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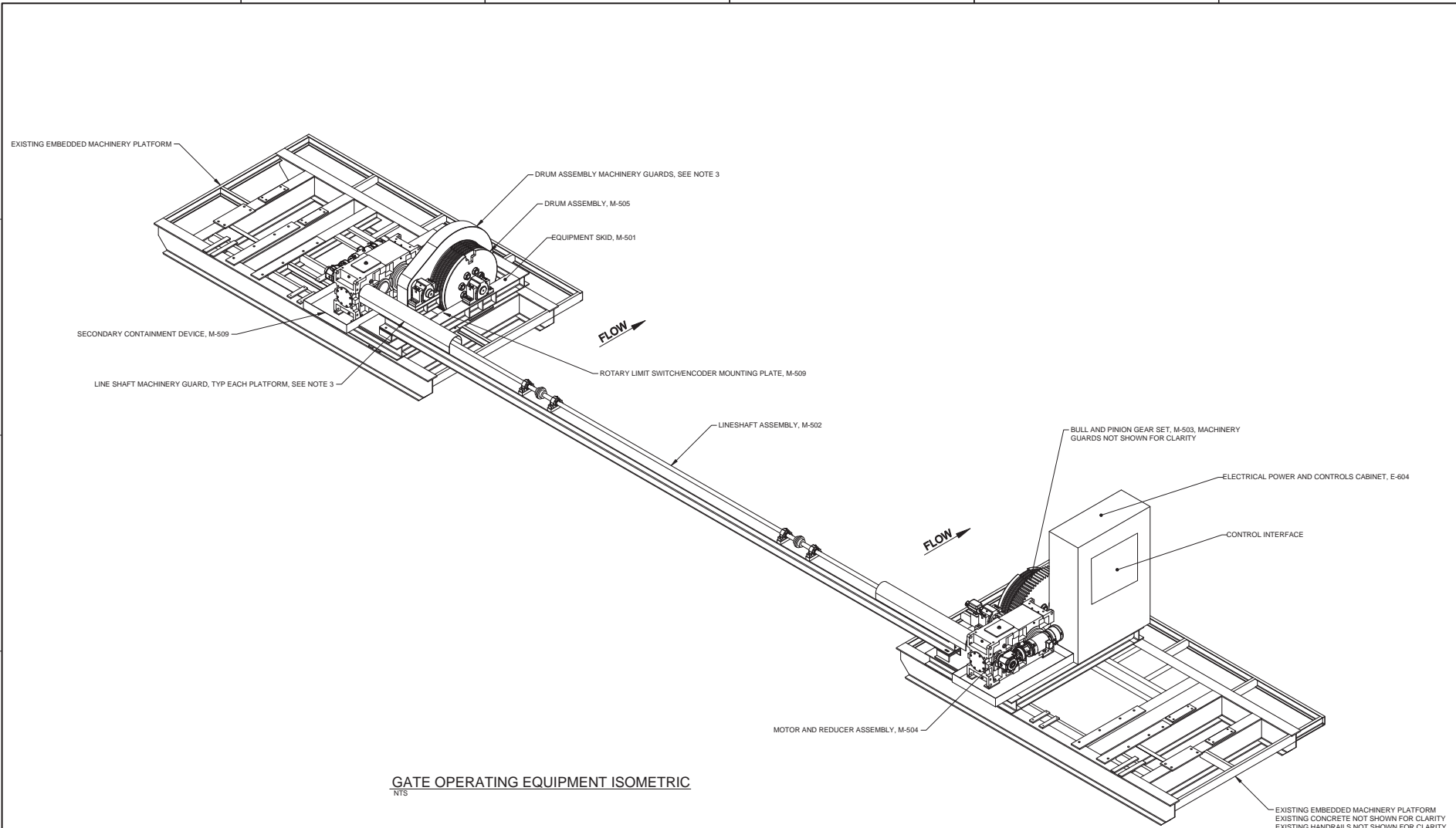
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## GATE OPERATING EQUIPMENT ISOMETRIC

NTS

### NOTES:

- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
- DAM STRUCTURE, GATE, HANDRAILS, ADJACENT MACHINERY, PARAPET WALL AND OTHER FEATURES OMITTED FOR CLARITY.
- DESIGN, FABRICATE AND INSTALL MACHINERY GUARDS ON EXPOSED ROTATING EQUIPMENT. INSTALL ACCESS HATCHES AND VIEW PORTS TO FACILITATE MAINTENANCE AND INSPECTION. SEE SPECIFICATION SECTION 35 20 16.47 25 FOR DETAILS.
- RAISE HANDRAILS ON EXISTING PLATFORMS TO 42" MINIMUM HEIGHT, MEASURED FROM TOP OF EQUIPMENT SKID STRUCTURE. SEE SPECIFICATIONS SECTION 35 20 16.47 25 FOR DETAILS.

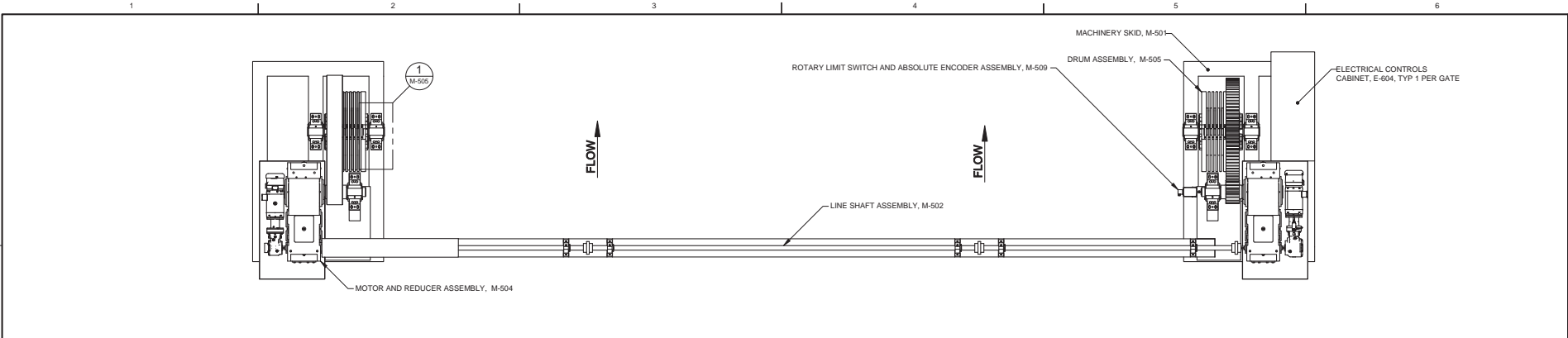
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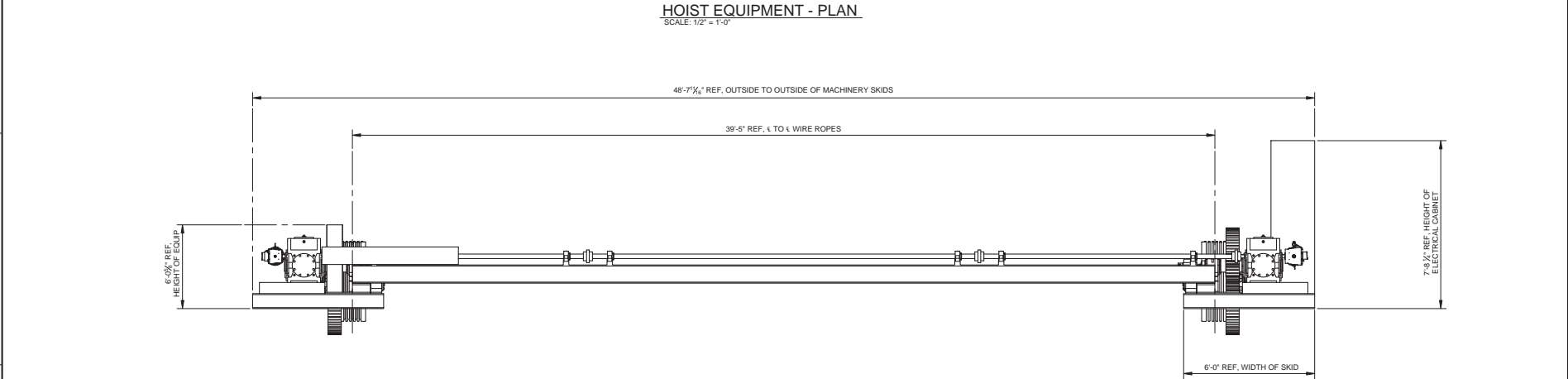
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 PORTLAND DISTRICT PROJECT NUMBER: [blank]

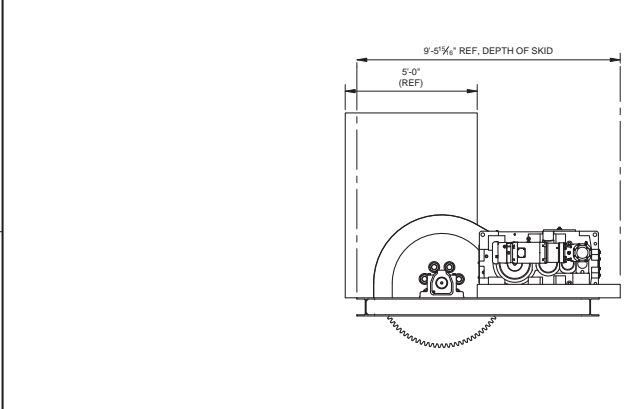
LOOKOUT POINT DAM AND RSVR  
O&M & BFA 75439  
TANIER GATE REHABILITATION  
MECHANICAL EQUIPMENT  
GENERAL LAYOUT



**HOIST EQUIPMENT - PLAN**  
SCALE: 1/2" = 1'-0"



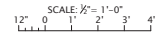
**HOIST EQUIPMENT - ELEVATION**  
SCALE: 1/2" = 1'-0"

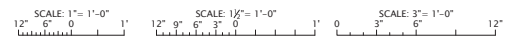
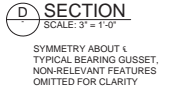
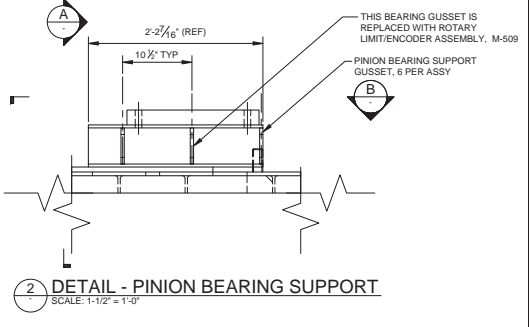
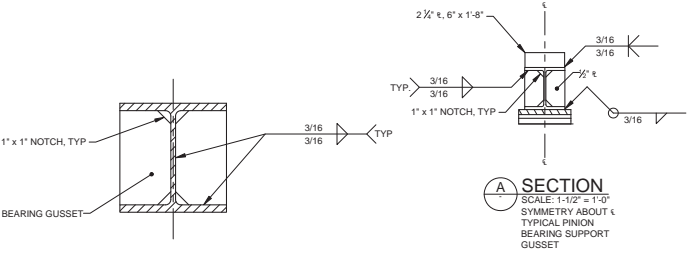
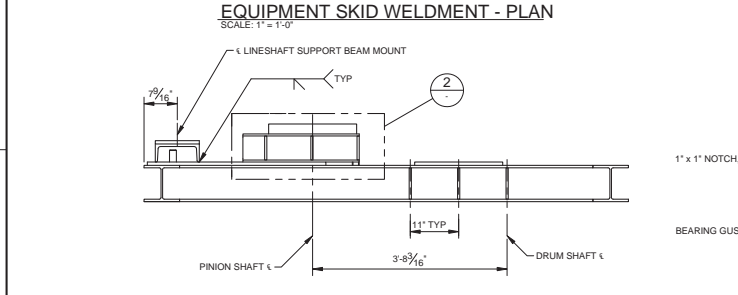
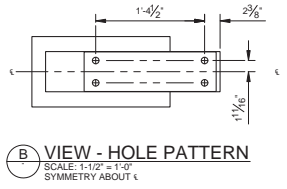
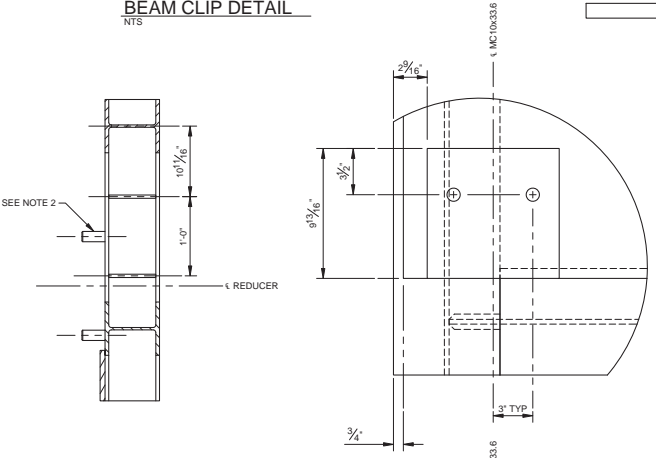
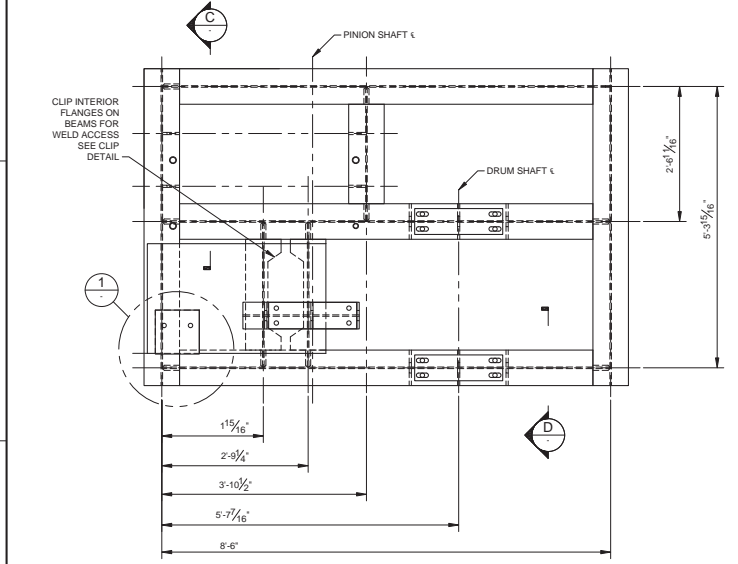
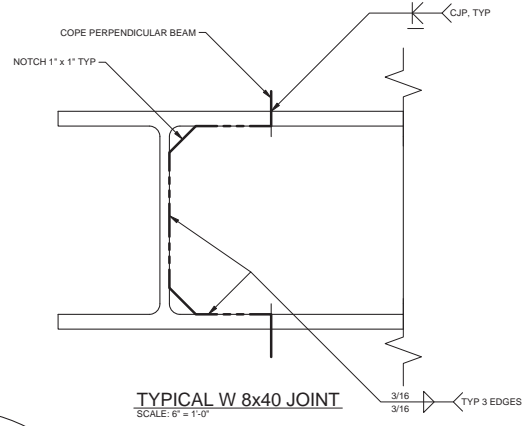
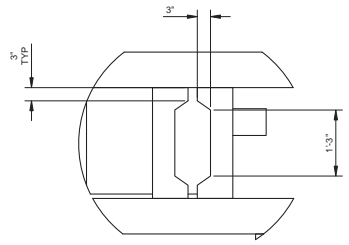
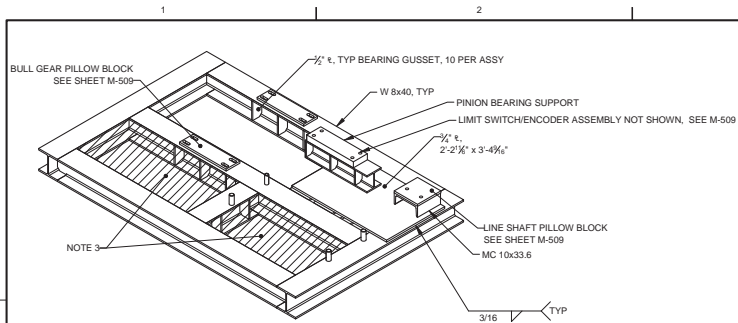


**HOIST EQUIPMENT - LEFT**  
SCALE: 1/2" = 1'-0"

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| <p>US Army Corps of Engineers<br/>PORTLAND DISTRICT</p>   |   |
| <p>DESIGNED BY: <i>[Name]</i></p> <p>CHECKED BY: <i>[Name]</i></p> <p>DATE: <i>[Date]</i></p>   | <p>DATE: _____</p> <p>DATE: _____</p> <p>DATE: _____</p> <p>DATE: _____</p> <p>DATE: _____</p> <p>DATE: _____</p> <p>DATE: _____</p>  |
| <p>U.S. ARMY CORPS OF ENGINEERS<br/>PORTLAND DISTRICT<br/>PORTLAND, OREGON</p> <p>DESIGNED BY: _____<br/>CHECKED BY: _____<br/>DATE: _____</p> <p>PROJECT NO: _____<br/>DRAWING NO: _____<br/>SHEET NO: _____ OF _____</p> <p>SCALE: 1/2" = 1'-0"</p> | <p>DATE: _____</p> <p>DESIGNED BY: _____</p> <p>CHECKED BY: _____</p> <p>DATE: _____</p> <p>PROJECT NO: _____</p> <p>DRAWING NO: _____</p> <p>SHEET NO: _____ OF _____</p> <p>SCALE: 1/2" = 1'-0"</p> |
| <p>LOOKOUT POINT DAM AND RS/R<br/>O&amp;M &amp; BPA 75439<br/>TAINIER GATE REHABILITATION<br/>MECHANICAL EQUIPMENT<br/>HOIST EQUIPMENT LAYOUT</p>   | <p>SHEET IDENTIFICATION<br/><b>M-102</b></p>  |

- NOTES:
- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
  - NON-RELEVANT FEATURES AND SOME MACHINERY GUARDS OMITTED FOR CLARITY.





- NOTES:
- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
  - WELD 1'-8 UNC 2A STUDS TO MATCH HOLE PATTERN OF PARALLEL REDUCER. STUD PATTERN TO BE BASED ON SELECTED EQUIPMENT.
  - FILL OPENINGS WITH GALVANIZED STEEL GRATING. SIZE GRATING TO SUPPORT 500 LB POINT LOAD. TOP OF GRATING TO BE FLUSH WITH SKID TOP FLANGE.

U.S. Army Corps of Engineers  
Portland District

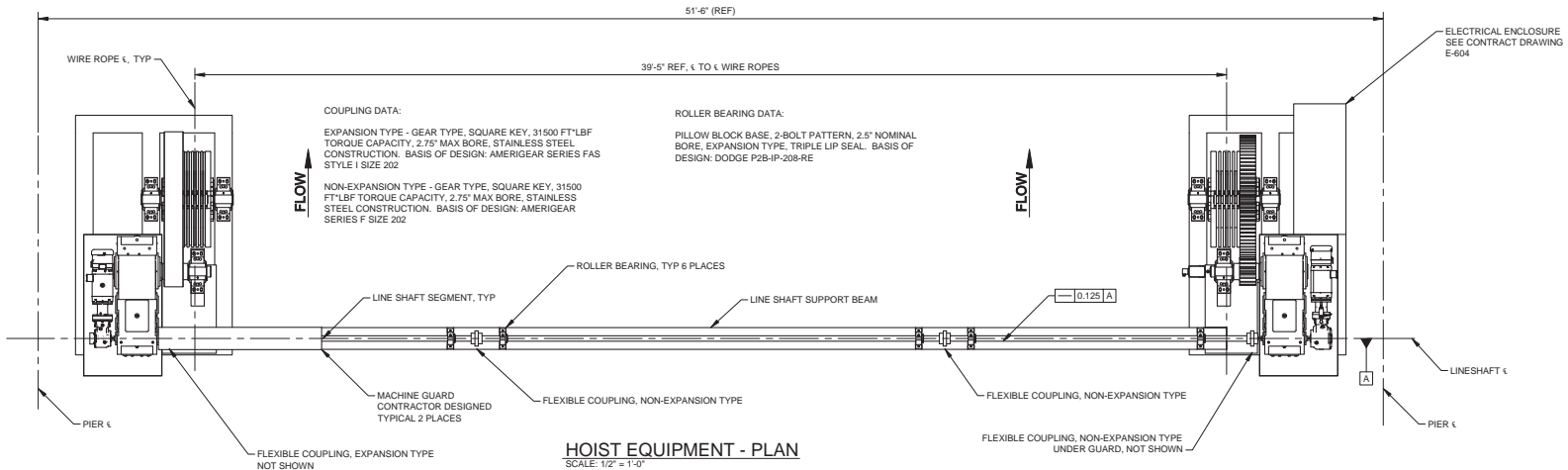
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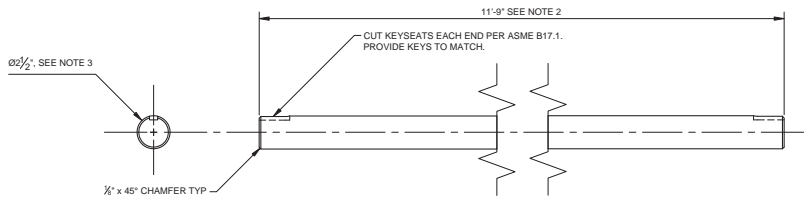
PROJECT NAME:  
DRAWING TITLE:

LOOKOUT POINT DAM AND RS/R  
O&M & BPA 75439  
TAINTER GATE REHABILITATION  
MECHANICAL EQUIPMENT  
STRUCTURAL STEEL

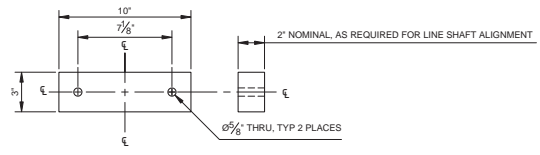
SHEET IDENTIFICATION  
**M-501**



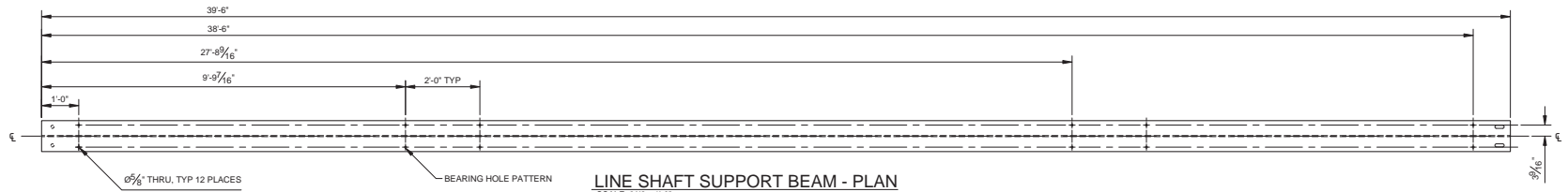
**HOIST EQUIPMENT - PLAN**  
SCALE: 1/2" = 1'-0"  
MACHINERY PLATFORMS NOT SHOWN FOR CLARITY



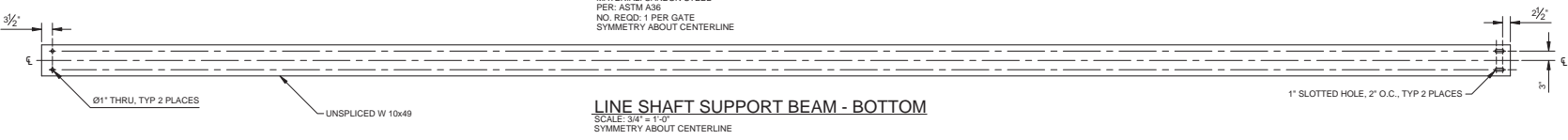
**LINE SHAFT SEGMENT**  
SCALE: 6" = 1'-0"  
MATERIAL: STAINLESS STEEL  
PER: ASTM A564, UNS 17400, TYPE 630, CONDITION H1100  
NO. REQD: 3 PER GATE



**BEARING SUPPORT BLOCK**  
SCALE: 3" = 1'-0"  
MATERIAL: A36 STEEL  
PER: ASTM A36  
NO. REQD: 6 PER GATE  
SYMMETRY ABOUT CENTERLINES



**LINE SHAFT SUPPORT BEAM - PLAN**  
SCALE: 3/4" = 1'-0"  
MATERIAL: CARBON STEEL  
PER: ASTM A36  
NO. REQD: 1 PER GATE  
SYMMETRY ABOUT CENTERLINE



**LINE SHAFT SUPPORT BEAM - BOTTOM**  
SCALE: 3/4" = 1'-0"  
SYMMETRY ABOUT CENTERLINE

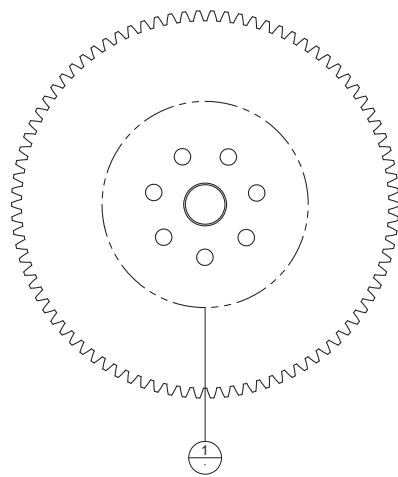
- NOTES:
- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
  - NOMINAL LINESHAFT LENGTH SHOWN. ADJUST LINE SHAFT LENGTH BASED ON EXISTING WIRE ROPE CENTERLINES, SELECTED SPEED REDUCERS, AND COUPLING MANUFACTURER SUGGESTED BORE EMBEDMENT.
  - NOMINAL LINESHAFT DIAMETER SHOWN. CONTRACTOR MAY REMOVE UP TO 1/32" MATERIAL BY TURNING OR GRINDING TO ENSURE ACCEPTABLE FIT WITH LINESHAFT BEARINGS.



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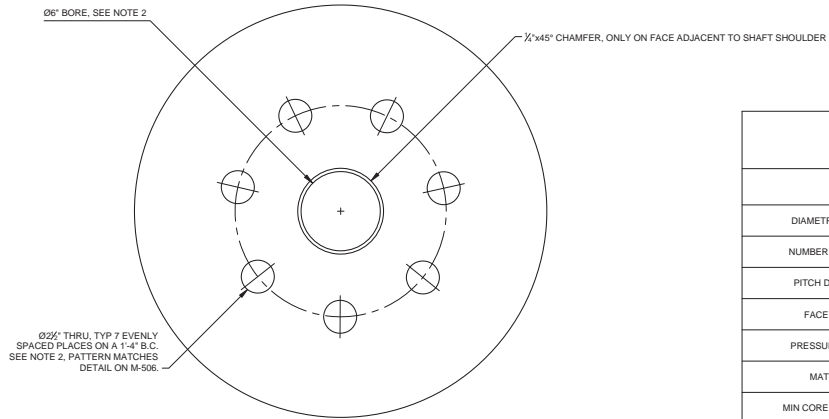
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| PROJECT MANAGER     |      |              |               |
| PROJECT SUPERVISOR  |      |              |               |
| PROJECT COORDINATOR |      |              |               |

LOOKOUT POINT DAM AND RSVR  
O&M & BPA 75439  
TAINTER GATE REHABILITATION  
LINE SHAFT  
ASSEMBLY AND DETAILS



**BULL GEAR**

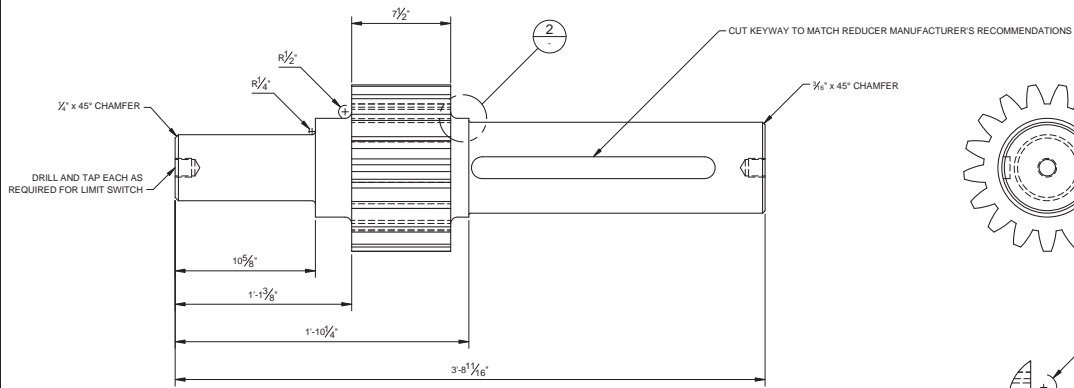
SCALE: 1/12" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A290 UNS G43400  
NO. REQD: 2 PER GATE  
SEE GEAR DATA TABLE



**DETAIL 1**

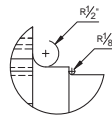
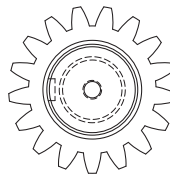
SCALE: 3" = 1'-0"

|                            | PINION                                      | BULL GEAR |
|----------------------------|---|-----------|
| DIAMETRAL PITCH            | 1.5/IN                                      |           |
| NUMBER OF TEETH            | 17  | 86        |
| PITCH DIAMETER             | 11.3333                                     | 57.3333   |
| FACE WIDTH                 | 7.5"  | 7.25"     |
| PRESSURE ANGLE             | 20°   | 20°       |
| MATERIAL                   | AISI 4340QT STEEL, INDUCTION HARDENED TEETH |           |
| MIN CORE HARDNESS          | 300 BHN                                     | 300 BHN   |
| MIN SURFACE HARDNESS       | 54 HRC                                      | 50 HRC    |
| TOOTH ACCURACY (AGMA 2015) | A10   | A10       |



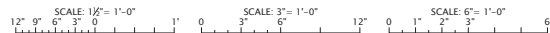
**PINION SHAFT**

SCALE: 3" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A291 UNS G43400  
NO. REQD: 2 PER GATE  
SEE GEAR DATA TABLE



**DETAIL 2**

SCALE: 6" = 1'-0"



- NOTES:  
1. SEE SHEET M-001 FOR GENERAL MECHANICAL NOTES.  
2. NOMINAL BORE DIMENSION. CONTRACTOR SHALL DETERMINE THE APPROPRIATE TOLERANCES FOR THE BORE TO ACHIEVE FN1 CLASS INTERFERENCE FIT WITH THE MATING PART. SHOW TOLERANCES ON CONTRACTOR-PRODUCED SHOP DRAWINGS.



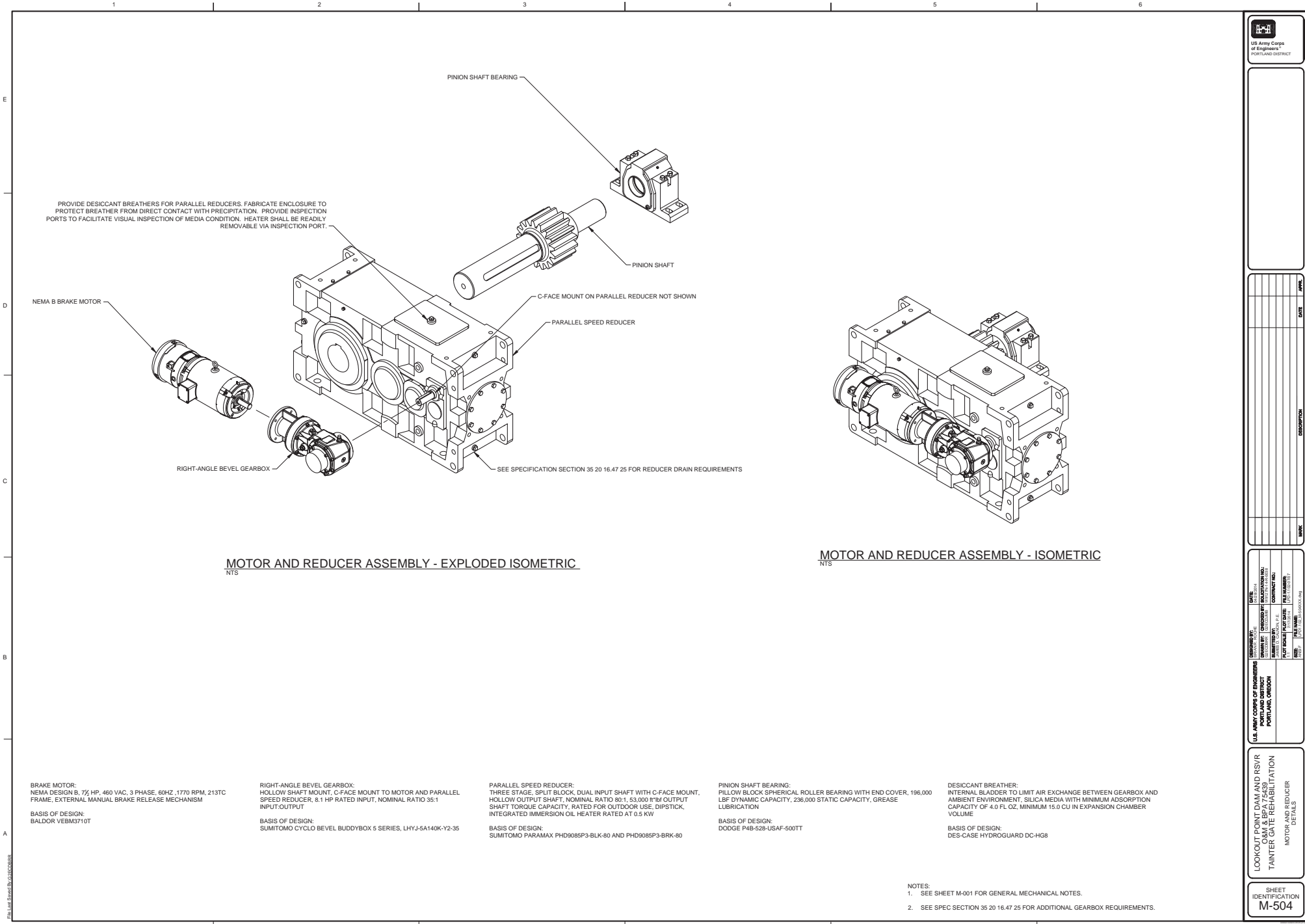
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PORTLAND DISTRICT

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| APPROVED BY | PROJECT ENGINEER | PROJECT NO.   | PROJECT DATE     |
| PROJECT NO. | PROJECT DATE     | PROJECT SCALE | PROJECT LOCATION |

LOOKOUT POINT DAM AND RSVR  
O&M & BPA 75439  
TAINIER GATE REHABILITATION  
OPEN GEARING  
DETAILS

SHEET IDENTIFICATION  
M-503



**MOTOR AND REDUCER ASSEMBLY - EXPLODED ISOMETRIC**  
NTS

**MOTOR AND REDUCER ASSEMBLY - ISOMETRIC**  
NTS

**BRAKE MOTOR:**  
NEMA DESIGN B, 7 1/2 HP, 460 VAC, 3 PHASE, 60HZ, 1770 RPM, 213TC FRAME, EXTERNAL MANUAL BRAKE RELEASE MECHANISM  
**BASIS OF DESIGN:**  
BALDOR VEBM3710T

**RIGHT-ANGLE BEVEL GEARBOX:**  
HOLLOW SHAFT MOUNT, C-FACE MOUNT TO MOTOR AND PARALLEL SPEED REDUCER, 8.11 HP RATED INPUT, NOMINAL RATIO 35:1 INPUT-OUTPUT  
**BASIS OF DESIGN:**  
SUMITOMO CYCLO BEVEL BUDDYBOX S SERIES, LHYJ-5A140K-Y2-35

**PARALLEL SPEED REDUCER:**  
THREE STAGE, SPLIT BLOCK, DUAL INPUT SHAFT WITH C-FACE MOUNT, HOLLOW OUTPUT SHAFT, NOMINAL RATIO 80:1, 53,000 IN³ OUTPUT SHAFT TORQUE CAPACITY, RATED FOR OUTDOOR USE, DIPSTICK, INTEGRATED IMMERSION OIL HEATER RATED AT 0.5 KW  
**BASIS OF DESIGN:**  
SUMITOMO PARAMAX PHD9085P3-BLK-80 AND PHD9085P3-BRK-80

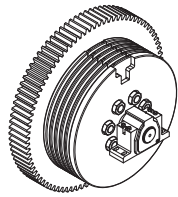
**PINION SHAFT BEARING:**  
PILLOW BLOCK SPHERICAL ROLLER BEARING WITH END COVER, 196,000 LBF DYNAMIC CAPACITY, 236,000 STATIC CAPACITY, GREASE LUBRICATION  
**BASIS OF DESIGN:**  
DODGE P4B-528-USAF-500TT

**DESICCANT BREATHERS:**  
INTERNAL BLADDER TO LIMIT AIR EXCHANGE BETWEEN GEARBOX AND AMBIENT ENVIRONMENT, SILICA MEDIA WITH MINIMUM ADSORPTION CAPACITY OF 4.0 FL OZ, MINIMUM 15.0 CU IN EXPANSION CHAMBER VOLUME  
**BASIS OF DESIGN:**  
DES-CASE HYDROGUARD DC-HGS

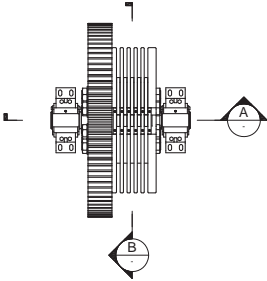
- NOTES:**  
1. SEE SHEET M-001 FOR GENERAL MECHANICAL NOTES.  
2. SEE SPEC SECTION 35 20 16.47 25 FOR ADDITIONAL GEARBOX REQUIREMENTS.

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| <br>US Army Corps of Engineers<br>PORTLAND DISTRICT   |  |
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| <b>LOOKOUT POINT DAM AND RS/R<br/>O&amp;M &amp; BPA 75439<br/>TAINTER GATE REHABILITATION<br/>MOTOR AND REDUCER<br/>DETAILS</b> |  |
| SHEET IDENTIFICATION<br><b>M-504</b>  |  |

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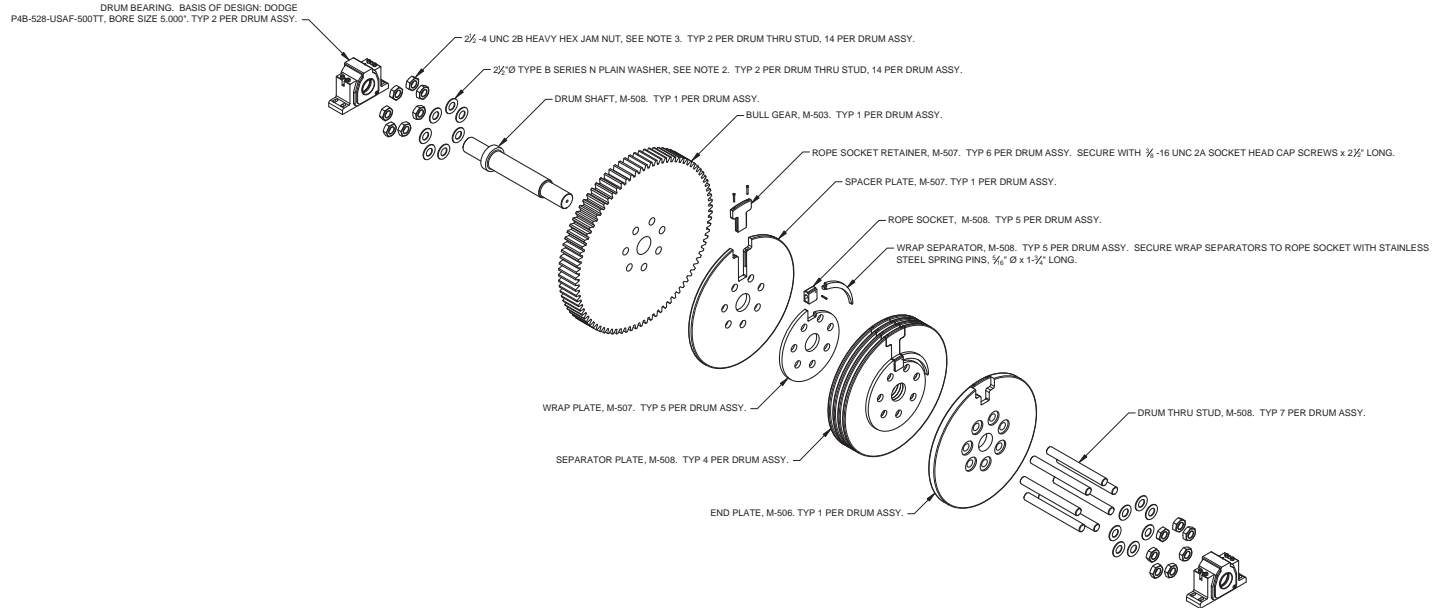


HOIST DRUM ASSY - ISOMETRIC  
NTS

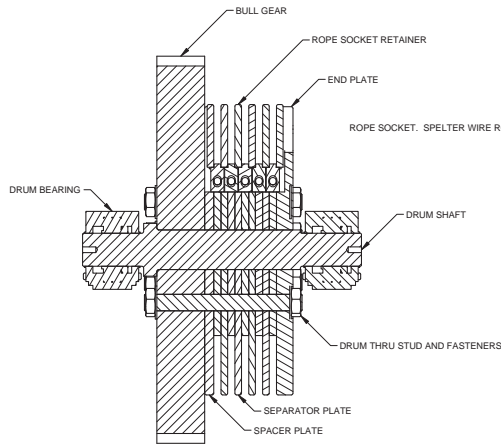


HOIST DRUM ASSY - PLAN  
SCALE: 3/4" = 1'-0"

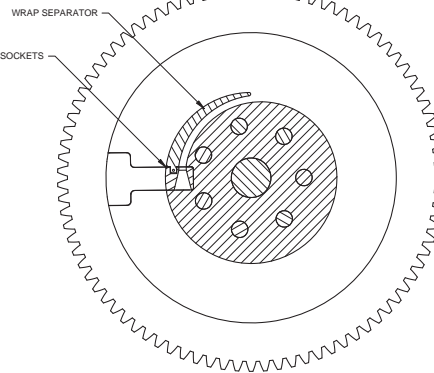
DRUM BEARING, BASIS OF DESIGN: DODGE  
P48-528-USAF-500TT, BORE SIZE 5.000". TYP 2 PER DRUM ASSY.



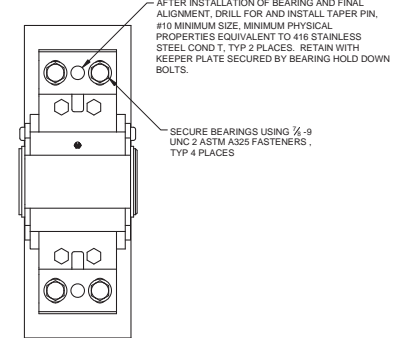
HOIST DRUM ASSY - EXPLODED ISOMETRIC  
NTS



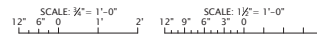
A SECTION  
SCALE: 1-1/2" = 1'-0"



B SECTION  
SCALE: 1-1/2" = 1'-0"



1 DETAIL - TYP BEARING DOWELS  
SCALE: 3" = 1'-0"



- NOTES:
- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
  - PLAIN WASHERS SHALL CONFORM TO ASME B18.21.1-2009.
  - HEAVY HEX JAM NUTS SHALL CONFORM TO ASTM A194, GRADE 7 TYPE 4140.
  - TWO DRUM ASSEMBLIES REQUIRED PER GATE, ONE OPPOSITE HAND TO ASSEMBLY SHOWN.
  - NUTS AND WASHERS ON THRU STUDS SHALL BE INSTALLED USING AN APPROVED ANTI-GALLING COMPOUND.

FILED IN SHEET M-505

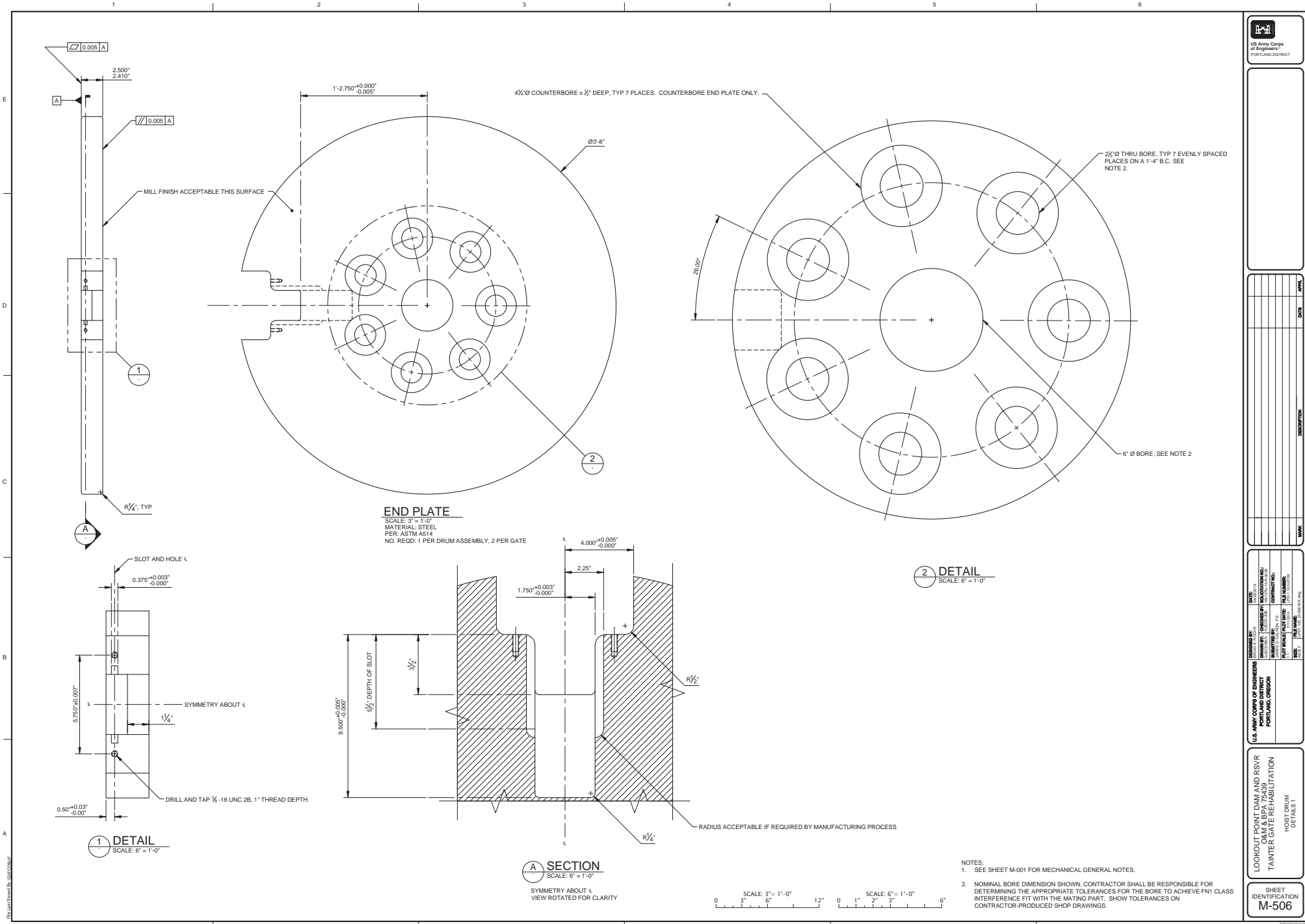


US Army Corps of Engineers  
PORTLAND DISTRICT

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| DESIGNED BY: M-102          | DATE: 10/20/11          |
| DRAWN BY: M-102             | DATE: 10/20/11          |
| CHECKED BY: M-102           | DATE: 10/20/11          |
| APPROVED BY: M-102          | DATE: 10/20/11          |
| PROJECT SCALE: 3/4" = 1'-0" | PLANT NUMBER: 100000000 |
| SHEET NUMBER: M-505         | OF SHEETS: 1            |

LOOKOUT POINT DAM AND RSVR  
O&M & BPA 75439  
TAINTER GATE REHABILITATION  
DRUM ASSEMBLY  
EXPLODED AND ISOMETRIC  
SHEET IDENTIFICATION  
M-505

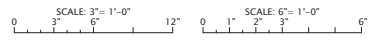


**END PLATE**  
 SCALE: 3" = 1'-0"  
 MATERIAL: STEEL  
 PER: ASTM A514  
 NO. REQD: 1 PER DRUM ASSEMBLY, 2 PER GATE

**2 DETAIL**  
 SCALE: 6" = 1'-0"

**1 DETAIL**  
 SCALE: 6" = 1'-0"

**A SECTION**  
 SCALE: 6" = 1'-0"  
 SYMMETRY ABOUT  $\epsilon$   
 VIEW ROTATED FOR CLARITY



- NOTES:  
 1. SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.  
 2. NOMINAL BORE DIMENSION SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE TOLERANCES FOR THE BORE TO ACHIEVE FN1 CLASS INTERFERENCE FIT WITH THE MATING PART. SHOW TOLERANCES ON CONTRACTOR-PRODUCED SHOP DRAWINGS.

US Army Corps of Engineers  
PORTLAND DISTRICT

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| DRAWN BY: [ ]<br>CHECKED BY: [ ]<br>DESIGNED BY: [ ]<br>PROJECT NUMBER: [ ]<br>SHEET NUMBER: [ ] | CONTRACTOR: [ ]<br>SUBMITTED BY: [ ]<br>DATE: [ ] | U.S. ARMY CORPS OF ENGINEERS<br>PORTLAND DISTRICT<br>LOOKOUT POINT DAM AND RSVR<br>O&M & BPA 75439<br>TAILER GATE REHABILITATION<br>HOIST DRUM<br>DETAILS 1 |
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SHEET IDENTIFICATION  
M-506

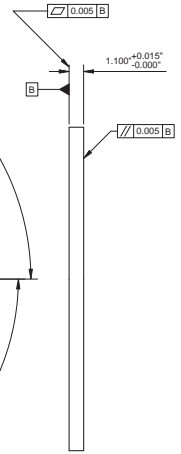
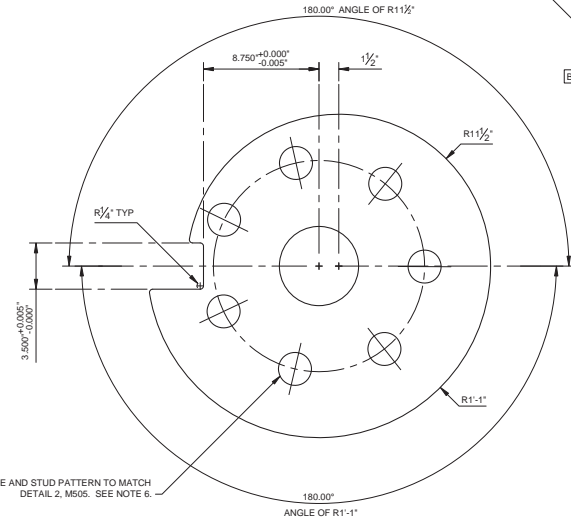
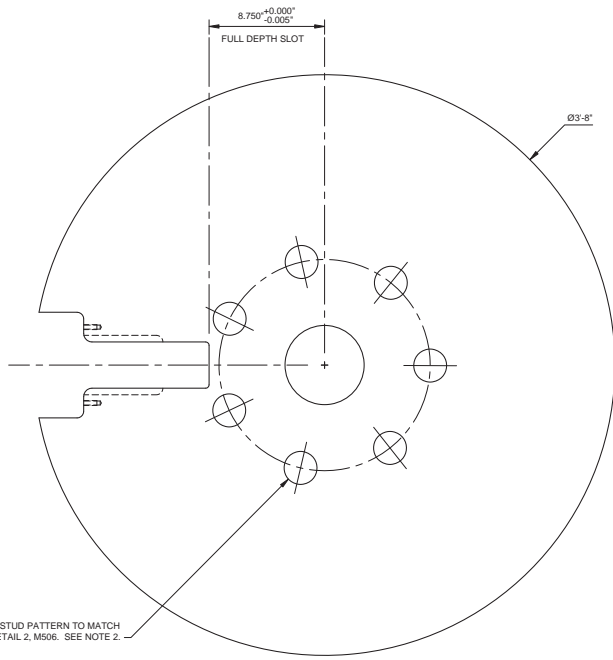
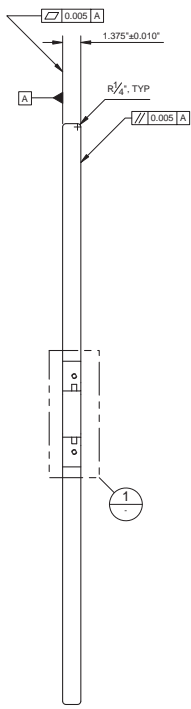


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| U.S. ARMY CORPS OF ENGINEERS<br>PORTLAND DISTRICT<br>PORTLAND, OREGON | DRAWN BY: [ ]<br>CHECKED BY: [ ]<br>DATE: [ ]<br>PROJECT NUMBER: [ ]<br>SHEET NUMBER: [ ] |
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| LOOKOUT POINT DAM AND RS/R<br>O&M & BPA 75439<br>TAINTER GATE REHABILITATION<br>HOIST DRUM<br>DETAILS 2 |
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| SHEET IDENTIFICATION<br><b>M-507</b> |
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CENTER BORE AND STUD PATTERN TO MATCH  
DETAIL 2, M505. SEE NOTE 2.

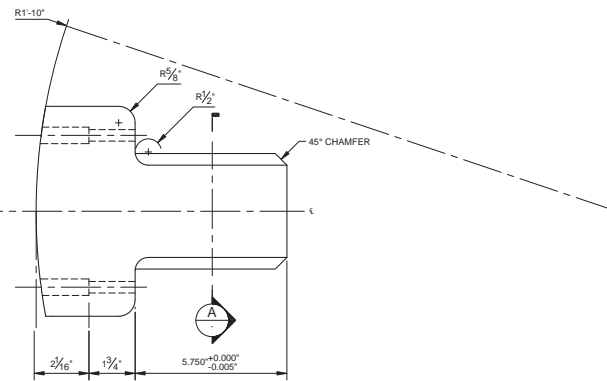
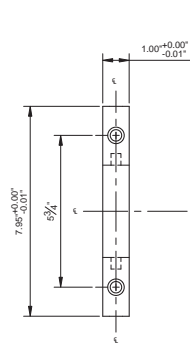
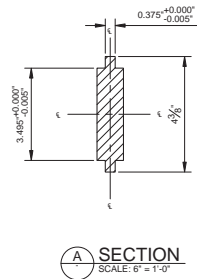
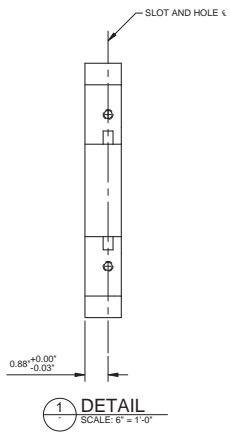
CENTER BORE AND STUD PATTERN TO MATCH  
DETAIL 2, M505. SEE NOTE 6.

**SPACER PLATE**

SCALE: 3" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQD: 1 PER DRUM ASSY, 2 PER GATE

**WRAP PLATE**

SCALE: 3" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQD: 5 PER DRUM ASSY, 10 PER GATE



**ROPE SOCKET RETAINER**

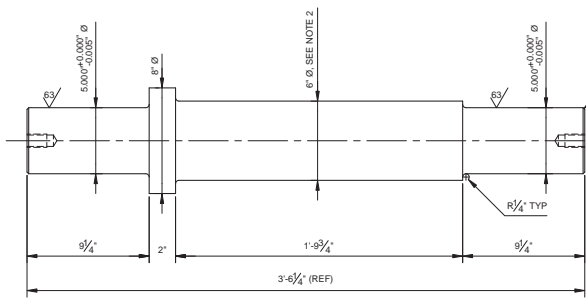
SCALE: 6" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQD: 6 PER DRUM ASSEMBLY, 12 PER GATE  
SYMMETRY ABOUT CENTERLINES

NOTES:  
1. SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.

2. NOMINAL BORE DIMENSION SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE TOLERANCES FOR THE BORE TO ACHIEVE FN1 CLEAR INTERFERENCE FIT WITH THE MATING PART. SHOW TOLERANCES ON CONTRACTOR-PRODUCED SHOP DRAWINGS.

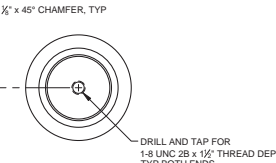


ALL OTHER DIMENSIONS, TOLERANCES, AND FEATURES OF SLOT SAME AS DETAIL 1 AND SECTION A, SHEET M-506.



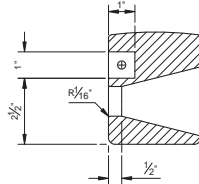
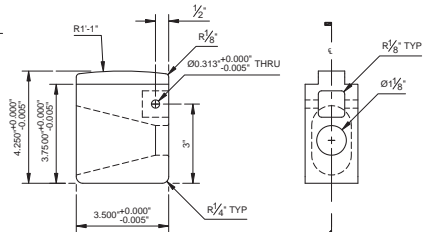
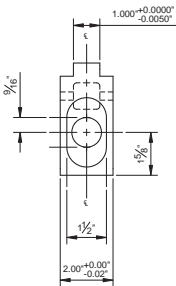
### HOIST DRUM SHAFT

SCALE: 3" = 1'-0"  
MATERIAL: FORGED STEEL  
PER: ASTM A29, UNS G43400, 1200° F TEMPER  
NO. REQ: 1 PER DRUM ASSY, 2 PER GATE

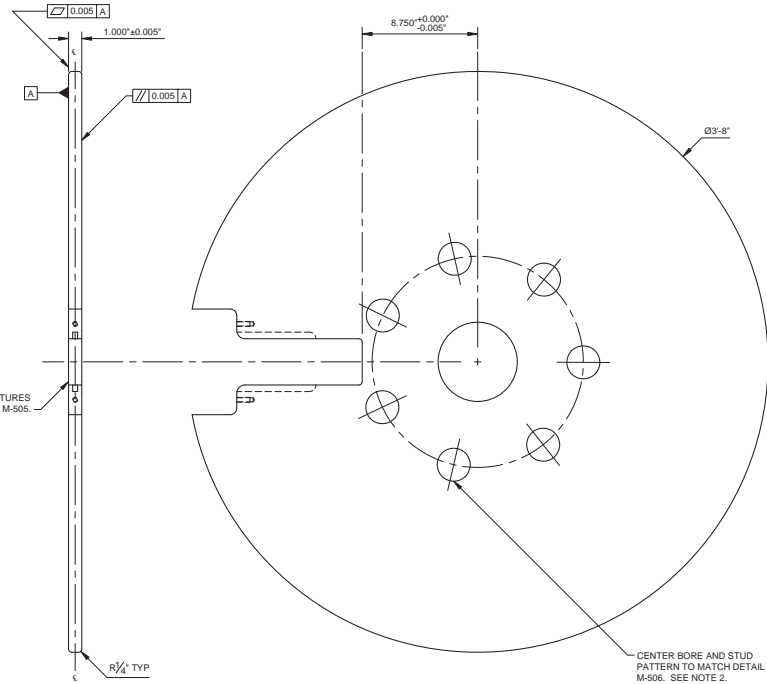


DRILL AND TAP FOR  
1-8 UNC 2B x 1/2" THREAD DEPTH  
TYP BOTH ENDS

ALL OTHER DIMENSIONS, TOLERANCES, AND FEATURES  
OF SLOT SAME AS DETAIL 1 AND SECTION A, SHEET M-505



SECTION A  
SCALE: 6" = 1'-0"



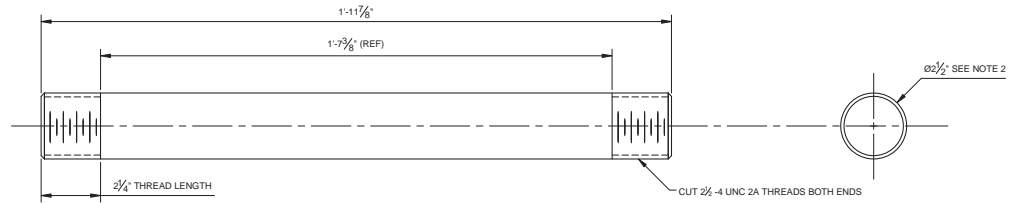
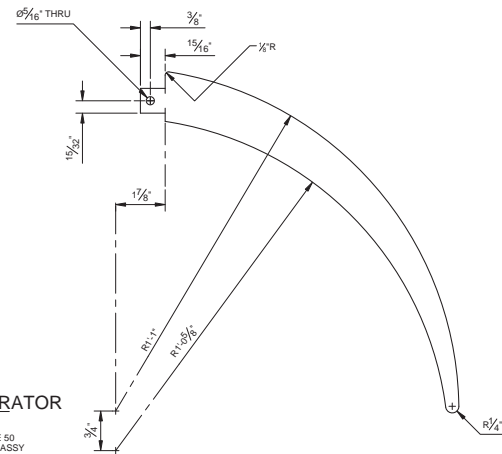
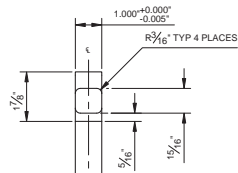
### SEPARATOR PLATE

SCALE: 3" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQ: 4 PER DRUM ASSY, 8 PER GATE  
SYMMETRY ABOUT CENTERLINE

CENTER BORE AND STUD  
PATTERN TO MATCH DETAIL 2,  
M-506. SEE NOTE 2.

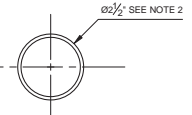
### ROPE SOCKET

SCALE: 6" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQ: 5 PER DRUM ASSY, 10 PER GATE  
SYMMETRY ABOUT CENTERLINES



### DRUM THRU STUD

SCALE: 6" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A193 GRADE B7  
NO. REQ: 7 PER DRUM ASSY, 14 PER GATE



### WRAP SEPARATOR

SCALE: 6" = 1'-0"  
MATERIAL: STEEL  
PER: ASTM A572, GRADE 50  
NO. REQ: 5 PER DRUM ASSY  
SYMMETRY ABOUT CENTERLINE

#### NOTES:

- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
- NOMINAL BORE DIMENSION SHOWN. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE APPROPRIATE TOLERANCES FOR THE BORE TO ACHIEVE FN1 CLASS INTERFERENCE FIT WITH THE MATING PART. SHOW TOLERANCES ON CONTRACTOR-PRODUCED SHOP DRAWINGS.

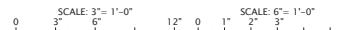
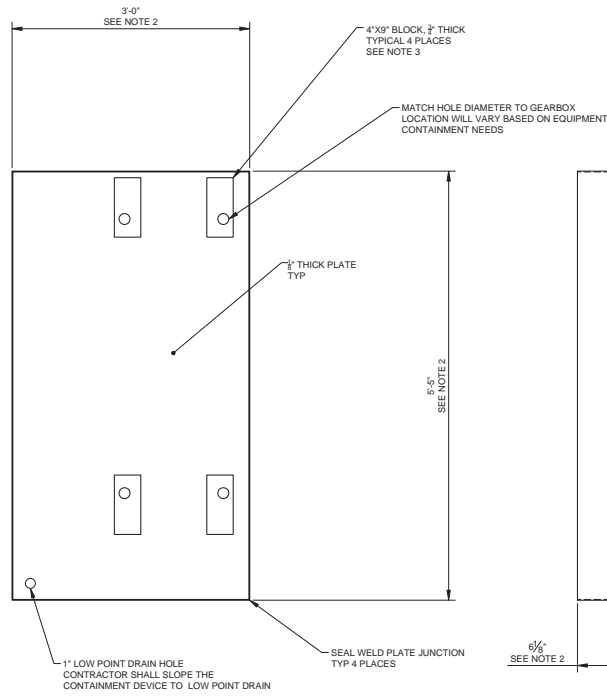


Table with columns for Date, Revision, and Description.

Table with columns for Name and Position.

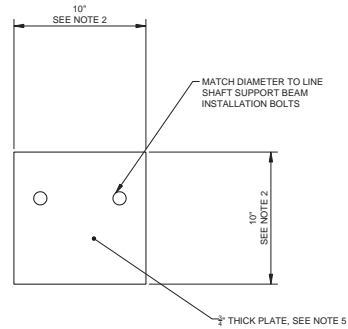
Table with columns for Date, Drawn by, Checked by, and others.

LOOKOUT POINT DAM AND RSVR  
O&M & BPA 75439  
TAINTER GATE REHABILITATION  
HOIST DRUM  
DETAILS 3  
SHEET IDENTIFICATION  
M-508



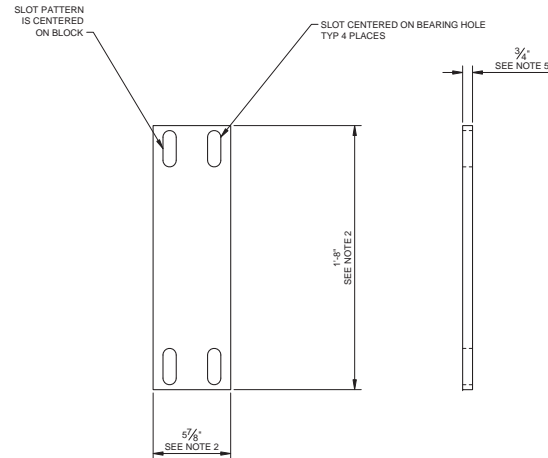
**SECONDARY CONTAINMENT DEVICE**

SCALE: 6" = 1'-0"  
 MATERIAL: CARBON STEEL  
 PER: ASTM A36  
 NO. REQD: 1 PER GEARBOX



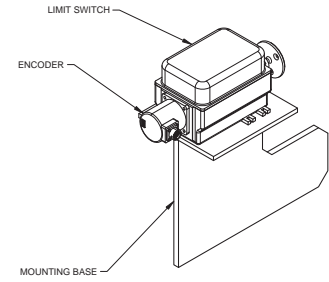
**LINE SHAFT PILLOW BLOCK SPACER**

SCALE: 6" = 1'-0"  
 MATERIAL: CARBON STEEL  
 PER: ASTM A36  
 NO. REQD: 2 PER GATE



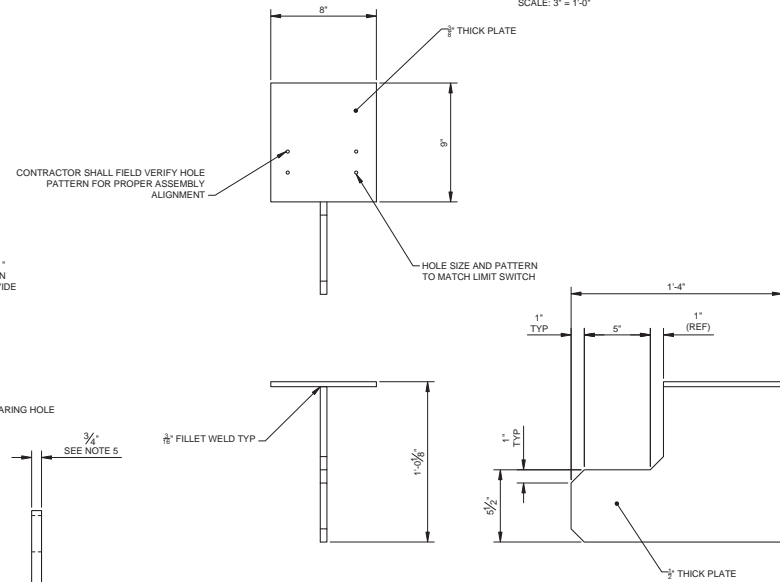
**BULL GEAR PILLOW BLOCK SPACER**

SCALE: 6" = 1'-0"  
 MATERIAL: CARBON STEEL  
 PER: ASTM A36  
 NO. REQD: 4 PER GATE



**LIMIT SWITCH/ENCODER ASSEMBLY**

SCALE: 3" = 1'-0"



**MOUNTING BASE**

SCALE: 3" = 1'-0"  
 MATERIAL: CARBON STEEL  
 PER: ASTM A36  
 NO. REQD: 1 PER GATE

- NOTES:
- SEE SHEET M-001 FOR MECHANICAL GENERAL NOTES.
  - PROVIDE ONE SPARE LIMIT SWITCH AND ABSOLUTE ENCODER ASSEMBLY
  - CONTRACTOR SHALL DETERMINE THIS DIMENSION BASED ON FINAL EQUIPMENT LOCATION.
  - THROUGH HOLE IS MADE IN THE CONTAINMENT DEVICE FOR BLOCK; BLOCK LOCATION WILL VARY AND IS BASED ON FINAL EQUIPMENT LOCATION.
  - VERIFY FINAL DIMENSION BASED ON MANUFACTURER'S RECOMMENDED EQUIPMENT ALIGNMENT CRITERIA.
  - PAINT COMPONENTS PER SPECIFICATION 09 97 03.00 25.
  - SEE M-001 FOR GENERAL MECHANICAL NOTES.

US Army Corps of Engineers  
 PORTLAND DISTRICT

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U.S. ARMY CORPS OF ENGINEERS  
 PORTLAND DISTRICT  
 PORTLAND, OREGON

DATE: 11/10/2014  
 DRAWN BY: J. J. JONES  
 CHECKED BY: J. J. JONES  
 PROJECT: LOOKOUT POINT DAM AND RSVR  
 SHEET: M-509

LOOKOUT POINT DAM AND RSVR  
 O&M & BPA 75439  
 TANKER GATE REHABILITATION  
 GATE POSITION EQUIPMENT

SHEET IDENTIFICATION  
**M-509**