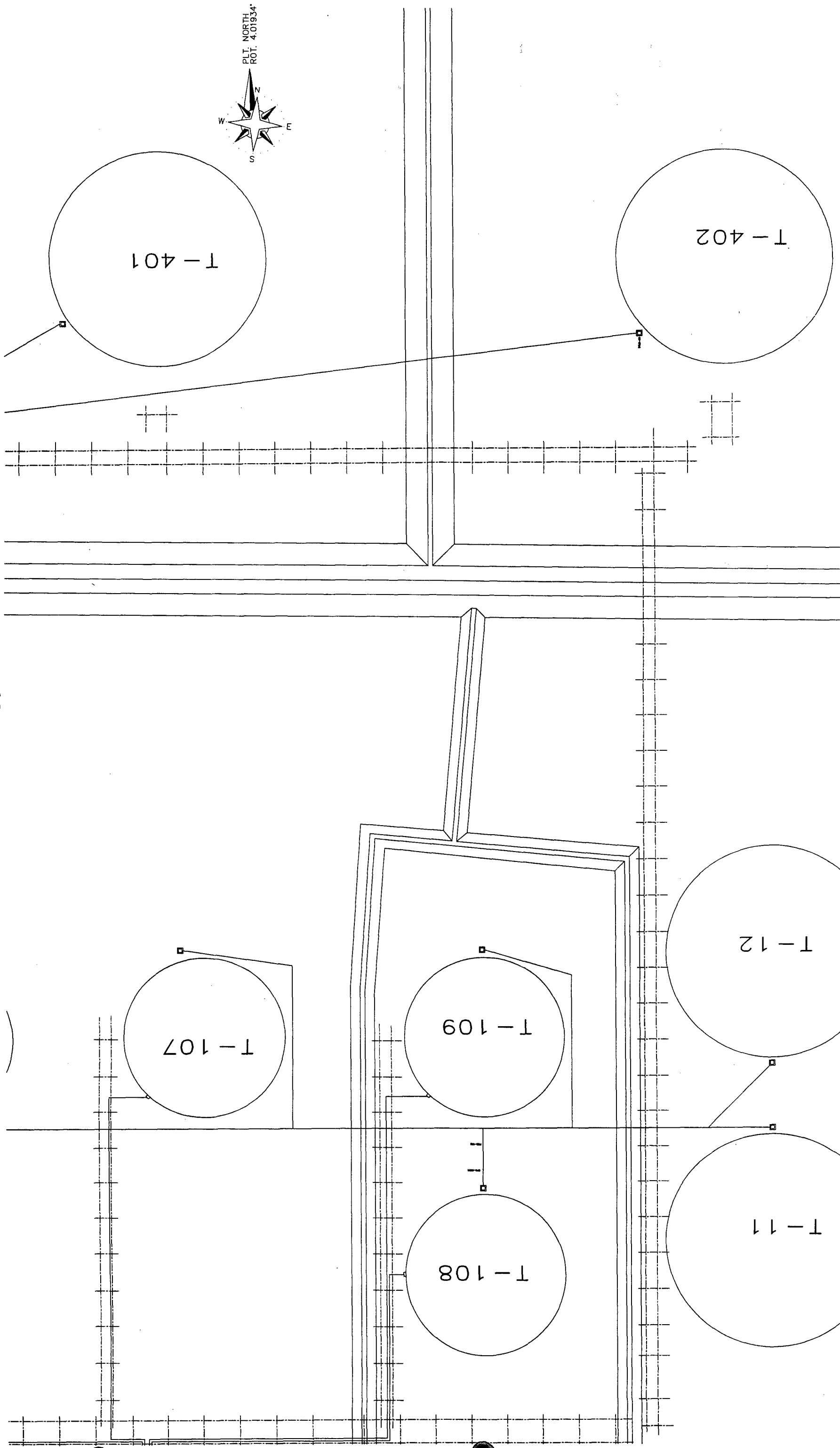
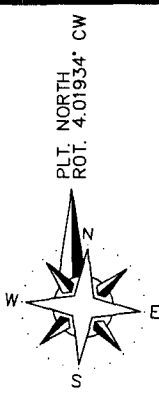
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PLOT PLAN
NAVAJO REFINERY
UNDERGROUND SEWER PIPING

NAVAJO REFINING CO.
ENGINEERING DEPARTMENT
P.O. DRAWER 159
ARTESIA, NEW MEXICO

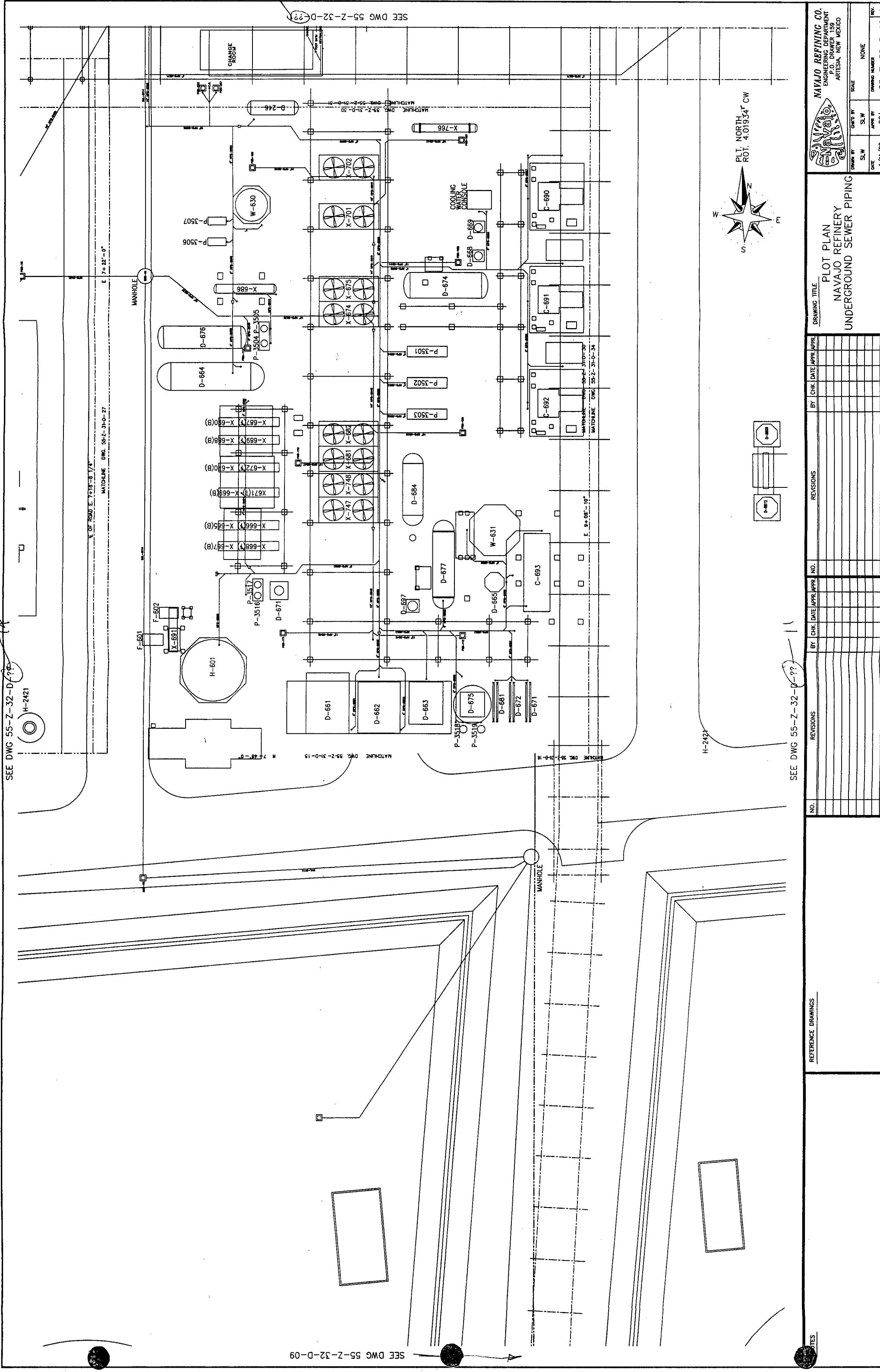
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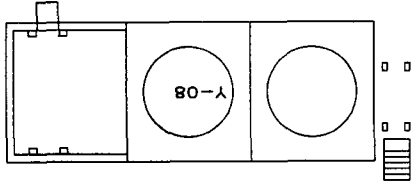
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ENGINEERING DEPARTMENT
P.O. DRAWER 159
ARTESIA, NEW MEXICO

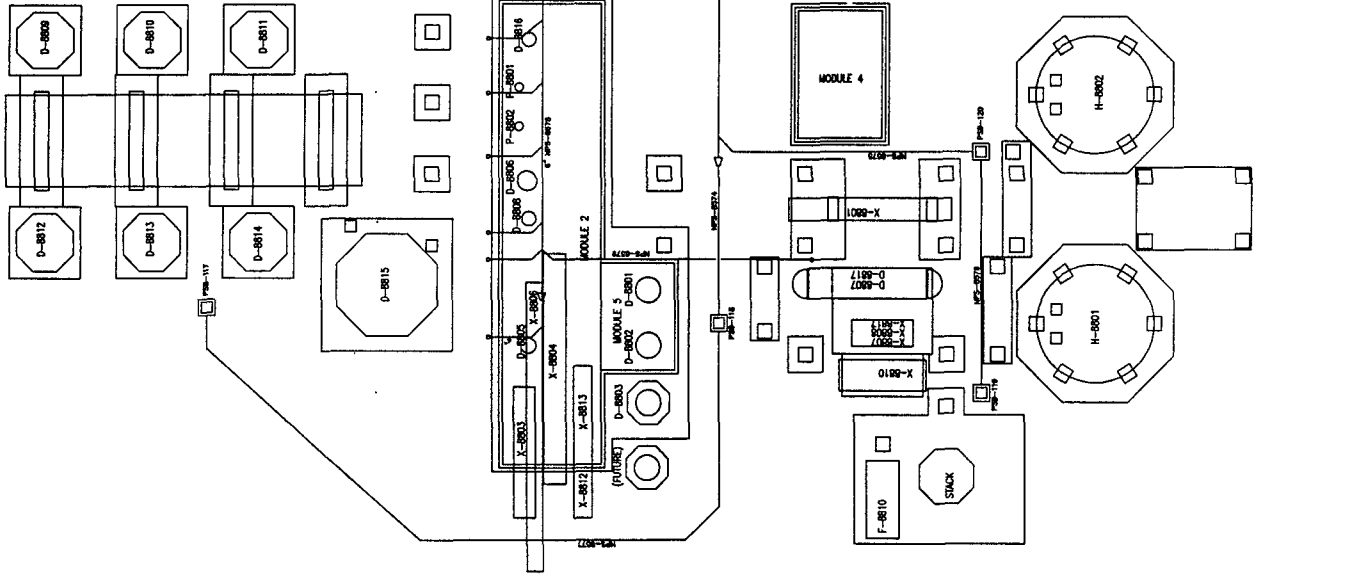


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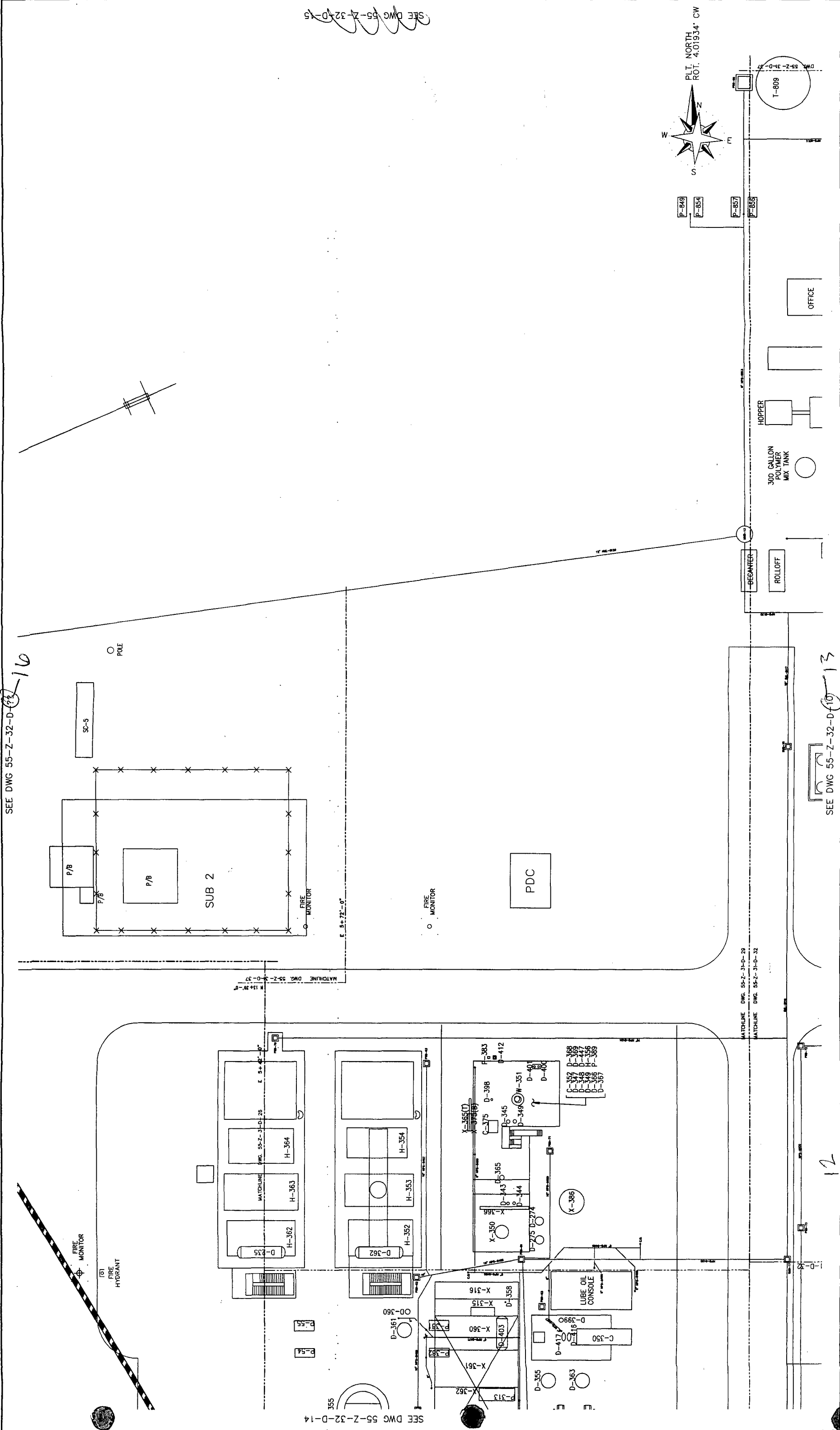
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FUTURE
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HYDROGEN PLANT

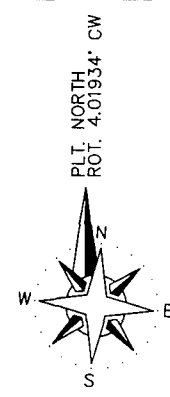


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SEE DWG 55-Z-32-D-15



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UNDERGROUND SEWER PIPING				55-Z-32-D-15			
NAVAJO REFINING CO.				NAVAJO REFINING CO.			
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