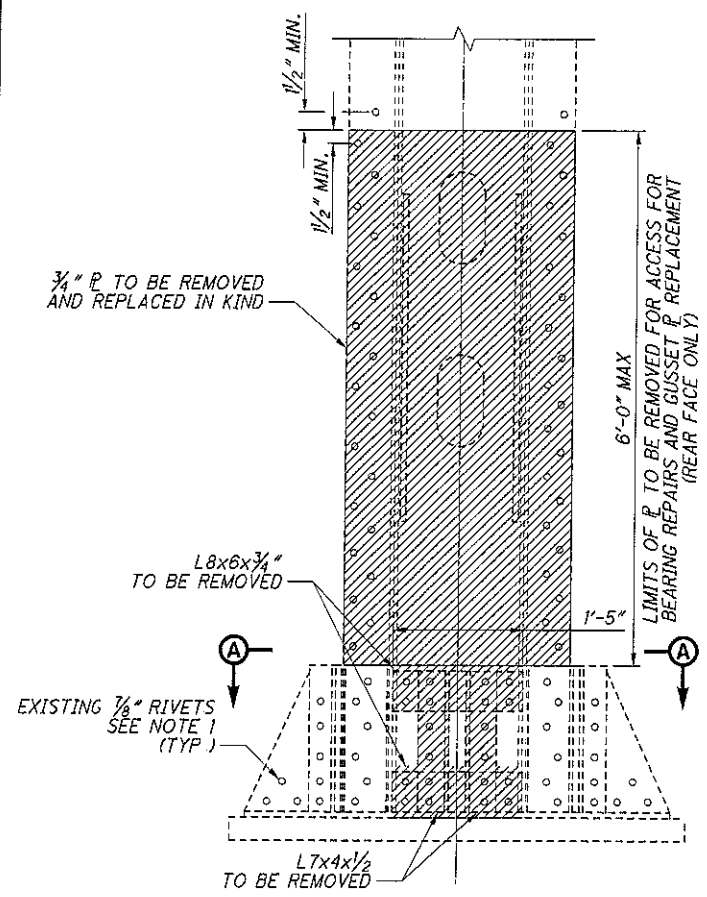
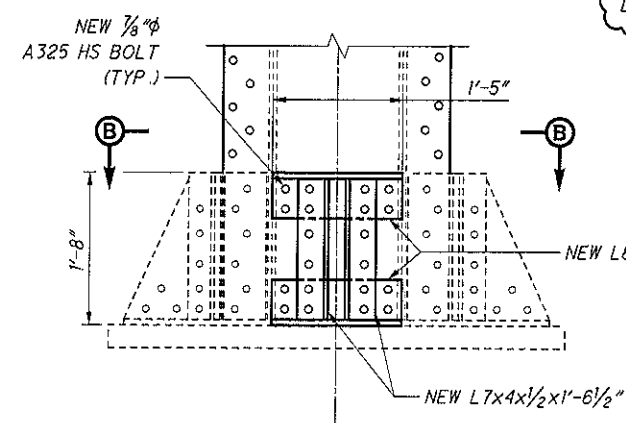


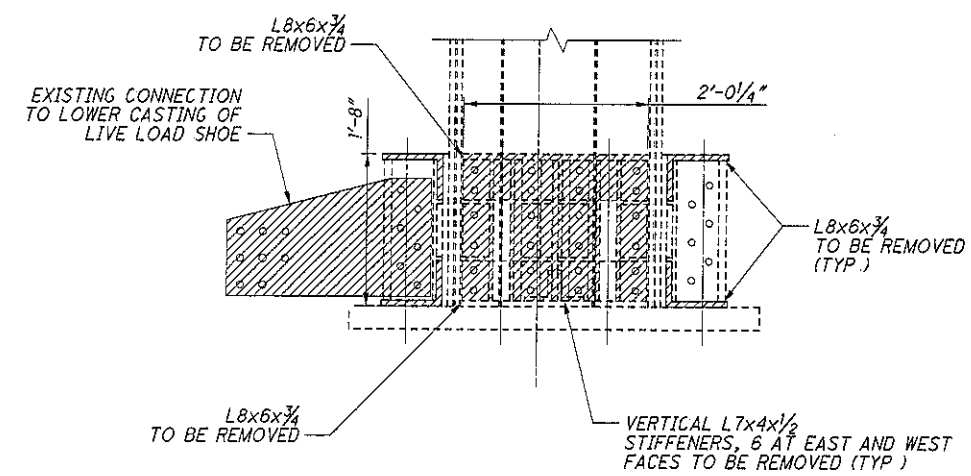
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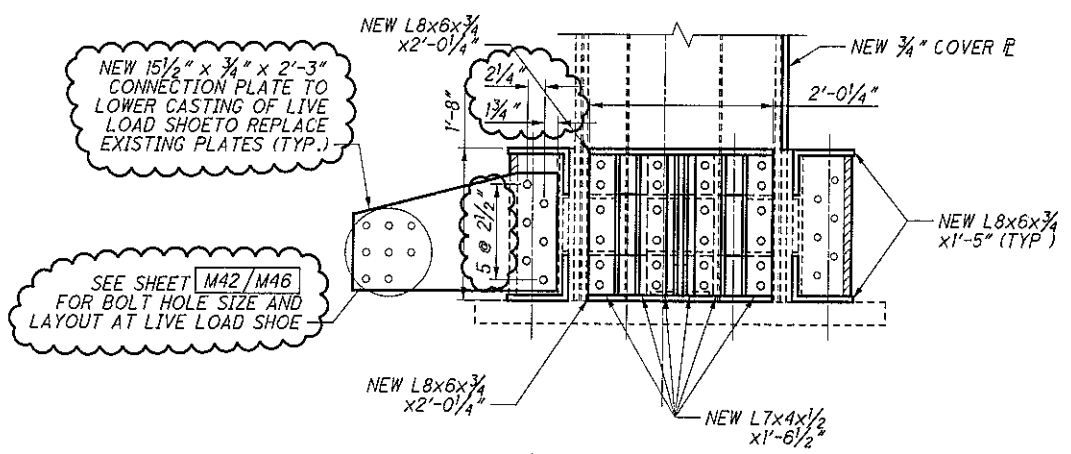
**NORTH TOWER FORWARD COLUMN**  
(REAR FACE SHOWN)  
(SOUTH TOWER SIMILAR)



**NORTH TOWER FORWARD COLUMN**  
(REAR FACE SHOWN)  
(SOUTH TOWER SIMILAR)

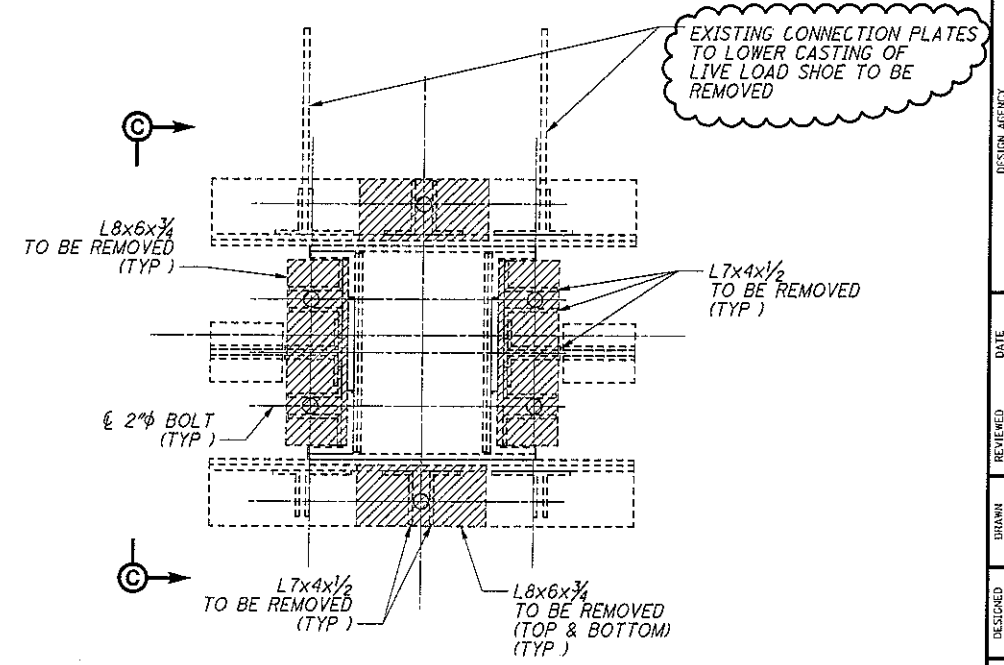


**VIEW C-C**  
**NORTH TOWER FORWARD COLUMN**  
(EAST FACE SHOWN)  
(SOUTH TOWER SIMILAR)

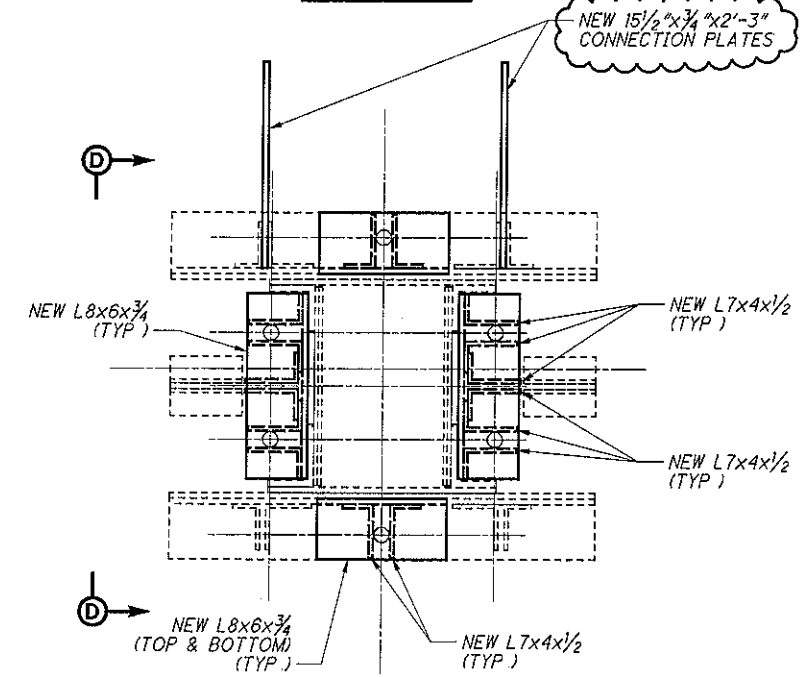


**VIEW D-D**  
**NORTH TOWER FORWARD COLUMN**  
(EAST FACE SHOWN)  
(SOUTH TOWER SIMILAR)

**LEGEND:**  
 LIMITS OF ITEMS TO BE REMOVED, PAID FOR UNDER ITEM 202 - PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT, AS PER PLAN



**SECTION A-A**



**SECTION B-B**

- NOTES:**
- EXISTING  $\frac{1}{8}$ "  $\phi$  RIVETS TO BE REPLACED WITH  $\frac{1}{8}$ "  $\phi$  A325 HS BOLTS. THE REQUIREMENTS ON SHEET [S4/S136] FOR RIVET REMOVAL SHALL BE MET WITH THE FOLLOWING EXCEPTIONS: REAMING SHALL NOT MAKE HOLES LARGER THAN  $\frac{15}{16}$ "  $\phi$  UNLESS THE HOLE IS VISIBLY OBLONG. IN THIS CASE, REAM TO  $\frac{1}{16}$ "  $\phi$  AND INSERT 1"  $\phi$  BOLT.
  - REMOVAL AND REPLACEMENT OF COLUMN COVER  $\phi$  AND BEARING MEMBERS IS TO BE COORDINATED WITH REPLACEMENT OF GUSSET  $\phi$  AND STRUT AT TOWER COLUMN BASE.
  - FOR GUSSET  $\phi$  REPAIR DETAILS, SEE SHEET [S95/S136] AND [S96/S136].
  - NEW RIVETS AND TOWER REPAIR STEEL ARE INCLUDED FOR PAYMENT UNDER ITEM 513 - STRUCTURAL STEEL MEMBERS, LEVEL UF, AS PER PLAN.

**TOWER COLUMN BEARING DETAILS**  
COLUMBUS ROAD BRIDGE NO. 1007  
OVER THE CUYAHOGA RIVER

**CUY-COLUMBUS ROAD**  
(C.R. - 356)

DESIGN AGENCY  
**Trap Systems**  
55 PUBLIC SQUARE, SUITE 1900  
CLEVELAND, OHIO 44113

DESIGNED	ADK	CHECKED	NBR
DRAWN	NRF	REVISOR	
REVIEWED	WRW	STRUCTURE FILE NUMBER	18.33758
DATE	2/14/11		

S94/S136

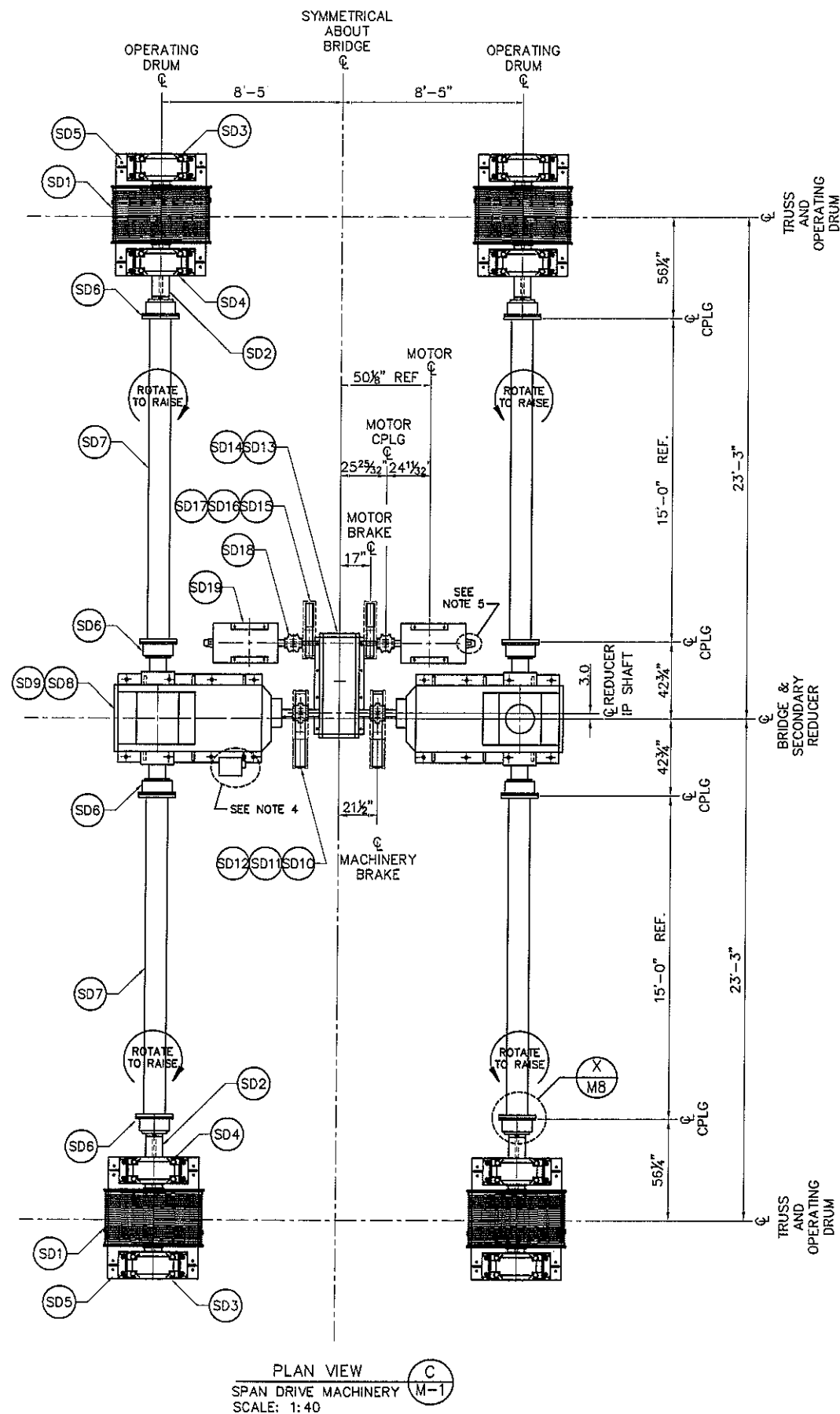
117  
301

SPAN DRIVE OPERATING MACHINERY SCHEDULE

MARK NO	QTY. REQ D (SEE NOTE 2)	COMPONENT	DESCRIPTION (SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION)	REFERENCE SHEETS
SD1	2 LH 2 RH	OPERATING DRUM	WELDMENT. MATERIAL: HUB - ASTM A668 CL D RIM. WEB AND STIFFENERS - ASTM 709 GRADE 50.	M4 M6 M7
SD2	4	OPERATING DRUM SHAFT	FORGING MATERIAL: ASTM A668 CLASS D	M4 M6 M8
SD3	4	OPERATING DRUM BEARING - B1	SPHERICAL ROLLER BEARING. FLOATING BEARING WITH END COVER SDAFS 23252KA-9 7/8" FL WITH ADAPTER KIT FOR STRAIGHT BORE	M4, M6
SD4	4	OPERATING DRUM BEARING - B2	SPHERICAL ROLLER BEARING. FIXED BEARING SDAFS 23252KA-9 7/8" FX WITH ADAPTER KIT FOR STRAIGHT BORE	M4 M6
SD5	4	OPERATING DRUM SUPPORT FRAME	WELDMENT MATERIAL: ASTM A709	M4 M6 M8
SD6	4	FLOATING SHAFT COUPLING	DOUBLE ENGAGEMENT GEAR TYPE COUPLING TO MATE WITH CUSTOM END PLUGS ON FLOATING SHAFT. MOUNT ONE HALF TO SD2 AND ONE HALF TO SD8 PROVIDE 2 KEYS (ASTM A668 CL K) AT EACH HUB	M4, M6
SD7	4	FLOATING SHAFT	MECHANICAL TUBING (12" O.D. X 9.5" I.D.) WITH END PLUGS MATERIAL: TUBE-ASTM A519, GRADE 1020. STRESS RELIEVE MATERIAL: END PLUG-ASTM A709 GRADE 50	M4, M8
SD8	1 LH 1 RH	SECONDARY REDUCER	SPIRAL BEVEL REDUCER WITH SINGLE INPUT AND DUAL EXTENDED OUTPUT SHAFTS. PROVIDE 1.5 SERVICE FACTOR ON 62.5 HP 117 RPM (INPUT). RATIO: 38.44:1 SEE NOTE 4.	M4, M6, M10
SD9	2	SECONDARY REDUCER SUPPORT FRAME	WELDMENT MATERIAL: ASTM A709	M4, M6, M9
SD10	2	MACHINERY BRAKE	THRUSTOR RELEASED, SPRING SET SHOE-TYPE BRAKE FOR MINIMUM 15.75" (400MM) DIAMETER BRAKEWHEEL. SET FOR 1200 FT.LBS PROVIDE NOMINAL 3 TO 4 SECOND TIME DELAY UPON SETTING	M4, M6
SD11	2	MACHINERY BRAKEWHEEL COUPLING	DOUBLE ENGAGEMENT GEAR TYPE BRAKEWHEEL COUPLING 15.75" DIAMETER BRAKEWHEEL MATERIAL: DUCTILE IRON	M4, M6
SD12	2	MACHINERY BRAKE COVER	NEMA 3R STAINLESS ENCLOSURE PROVIDE VERTICAL SPLIT ALONG BRAKEWHEEL AXIS TO FACILITATE INSTALLATION AND REMOVAL COVER WIDTH TO ACCOMODATE BRAKEWHEEL COUPLING	M4, M6
SD13	1	PRIMARY REDUCER	PARALLEL SHAFT REDUCER WITH DUAL EXTENDED INPUT AND OUTPUT SHAFTS. PROVIDE 1.5 SERVICE FACTOR ON 125 HP 1200 RPM (INPUT) RATIO: 10.1:1. PROVIDE EXTENDED DISTANCE BETWEEN INPUT AND OUTPUT SHAFTS AS INDICATED ON DRAWINGS.	M4, M6, M10
SD14	1	PRIMARY REDUCER SUPPORT FRAME	WELDMENT MATERIAL: ASTM A709	M4 M6 M9
SD15	2	MOTOR BRAKE	THRUSTOR RELEASED, SPRING SET SHOE-TYPE BRAKE FOR MINIMUM 10" DIAMETER BRAKEWHEEL. SET FOR 235 FT LBS PROVIDE NOMINAL 1 TO 2 SECOND TIME DELAY UPON SETTING	M4 M6
SD16	2	MOTOR BRAKEWHEEL	10" DIAMETER BRAKEWHEEL MATERIAL: DUCTILE IRON.	M4, M6
SD17	2	MOTOR BRAKE COVER	NEMA 3R STAINLESS ENCLOSURE PROVIDE VERTICAL SPLIT ALONG BRAKEWHEEL AXIS TO FACILITATE INSTALLATION AND REMOVAL.	M4, M6
SD18	2	MOTOR COUPLING	FLEXIBLE STEEL GRID TYPE COUPLING WITH HORIZONTALLY SPLIT COVER	M4, M6
SD19	2	MOTOR	125HP@1170 RPM ELECTRIC MOTOR. FRAME 445T CUSTOM SHAFT EXTENSION TO SUIT. SEE ELECTRICAL SECTION OF SPECIAL PROVISIONS FOR ADDITIONAL DETAILS	M4, M6

NOTES:

- SEE SHEET M1 FOR GENERAL NOTES APPLICABLE TO THIS DRAWING
- TABLE QUANTITIES ARE MINIMUM REQUIRED FOR INSTALLATION SEE SPECIAL PROVISIONS FOR ADDITIONAL QUANTITIES REQUIRED FOR SPARES
- WORK THIS DRAWING WITH SHEETS M5, M6, M7, M8, M9 AND M10
- PROVIDE INTERMEDIATE 1/2" DIA BY 3" LONG SHAFT EXTENSION AT ONE SECONDARY REDUCER TO MATE WITH ROTARY CAM LIMIT SWITCH. PROVIDE SUPPORT FOR ROTARY CAM. SUPPORT SHALL BE FABRICATED FROM 1/2" PLATE WITH 3/8" FILLET WELDS AND SHALL BE SECURED TO FACE OF REDUCER WITH 3/8" CAP SCREWS. PROVIDE ELASTOMERIC JAW TYPE COUPLING TO ENGAGE COMPONENTS SUPPORT AND COUPLING TO BE PROVIDED UNDER MECHANICAL WORK. ROTARY CAM TO BE PROVIDED UNDER ELECTRICAL WORK SEE ELECTRICAL PLANS AND SPECIAL PROVISIONS FOR ADDITIONAL DETAILS ON ROTARY CAM. ALIGNMENT AND MOUNTING OF COMPONENTS IS MECHANICAL WORK AND SHALL BE PERFORMED IN THE SHOP. WIRING AND ADJUSTMENT OF ROTARY CAM IS ELECTRICAL WORK AND SHALL BE PERFORMED IN THE FIELD
- PROVIDE COVERED SHAFT EXTENSION FOR BRAKE TORQUE VERIFICATION. SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.
- THE CONTRACTOR SHALL PROVIDE AN ELECTRIC MOTOR DRIVEN CRANE BRIDGE WITH AN ELECTRIC CHAIN HOIST TO FACILITATE MAINTENANCE AND REPAIR OF MACHINERY IN THE MACHINERY ROOM AT MID SPAN SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION



PLAN VIEW C  
SPAN DRIVE MACHINERY M-1  
SCALE: 1:40

DESIGN AGENCY  
**Train Systems**  
55 PUBLIC SQUARE, SUITE 1900  
CLEVELAND, OHIO 44113

DATE: 09-15-11  
REVISIONS: PMB (PMB), RJT (RJT), KHM (KHM)  
STRUCTURE FILE NUMBER: 1833758

DESIGNED BY: RJT  
CHECKED BY: KHM

SPAN DRIVE MACHINERY ASSEMBLY - IDENTIFICATION  
COLUMBUS ROAD BRIDGE No. 1:007  
OVER THE CUYAHOGA RIVER

CUY-COLUMBUS ROAD  
(C.R. - 356)

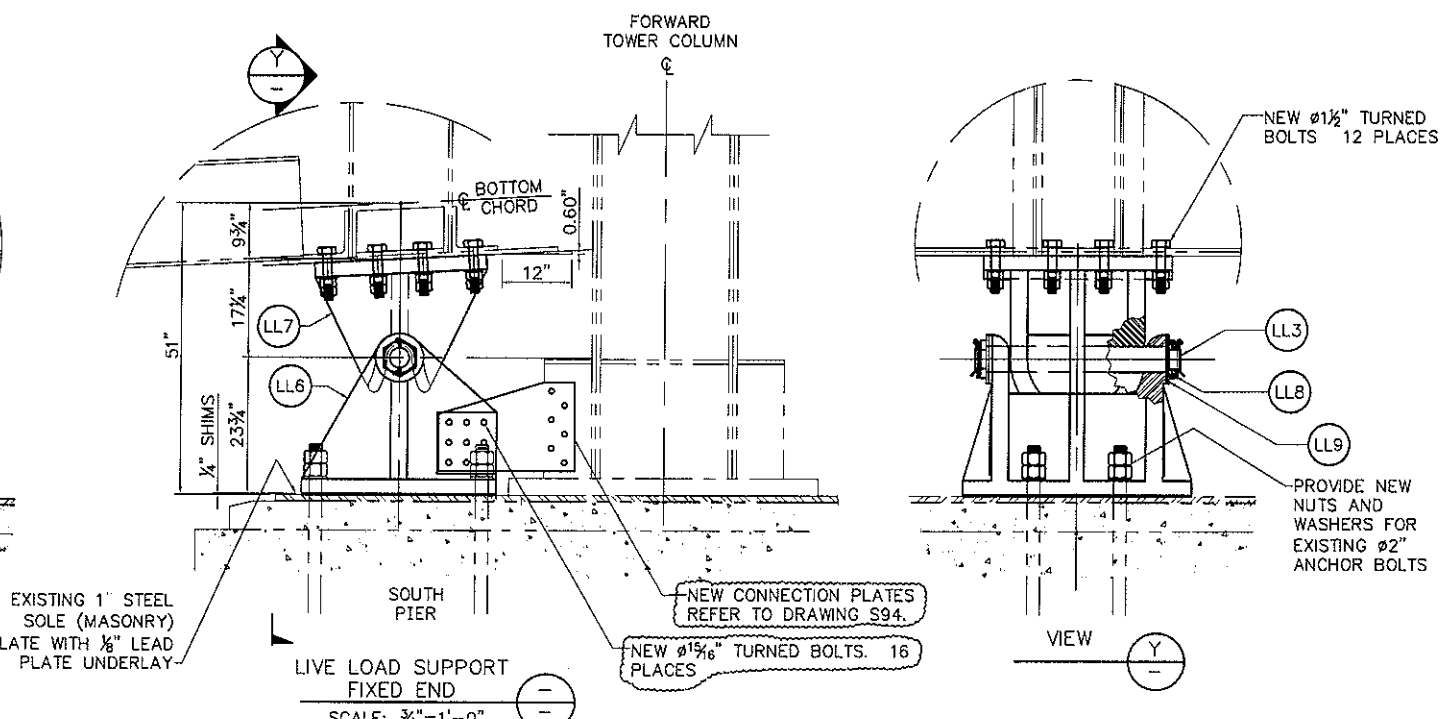
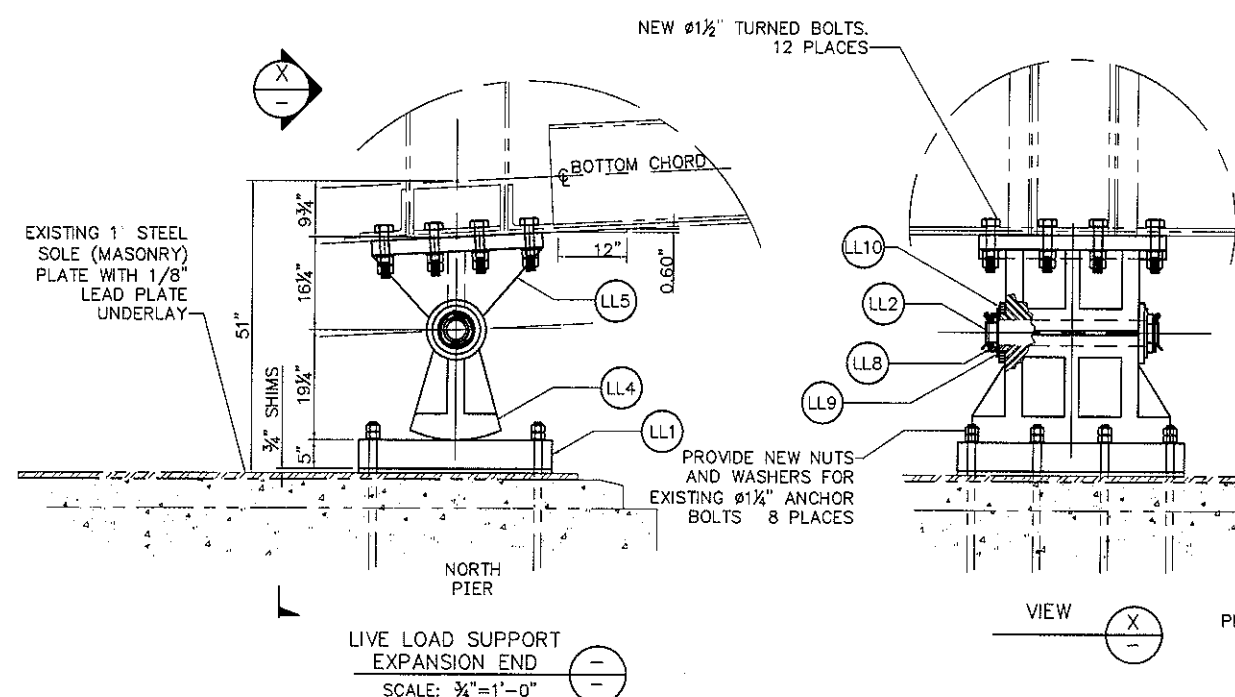
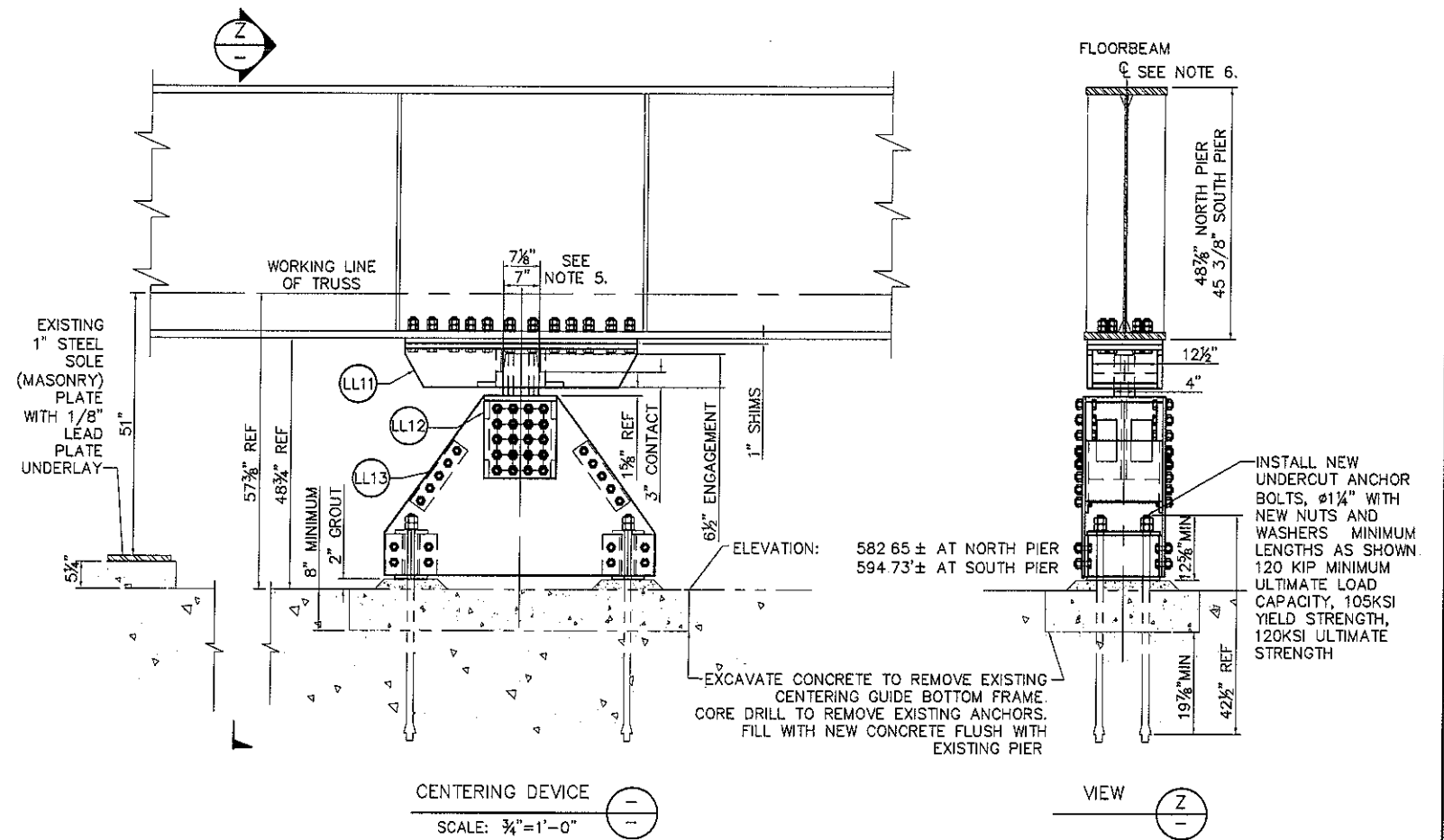
M4/M46  
163  
301

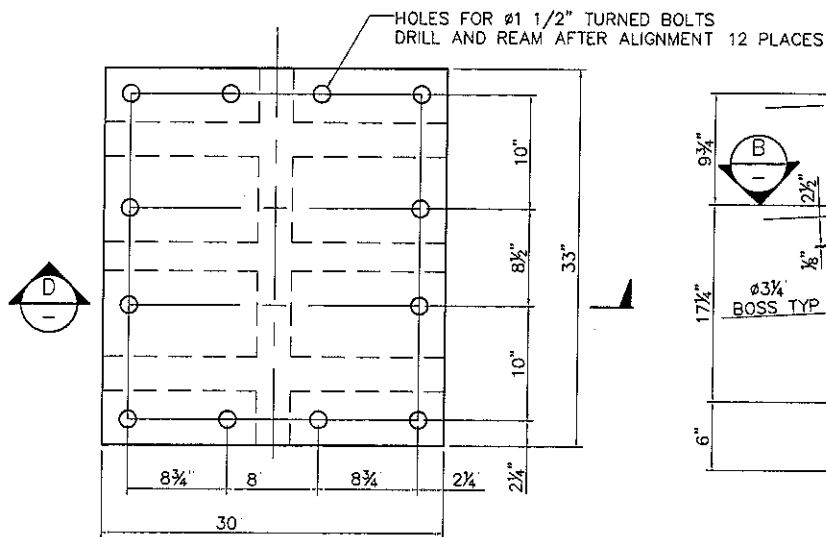
LIVE LOAD SUPPORT AND CENTERING DEVICE REHABILITATION SCHEDULE

MARK NO	QTY. REQ'D (SEE NOTE 2)	COMPONENT	DESCRIPTION (SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION)	REFERENCE SHEETS
LL1	2	ROCKER PLATE	STEEL PLATE MATERIAL: ASTM A709 GR36	M40, M41
LL2	2	EXPANSION END PIN	STEEL FORGING MATERIAL: ASTM A668 CLASS D	M40 M41
LL3	2	FIXED END PIN	STEEL FORGING MATERIAL: ASTM A668 CLASS D	M40 M41
LL4	2	EXPANSION ROCKER	CAST STEEL MATERIAL: ASTM A148 GR90-60	M40 M41
LL5	2	UPPER SHOE	CAST STEEL MATERIAL: ASTM A148 GR90-60	M40 M41
LL6	2	FIXED LOWER SUPPORT	CAST STEEL MATERIAL: ASTM A148 GR90-60	M40 M42
LL7	2	FIXED UPPER SUPPORT	CAST STEEL MATERIAL: ASTM A148 GR90-60	M40 M42
LL8	8	NUT	STEEL PLATE MATERIAL: ASTM A709 GR36	M40, M41
LL9	8	WASHER	STEEL PLATE MATERIAL: ASTM A709 GR36	M40 M41
LL10	4	RETAINING RING	STEEL PLATE MATERIAL: ASTM A709 GR36	M40, M41
LL11	2	TOP CENTERING GUIDE	STEEL PLATE WELDMENT MATERIAL: ASTM A709 GR50	M40 M43
LL12	2	BOTTOM CENTERING GUIDE	STEEL PLATE WELDMENT MATERIAL: ASTM A709 GR50	M40 M43
LL13	2	CENTERING FRAME ASSEMBLY	SEE SCHEDULE ON SHEET M43 FOR DETAILS	M40 M43

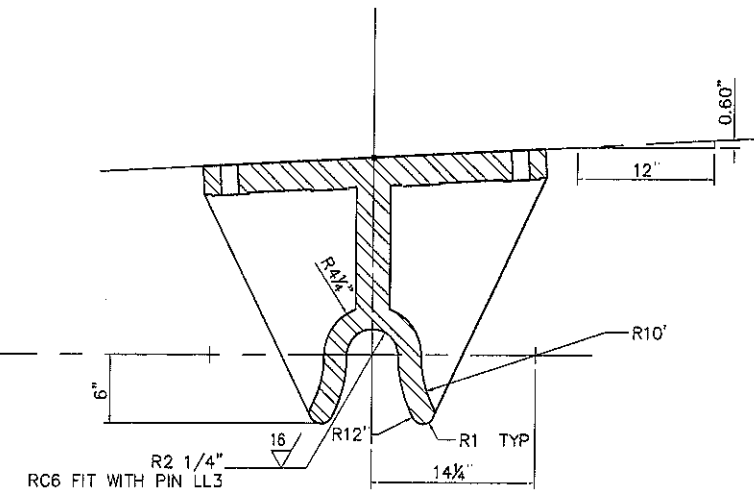
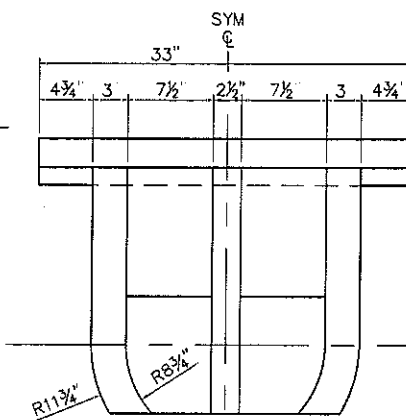
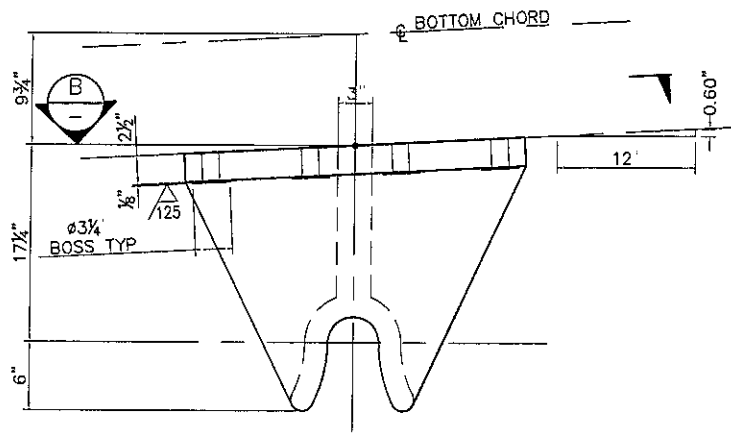
NOTES:

- SEE SHEET M1 FOR GENERAL NOTES APPLICABLE TO THIS DRAWING
- TABLE QUANTITIES ARE MINIMUM REQUIRED FOR INSTALLATION SEE SPECIAL PROVISIONS FOR ADDITIONAL QUANTITIES REQUIRED FOR SPARES
- CLEAN SOLE PLATES TO BARE METAL BEFORE SETTING AND ALIGNING LL1 AND LL6
- REPLACE DAMAGED ANCHOR BOLTS AS NEEDED
- LOCATE BOTTOM CENTERING GUIDE WITH A NOMINAL  $\frac{1}{8}$ " GAP ON BOTH SIDES WITH TOP CENTERING GUIDE
- LOCATE BOTTOM CENTERING GUIDE CENTERLINE AND TOP CENTERING GUIDE CENTERLINE WITHIN  $\frac{1}{8}$ " OF THE FLOORBEAM (FBO AND FB11) CENTERLINE WHEN AMBIENT TEMPERATURE IS 70° ADJUST AS REQUIRED TO ACCOMMODATE TEMPERATURE AT TIME OF INSTALLATION





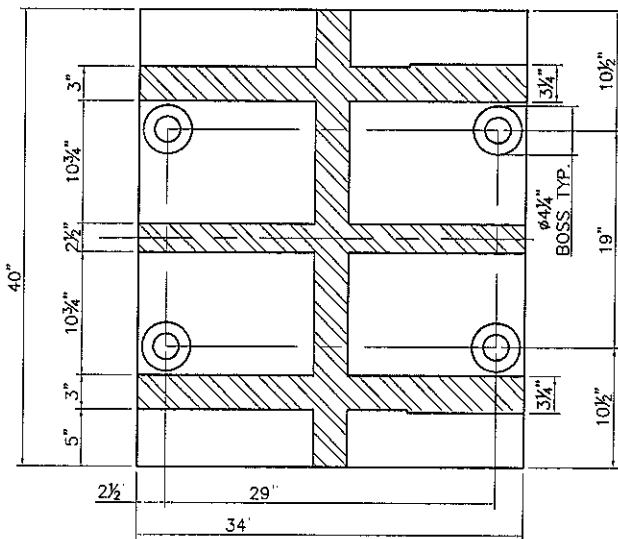
**B** VIEW  
SCALE: 1 1/2"=1'-0"



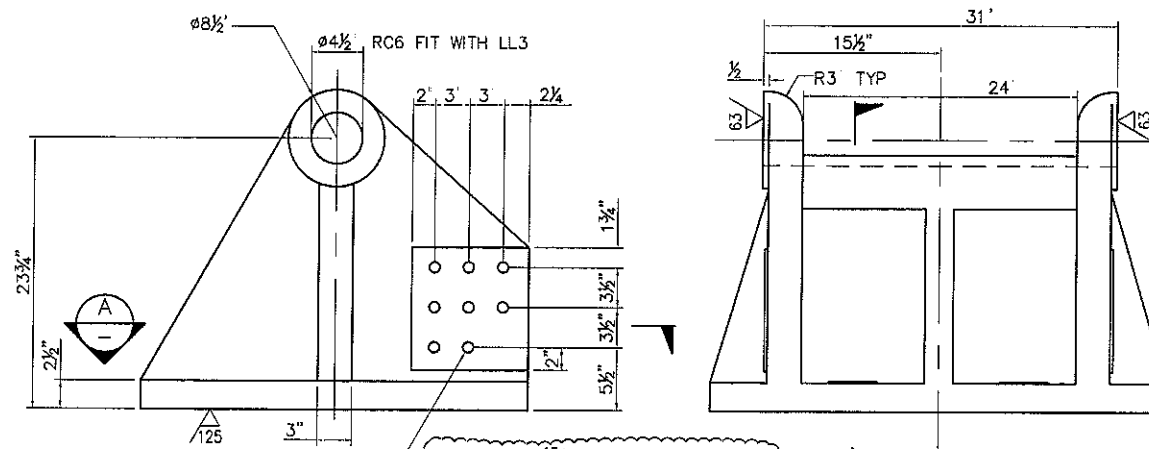
**D** SECTION  
SCALE: 1 1/2"=1'-0"

**LL7** FIXED UPPER SUPPORT

SCALE: 1 1/2"=1'-0"  
MATERIAL: CAST STEEL  
ASTM A148 GR90-60  
QUANTITY: 2



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

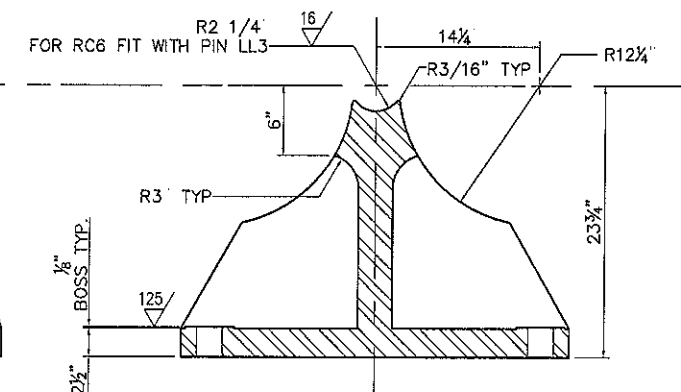


HOLE FOR  $\phi 1 5/16$ " TURNED BOLTS 16 PLACES.

**C**

**LL6** FIXED LOWER SUPPORT

SCALE: 1 1/2"=1'-0"  
MATERIAL: CAST STEEL  
ASTM A148 GR90-60  
QUANTITY: 2



**C** SECTION  
SCALE: 1 1/2"=1'-0"

NOTES:

- SEE SHEET M1 FOR GENERAL NOTES APPLICABLE TO THIS DRAWING
- PROVIDE SUFFICIENT RADIUS AT CORNERS OF CAST PARTS
- WORK THIS DRAWING WITH SHEET M40.