

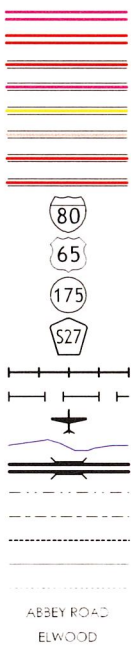
BRIDGE REPLACEMENT - PPCB LETTING DATE
BRF-012-2(32)--38-75 01-20-2021

PLYMOUTH COUNTY
PLYMOUTH COUNTY - DESIGN 0221

LEGEND

INTERSTATE HIGHWAY
PRIMARY HIGHWAY-DIVIDED
PRIMARY HIGHWAY
PORTLAND CEMENT CONCRETE ROAD
ASPHALT ROAD
BITUMINOUS ROAD
GRAVEL ROAD
EARTHEN ROAD

INTERSTATE HIGHWAY
UNITED STATES HIGHWAY
STATE HIGHWAY
COUNTY HIGHWAY
RAILROAD
PIPELINE
AIRPORT
HYDROLOGY
BRIDGE
STATE BOUNDARY
COUNTY BOUNDARY
CORPORATE BOUNDARY
TOWNSHIP LINE
SECTION LINE
ROAD NAMES
UNINCORPORATED PLACE



PLANS OF PROPOSED IMPROVEMENTS ON THE

PRIMARY ROAD SYSTEM

PLYMOUTH COUNTY

BRIDGE REPLACEMENT - PPCB

1A 12 BRIDGE OVER INDIAN CREEK

4.0 MILES NORTH OF COUNTY ROAD C16

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

ENGLISH STANDARD
BRIDGE PLANS

STANDARD	ISSUED	REVISED
H40-01-14	09-14	-
H40-01A-14	09-14	-
H40-02-14	09-14	-
H40-03-14	09-14	-
H40-04-14	09-14	-
H40-19-14	09-14	-
H40-21-14	09-14	-
H40-22-14	09-14	07-15
H40-23-14	09-14	-
H40-24-14	09-14	-
H40-36-14	09-14	-
H40-37-14	09-14	-
H40-38-14	09-14	-
H40-39-14	09-14	-
H40-40-14	09-14	-
H40-41-14	09-14	-
H40-44-14	09-14	-
H40-73-14	09-14	-
H40-74-14	09-14	-
H40-76-14	09-14	-
H40-89-14	09-14	-
H40-91-14	09-14	-
H40-95-14	09-14	-

REVISIONS

TOTAL SHEETS
70

PROJECT NUMBER

BRF-012-2(32)--38-75

R.O.W. PROJECT NUMBER

PROJECT IDENTIFICATION NUMBER

16-75-012-010

INDEX OF SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET - DESIGN 0221
2-10	DESIGN 0221
SPS.1-SPS.2	SOIL PROFILE SHEET
C.1	EST. SHEET FOR ROADWAY
RC.1	EST. SHEET FOR EROSION CONTROL
A.1-W.10	ROADWAY SHEETS



1-800-292-8989
www.iowaonecall.com



STANDARD ROAD
PLANS

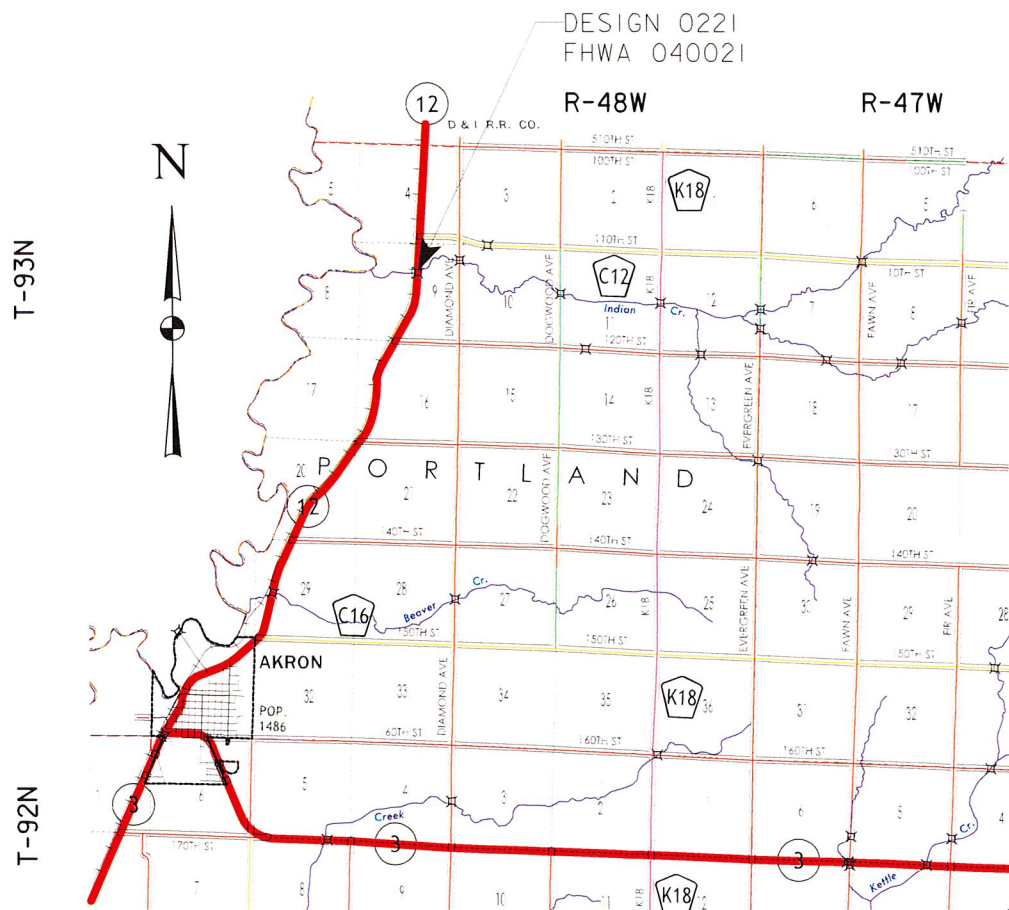
STANDARD ROAD PLANS ARE LISTED
ON SHEET NUMBER C.2

DESIGN DATA RURAL

2021	AADT	1,200	V.P.D.
2041	AADT	1,200	V.P.D.
2021	DHV		V.P.H.
TRUCKS		20	%
Total			
Design	ESALs		

INDEX OF SEALS

SHEET NO.	NAME	TYPE
I	DALLAS R. SCHECHINGER	STRUCTURAL DESIGN
I	TIMOTHY J. SHEETS	HYDRAULIC DESIGN
SPS.1	ZACHARY A. BONZER	GEOTECHNICAL DESIGN
A.1	SCOTT E. PORT	ROADWAY DESIGN
H40 BRIDGE STANDARDS	NORMAN L. McDONALD	STRUCTURAL DESIGN



LOCATION MAP

NEAREST CROSSING FRA NUMBER: 381542J

PROJECT DIRECTORY NAME: 7501201016

HYDRAULIC DESIGN



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: Timothy J. Sheets Date: 10/26/2020

Printed or Typed Name: Timothy J. Sheets

My license renewal date is December 31, 2021

Pages or sheets covered by this seal: SHEETS 6 AND 7

STRUCTURAL DESIGN



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: Dallas R. Schechinger Date: 10/26/2020

Printed or Typed Name: Dallas R. Schechinger

My license renewal date is December 31, 2020

Pages or sheets covered by this seal: SHEETS 1 THRU 10

ESTIMATED BRIDGE QUANTITIES					
ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS BUILT QUAN.
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL	CY	4,460.0	
2	2401-6745625	REMOVAL OF EXISTING BRIDGE	LS	1.00	
3	2402-2720000	EXCAVATION, CLASS 20	CY	380	
4	2402-2721000	EXCAVATION, CLASS 21	CY	375	
5	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	610.4	
6	2404-7775000	REINFORCING STEEL	LB	31,360	
7	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	90,028	
8	2404-7775009	REINFORCING STEEL, STAINLESS STEEL	LB	3,657	
9	2407-0551367	BEAM, PPC, C67	EACH	12	
10	2407-0551375	BEAM, PPC, C75	EACH	6	
11	2408-7800000	STRUCTURAL STEEL	LB	6,485	
12	2414-6424110	CONCRETE BARRIER RAILING	LF	481.7	
13	2501-0201057	PILES, STEEL, HP 10x57	LF	2,540	
14	2501-6335010	PREFORED HOLE	LF	200	
15	2507-3250005	ENGINEERING FABRIC	SY	2,710.0	
16	2507-6800061	REVTMENT, CLASS E	TON	1,675.0	
17	2507-6875002	REVTMENT, REMOVE AND REPLACE	CY	590.0	
18	2533-4980005	MOBILIZATION	LS	1.00	
19	2599-9999010	(‘LUMP SUM’ ITEM) DYNAMIC PILE TEST	LS	1.00	

ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

ESTIMATE REFERENCE INFORMATION		
ITEM NO.	ITEM CODE	DESCRIPTION
1	2104-2710020	EXCAVATION, CLASS 10, CHANNEL --
2	2401-6745625	REMOVAL OF EXISTING BRIDGE CONTRACTOR SHALL SALVAGE AND STOCKPILE ON-SITE THE EXISTING BRIDGE NUMBER SIGNS, FOR FUTURE PICK-UP BY IOWA DOT STAFF.
3	2402-2720000	EXCAVATION, CLASS 20 --
4	2402-2721000	EXCAVATION, CLASS 21 --
5	2403-0100010	STRUCTURAL CONCRETE (BRIDGE) INCLUDES ALL RESILIENT JOINT FILLER REQUIRED. INCLUDES FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), FLOODABLE BACKFILL, POUROUS BACKFILL, GEOTEXTILE FABRIC, WATER FLOODING, AND SUBDRAIN OUTLET AT ABUTMENTS AND TOE OF BERM. INCLUDES FURNISHING AND PLACING CONCRETE SEALER. INCLUDES FURNISHING AND PLACING 3 INCH DIAMETER PVC PLASTIC PIPE AND EXPANDING FOAM IN THE ABUTMENT WINGS.
6	2404-7775000	REINFORCING STEEL --
7	2404-7775005	REINFORCING STEEL, EPOXY COATED --
8	2404-7775009	REINFORCING STEEL, STAINLESS STEEL --
9	2407-0551367	BEAM, PPC, C67 INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PCC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER. INCLUDES PIER AND ABUTMENT BEARING MATERIAL. INCLUDES ANCHORED CURVED SOLE PLATES AT PIERS.
10	2407-0551375	BEAM, PPC, C75 INCLUDES CONTRACTOR FILLING OUT BEAM NUMBERS BY LOCATION AND BEAM SEAT ELEVATIONS IN "PCC BEAM DATA SPREADSHEET" AND FORWARDING ELECTRONIC SPREADSHEET TO THE ENGINEER. INCLUDES PIER BEARING MATERIAL. INCLUDES ANCHORED CURVED SOLE PLATES AT PIERS.
11	2408-7800000	STRUCTURAL STEEL --
12	2414-6424110	CONCRETE BARRIER RAIL IF PLACEMENT OF CONCRETE IS DONE BY THE SLIPFORMING METHOD, CLASS BR CONCRETE IS REQUIRED. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. PRICE BID FOR THIS ITEM SHALL INCLUDE THE COST OF CAST-IN-PLACE FORMS IF REQUIRED FOR PLACEMENT OF THE CONCRETE.
13	2501-0201057	PILES, STEEL, HP 10x57 --
14	2501-6335010	PREFORED HOLE --
15	2507-3250005	ENGINEERING FABRIC ENGINEERING FABRIC SHALL BE MATERIAL AS SPECIFIED FOR EMBANKMENT EROSION CONTROL IN ACCORDANCE WITH ARTICLE 4196.01,B,3 OF THE STANDARD SPECIFICATIONS.
16	2507-6800061	REVTMENT, CLASS E ESTIMATED AT 1.6 TON/CY.
17	2507-6875002	REVTMENT, REMOVE AND REPLACE --
18	2533-4980005	MOBILIZATION --
19	2599-9999010	(‘LUMP SUM’ ITEM) DYNAMIC PILE TEST PDA TEST SHALL BE PERFORMED ON 2 PRODUCTION PILES AS INDICATED IN THESE PLANS. REFER TO "DYNAMIC PILE ANALYZER (PDA) TEST NOTE" FOR ADDITIONAL INFORMATION. METHOD OF MEASUREMENT AND BASIS OF PAYMENT SHALL BE TO THE LUMP SUM PRICE.

DESIGN FOR 30° SKEW (R.A.)
213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC.BEAM BRIDGE
68'-3 END SPANS77'-4 INTERIOR SPAN
ESTIMATED QUANTITIES
STA. 285+35.00 (IA 12)NOVEMBER, 2020
PLYMOUTH COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 9FILE NO. 31633DESIGN NO. 221

DESIGN TEAM	IOWA DOT / JEO CONSULTING GROUP	PLYMOUTH COUNTY	PROJECT NUMBER BRF-012-2(32)--38-75	SHEET NUMBER 2
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SUMMARY OF CONCRETE QUANTITIES

LOCATION		STRUCTURAL CONCRETE	HPC STRUCTURAL CONCRETE
ABUTMENT FOOTINGS		48.4	---
ABUTMENT WINGS		8.4	---
SLAB + HAUNCH + ABUT. DIAP. + WINGWALLS SECTION 1 & 3		188.4	---
SLAB + HAUNCH SECTION 2		64.6	---
SLAB + HAUNCH + PIER DIAP. SECTION 4 & 5		74.4	---
PIER #1	CAP	35.8	---
	STEP CONCRETE ***	0.5	---
	COLUMN	32.8	---
	FOOTING	44.0	---
PIER #2	CAP	35.8	---
	STEP CONCRETE ***	0.5	---
	COLUMN	32.8	---
	FOOTING	44.0	---
TOTAL (CU. YDS.)		610.4	---

*** SEE APPROPRIATE ADDITIONAL QUANTITIES STANDARD SHEETS FOR SKEWED BRIDGES.

SUMMARY OF REINFORCING STEEL

LOCATION		NON-COATED REINFORCING STEEL	STAINLESS STEEL REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
SUPERSTRUCTURE AND 2 ABUTMENTS **		---	---	81,682
BARRIER RAIL - TWO RAILS		---	2,889	7,282
BARRIER RAIL END SECTIONS		---	4 AT 192	4 AT 266
PIER #1	CAP	5802	---	---
	STEP REINFORCING ***	159	---	---
	COLUMN	4849	---	---
	FOOTING	4870	---	---
PIER #2	CAP	5802	---	---
	STEP REINFORCING ***	159	---	---
	COLUMN	4849	---	---
	FOOTING	4870	---	---
** EXCLUDES RAIL REINFORCING. INCLUDES 206 LBS. FOR PILE SPIRALS AND SPACERS WITH OPTIONAL EPOXY COATING				
TOTAL (LBS.)		31,360	3,657	90,028

SUMMARY OF EXCAVATION

LOCATION	CLASS 20 EXCAVATION	CLASS 2I EXCAVATION
SOUTH ABUTMENT	110	---
NORTH ABUTMENT	110	---
PIER #1	80	185
PIER #2	80	190
TOTAL (CU. YDS.)	380	375

SUMMARY OF FOUNDATIONS

[illegible]

SUMMARY OF STRUCTURAL STEEL

LOCATION	TOTAL (LBS.)
BRIDGE DECK DRAINS	8 @ 106
INTERMEDIATE DIAPHRAGMS	4,367
PIER #2 BEARINGS	1,270
TOTAL (LBS.)	6,485

SUMMARY OF BEARINGS

[illegible]

* CURVED SOLE PLATES AND LAMINATED
NEOPRENE PADS ARE INCIDENTAL
TO PPC BEAMS

DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS 77'-4 INTERIOR SPAN

SUMMARY QUANTITIES SHEET

STA. 285+35.00 (1A 12) NOVEMBER, 2020

PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 2 OF 9 FILE NO. 31633 DESIGN NO. 221

GENERAL BRIDGE NOTES:

THIS DESIGN IS FOR THE REPLACEMENT OF THE EXISTING 150’ x 26’ STEEL GIRDER BRIDGE ON IA HWY 12 OVER INDIAN CREEK IN PLYMOUTH COUNTY (DESIGN NO. 2253) WITH A YEAR OF CONSTRUCTION OF 1953. ELECTRONIC PLANS OF THE EXISTING STRUCTURE ARE AVAILABLE TO THE CONTRACTOR AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS.

THE LUMP SUM BID FOR “REMOVAL OF EXISTING BRIDGE” SHALL INCLUDE REMOVAL OF THE EXISTING 150’ x 26’ STEEL GIRDER BRIDGE (DESIGN NO. 2253).

REMOVALS SHALL BE IN ACCORDANCE WITH SECTION 2401, OF THE STANDARD SPECIFICATIONS.

FAINT LINES ON PLANS INDICATE THE EXISTING STRUCTURE.

UTILITY COMPANIES WHOSE FACILITIES ARE SHOWN ON THE PLANS OR KNOWN TO BE WITHIN THE CONSTRUCTION LIMITS SHALL BE NOTIFIED BY THE BRIDGE CONTRACTOR OF THE STARTING DATE.

CLASS 20 EXCAVATION QUANTITIES ARE BASED ON THE ASSUMPTION THAT THE CHANNEL EXCAVATION IS COMPLETED PRIOR TO STARTING CONSTRUCTION OF THE ABUTMENTS AND PIERS.

IT SHALL BE THE BRIDGE CONTRACTOR’S RESPONSIBILITY TO PROVIDE SITES FOR EXCESS EXCAVATED MATERIAL. NO PAYMENT FOR OVERHAUL WILL BE ALLOWED FOR MATERIAL HAULED TO THESE SITES.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

THE BRIDGE CONTRACTOR SHALL PREBORE HOLES FOR ABUTMENT PILES. HOLES SHALL BE BORED TO THE ELEVATIONS SHOWN ON THE “LONGITUDINAL SECTION ALONG CENTERLINE ROADWAY” ON DESIGN SHEET 5. PILES SHALL BE DRIVEN THROUGH THE HOLES TO AT LEAST THE SPECIFIED DESIGN BEARING.

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03, A, 2, OF THE STANDARD SPECIFICATIONS. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING STABILITY OF PRESTRESSED CONCRETE BEAMS DURING ERECTION AND CONSTRUCTION UP THROUGH THE CONCRETE BRIDGE DECK REACHING ITS FULL 28-DAY STRENGTH. THE CONTRACTOR SHALL PROVIDE SUFFICIENT TEMPORARY ANCHOR BRACING AT BEAM ENDS AND TEMPORARY INTERMEDIATE BRACING AS NEEDED TO ENSURE PRESTRESSED BEAM STABILITY. PARTIALLY OR FULLY INSTALLED PERMANENT BRACING AS SHOWN IN THESE DESIGN PLANS SHALL NOT BE ASSUMED SUFFICIENT TO BRACE PRESTRESSED BEAMS DURING ERECTION AND CONSTRUCTION. TEMPORARY BRACING SHALL NOT BE WELDED TO PRESTRESSED BEAM STIRRUPS.

AT THE CONTRACTORS OPTION TRANSPARENT STAY-IN-PLACE DECK FORMS MAY BE USED FOR THIS PROJECT. THE STAY-IN-PLACE FORMS SHALL HAVE A MINIMUM AVERAGE TRANSPARENCY OF 70%. ALL STRUCTURAL STEEL MEMBERS USED IN THE FORM ASSEMBLY (INCLUDING COLD-FORMED AND ROLLED) SHALL BE CORROSION PROTECTED. THE FORM ASSEMBLY SHALL HAVE A MAXIMUM UNIT WEIGHT OF 3.5 PSF OVER THE FULL FORM PANEL AREA. SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED FOR THE ENGINEER’S REVIEW. THE TRANSPARENT STAY-IN-PLACE FORM MATERIAL AND INSTALLATION COST SHALL BE INCLUDED IN THE PAY ITEM FOR STRUCTURAL CONCRETE (BRIDGE), WITH NO ADDITIONAL COST TO THE STATE.

THE BRIDGE CONTRACTOR IS TO CLEAR AND/OR SHAPE THE CHANNEL WITHIN THE APPROXIMATE LIMITS OF THE AREAS AS SHOWN ON THE “SITUATION PLAN” AND “LONGITUDINAL SECTION ALONG CENTERLINE ROADWAY” ON DESIGN SHEET 5.

BRIDGE DECK DIMENSIONS TABLE			
NO.	ITEM	UNIT	QUANTITY
1	DECK LENGTH	L.F.	217.30
2	MINIMUM DECK WIDTH	L.F.	43.17
3	MAXIMUM DECK WIDTH	L.F.	43.17
4	DECK AREA	S.F.	9,381

1. DECK LENGTH IS MEASURED FROM FACE-TO-FACE OF PAVING NOTCHES ALONG THE CENTERLINE OF THE ROADWAY.
- 2, 3. DECK WIDTHS ARE MEASURED FROM OUT-TO-OUT OF DECK PERPENDICULAR TO THE CENTERLINE OF ROADWAY.
4. DECK AREA IS TO BE BASED ON THE FACE-TO-FACE PAVING NOTCH DISTANCE AND OUT-TO-OUT DECK DIMENSIONS.

ABUTMENT NOTES:

THE CONTRACT LENGTH OF 50 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A MIXED SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 144 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.70 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A MIXED SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.70 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 104 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

THE CONTRACT LENGTH OF 50 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 144 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF PREBORE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 107 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

HAZARDOUS MATERIALS NOTES:

A SCRAPE SAMPLE WAS TAKEN FROM AN AREA OF THIS BRIDGE TO GET AN INDICATION OF THE EXISTENCE OF AND LEVEL OF TOTAL LEAD AND TOTAL CHROMIUM. ANALYSIS OF TOTAL LEAD ON THIS SAMPLE WAS 4,640 PARTS PER MILLION (PPM). ANALYSIS OF TOTAL CHROMIUM ON THIS SAMPLE WAS 1,650 PPM. THESE ANALYSES SHOW THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS. LEVELS INDICATED BY THESE TESTS COULD CREATE CONDITIONS ABOVE REGULATORY LIMITS FOR HEALTH AND SAFETY REQUIREMENTS. NO OTHER CONSTITUENTS WERE ANALYZED. THE BIDDER SHOULD NOT RELY ON THE IOWA DOT’S TESTING AND ANALYSIS FOR ANY PURPOSE OTHER THAN AS AN INDICATION OF THE EXISTENCE OF THESE TWO TOXIC CONSTITUENTS.

SCRAPE SAMPLES OF THIS BRIDGE WERE TAKEN TO GET AN INDICATION OF THE EXISTENCE OF ASBESTOS. THE ANALYSIS INDICATED THAT ASBESTOS IS NOT PRESENT IN THE EXISTING BRIDGE. SHOULD ASBESTOS BE FOUND DURING DEMOLITION, THE CONTRACTOR SHALL CEASE DEMOLITION ACTIVITIES IMMEDIATELY AND CONTACT THE PROJECT ENGINEER.

SHOP DRAWING SUBMITTALS	
SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS SHOWN IN THE TABLE BELOW. (NOTE ADDITIONAL SHOP DRAWINGS MAY BE REQUIRED IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.)	
SUBMITTAL REQUIREMENTS FOR SHOP DRAWINGS SHOULD BE IN ACCORDANCE WITH ARTICLE 1105.03, OF THE STANDARD SPECIFICATIONS, FOR HIGHWAY AND BRIDGE CONSTRUCTION OF THE IOWA DEPARTMENT OF TRANSPORTATION.	
SHOP DRAWINGS SHALL BE SUBMITTED WITH THE FOLLOWING NAMING CONVENTION: (Paren) County_DesignNumber_SubmittalDescription.pdf Example: (090)_BlackHawk_Design915_DeckDrains.pdf	
1	EXPANSION PIER BEARINGS
2	INTERMEDIATE DIAPHRAGMS
3	TRANSPARENT STAY-IN-PLACE FORMS (IF USED)
4	DECK DRAINS

PIER NOTES:

THE CONTRACT LENGTH OF 35 FEET FOR THE PIER 1 PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 141 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING. DESIGN SCOUR (200-YEAR) WAS ASSUMED TO AFFECT THE UPPER 1 FEET OF EMBEDDED PILE LENGTH AND CAUSE 2 KIPS OF DRIVING RESISTANCE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER 1 PILES IS 109 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

THE CONTRACT LENGTH OF 35 FEET FOR THE PIER 2 PILES IS BASED ON A NON-COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 141 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A NON-COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.55 FOR SOIL AND 0.70 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING. DESIGN SCOUR (200-YEAR) WAS ASSUMED TO AFFECT THE UPPER 1 FEET OF EMBEDDED PILE LENGTH AND CAUSE 2 KIPS OF DRIVING RESISTANCE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER 2 PILES IS 106 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

FORMS FOR PIER CAPS ON PIERS SHALL BE REMOVED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. EARLY FORM REMOVAL IS PROHIBITED.

ALL BATTERED PILE SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN THE PLACEMENT OF REINFORCING.

FOR SPECIFICATIONS AND DESIGN STRESSES, REFER TO H40-01A-14

PIERS SHALL BE CONSTRUCTED ACCORDING TO THE STANDARD BRIDGE PLANS LISTED ON SHEET 1, FOR AN "H" VALUE OF 26'-0.

POLLUTION PREVENTION PLAN SHOWN ELSEWHERE IN THESE PLANS.

TRAFFIC CONTROL PLAN
THE ROADWAY WILL BE CLOSED TO THRU TRAFFIC. REFER TO THE TRAFFIC CONTROL PLAN SHOWN ELSEWHERE IN THESE PLANS.

DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS77'-4 INTERIOR SPAN

GENERAL NOTES

STA. 285+35.00 (IA 12)NOVEMBER, 2020

PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 3 OF 9FILE NO. 31633DESIGN NO. 221

DYNAMIC PILE ANALYZER (PDA) TEST:

DYNAMIC PILE TESTING SHALL BE PERFORMED ON THE TWO PRODUCTION PILES AS SHOWN IN THESE PLANS. THE PRODUCTION PILE TESTING SHALL BE PERFORMED DURING INITIAL DRIVING AND RESTRIKES TO MONITOR HAMMER AND DRIVE SYSTEM PERFORMANCE, ASSESS PILE INSTALLATION STRESSES, AS WELL AS TO EVALUATE PILE CAPACITY. THE PDA TESTS WILL BE ONLY USED FOR THE POOL-FUNDED RESEARCH PROJECT WHICH STUDIES PILES TIPPING OUT IN SHALE OR IGM LAYERS. THE CONTRACTOR SHOULD CONTACT THE RESEARCH PERSONNEL FOR THE TEST INSTRUCTION AT LEAST 5 DAYS PRIOR TO THE PDA PILE DRIVING. THE RESEARCH PERSONNEL CONTACT INFORMATION:

Kam Ng
1000 E. University Avenue
University of Wyoming
Laramie, WY 82071
e-mail: kng1@uwyo.edu
Office Phone: 307-766-4388

ALL EQUIPMENT NECESSARY FOR THE DYNAMIC MONITORING SUCH AS SENSORS, CABLES OR WIRELESS TRANSMITTERS, ETC., SHALL BE FURNISHED BY THE CONTRACTOR. THE EQUIPMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM D4945. THE CONTRACTOR WILL FURNISH THE PILE DRIVING ANALYZER, EQUIPMENT/INSTRUMENTS, MATERIAL, AND LABOR NECESSARY FOR DRILLING THE HOLES, MOUNTING THE INSTRUMENTS, OBTAINING THE DATA, AND PERFORMING THE CAPWAP ANALYSIS. AN ENGINEER WITH A MINIMUM 5 YEARS OF EXPERIENCE AND/OR WHO HAS ACHIEVED BASIC LEVEL OR BETTER ON THE FOUNDATION QA EXAMINATION FOR PROVIDERS OF PDA TESTING SERVICES SHALL BE IN CHARGE OF PILE DRIVING ANALYZER (PDA) OPERATION AND OF RESULT INTERPRETATION, EITHER ON SITE OR BY REMOTE CONNECTION.

CAPWAP ANALYSIS OF THE DYNAMIC PILE TESTING DATA SHALL BE PERFORMED ON DATA OBTAINED FROM: (1) AT THE INITIAL DRIVING WHEN THE PILE TIP PENETRATES INTO THE SHALE LAYER PRIOR TO END THE INITIAL DRIVING; (2) AT THE END OF INITIAL DRIVING; (3) AT THE BEGINNING OF THE 1-HOUR RESTRIKE; AND (4) AT THE BEGINNING OF THE 24-HOUR RESTRIKE. RESTRIKES SHOULD BE PERFORMED 1 HOUR AND 24 HOURS AFTER THE END OF INITIAL DRIVING. HAMMER BLOW COUNTS AND HAMMER STROKE HEIGHTS SHOULD BE RECORDED AT THE END OF INITIAL DRIVING AND ALL RESTRIKES. PILE DRIVING HAMMER SHOULD BE WARMED UP BEFORE PERFORMING THE RESTRIKES. CAPWAP ANALYSES SHALL BE PERFORMED BY AN ENGINEER WHO HAS ACHIEVED ADVANCED LEVEL OR BETTER ON THE FOUNDATION QA EXAMINATION FOR PROVIDERS OF PDA TESTING SERVICES. THE ENGINEER MAY REQUEST ADDITIONAL ANALYSES AT SELECTED PILE PENETRATION DEPTHS.

WITHIN ONE DAY OF PRODUCTION PILE TESTING, THE CONTRACTOR SHALL PREPARE A HAND WRITTEN DAILY FIELD REPORT SUMMARIZING THE DYNAMIC TESTING RESULTS. AS A MINIMUM, THE DAILY REPORTS SHALL INCLUDE THE CALCULATED DRIVING STRESSES, TRANSFERRED ENERGY, AND ESTIMATED ULTIMATE PILE CAPACITY AT THE TIME OF TESTING. VARIATIONS FROM PREVIOUS TRENDS IN THE DYNAMIC TEST DATA SHALL ALSO BE NOTED. DAILY FIELD REPORTS SHALL BE TRANSMITTED TO THE ENGINEER.

THE CONTRACTOR SHALL SEND THE DAILY FIELD REPORT, THE ELECTRONIC PDA TESTING FILES TOGETHER WITH THE CAPWAP ANALYSIS TO THE ABOVE RESEARCH PERSONNEL BY EMAILS NO LATER THAN TEN WORKING DAYS AFTER THE COMPLETION OF THE TESTING.

MEASUREMENT FOR THE DYNAMIC PILE TEST AND CAPWAP ANALYSIS WILL BE LUMP SUM. PAYMENT IS FULL COMPENSATION FOR ALL LABOR, MATERIALS, EQUIPMENT AND TIME ASSOCIATED WITH THE TESTS.

THE SELECTED PRODUCTION PILES FOR THE PDA TEST SHALL BE DRIVEN TO REACH THE BEARING CAPACITY PER PILE DESIGN NOTES IN THESE PLANS AND SHALL REMAIN AT LEAST 4'-0 OF PROJECTION ABOVE THE GROUND AT THE END OF DRIVING TO ALLOW THE PDA TEST INSTRUMENTATION REMOVAL. IF THE BEARING CAPACITY IS REACHED, THE TOP PROJECTION OF THE PILES SHALL BE CUT OFF TO PROVIDE THE REQUIRED PILE EMBEDMENT INTO ABUTMENT/PIER FOOTINGS.

DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS77'-4 INTERIOR SPAN

GENERAL NOTES

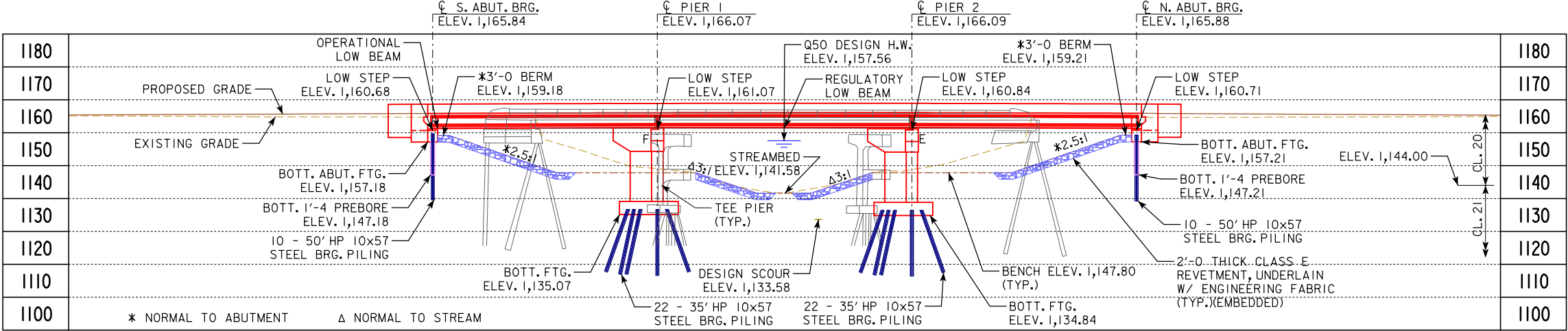
STA. 285+35.00 (1A 12)NOVEMBER, 2020

PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 4 OF 9FILE NO. 31633DESIGN NO. 221

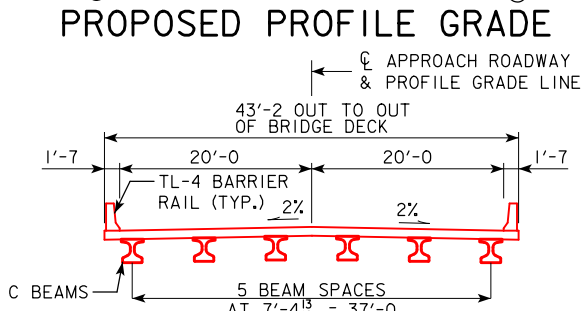
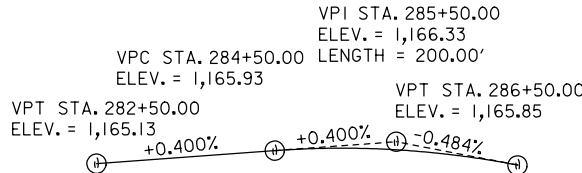
BENCH MARK NO.3: SET RR SPIKE IN COR POST E. SIDE HWY 12 @ FIELD DRIVE ±925' S. OF BRIDGE, ELEV. 1,164.071. N: 8,733,682.013, E: 14,048,717.380



LONGITUDINAL SECTION ALONG CL APPROACH ROADWAY

(NOTE: CL ELEVATIONS SHOWN ARE AT PROFILE GRADE LINE)

NOTE: TOP OF BRIDGE DECK AT CENTERLINE ROADWAY IS 0.03' BELOW THE PROFILE GRADE TO ACCOUNT FOR DECK CROSS SLOPE AND PARABOLIC CROWN.



BRIDGE CROSS SECTION

HYDRAULIC DATA

DRAINAGE AREA = 62.3 SQ. MI.
STREAM SLOPE = 3.17 FT./MI.
AVG. LOW WATER STAGE = 1,144.00
Q₅₀ = 11,200 CFS
STAGE = 1,157.56
REGULATORY LOW BEAM = 1,161.28
AVG. BRIDGE VELOCITY = 6.22 FPS
Q₁₀₀ = 13,400 CFS
STAGE = 1,157.86
OPERATIONAL LOW BEAM = 1,160.94
BACKWATER = 0.98 FT.
AVG. BRIDGE VELOCITY = 7.21 FPS
Q₂₀₀ = 15,700 CFS
STAGE = 1,158.30
CALCULATED DESIGN SCOUR = 1,133.58
Q₅₀₀ = 18,400 CFS
STAGE = 1,161.83
AVG. BRIDGE VELOCITY = 7.05 FPS
CALCULATED CHECK SCOUR = 1,137.90

ROADWAY OVERTOP 1,164.78
STA. 288+70.00
EXTREME HW STAGE = UNKNOWN
DATE = UNKNOWN

TRAFFIC ESTIMATE

2021 AADT	1,200	V.P.D.
2041 AADT	1,200	V.P.D.
2021 DHV	-	V.P.H.
TRUCKS	20	%
TOTAL DESIGN ESALs	-	

LOCATION

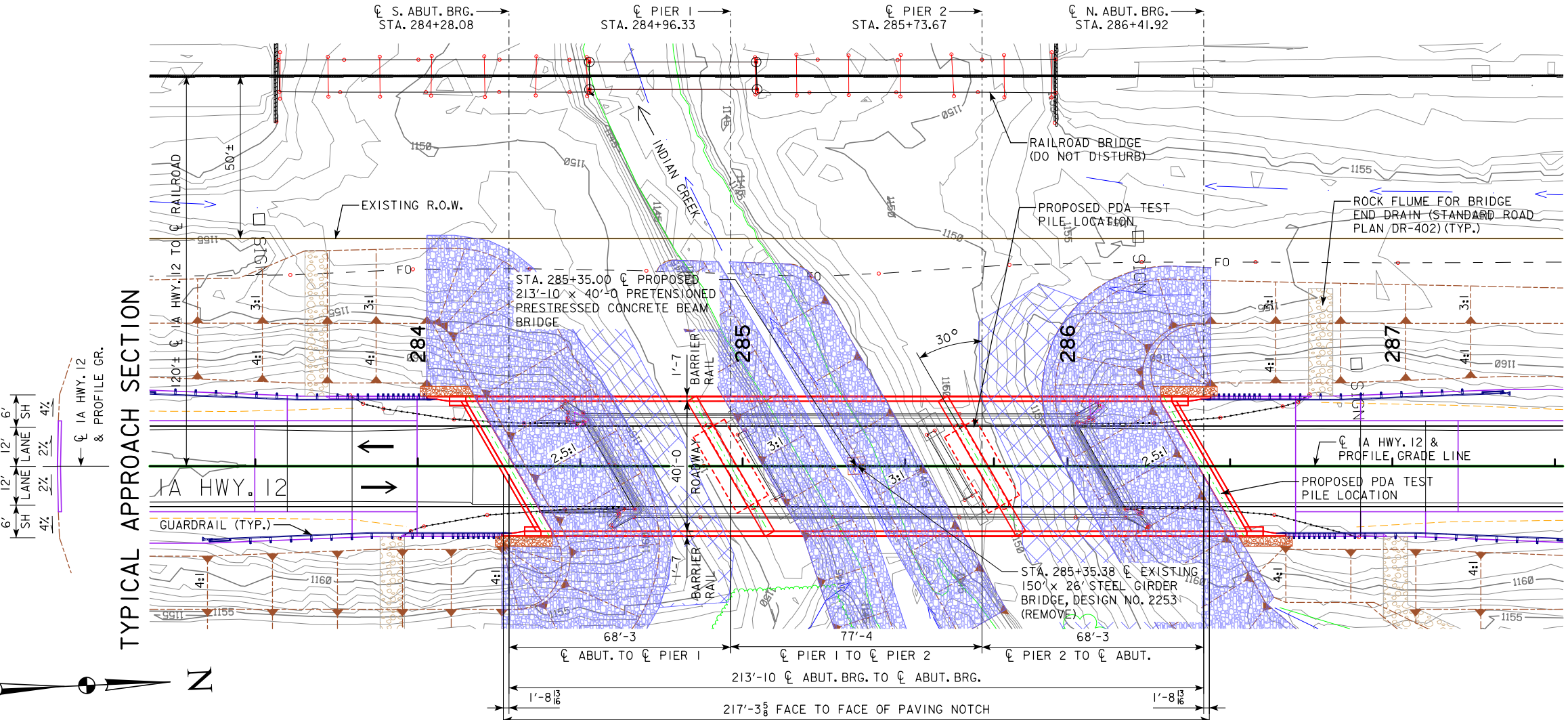
IA HWY 12
OVER INDIAN CREEK
T-93N R-48W
SECTION 09
PORTLAND TOWNSHIP
PLYMOUTH COUNTY
FHWA NO. 040021
BRIDGE MAINT. NO. 7538.9S012
LATITUDE 42.890556°
LONGITUDE -96.517222°

UTILITIES LEGEND

FO — FIBER OPTIC - PREMIER COMMUNICATIONS
T1 — TELEPHONE - PREMIER COMMUNICATIONS

DESIGN FOR 30° SKEW (R.A.)
**213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE**
68'-3 END SPANS 77'-4 INTERIOR SPAN
SITUATION PLAN
STA. 285+35.00 (IA 12) NOVEMBER, 2020
PLYMOUTH COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 5 OF 9 FILE NO. 31633 DESIGN NO. 221

PROPOSED PDA TEST PILE LOCATIONS ARE THE PIER 2 PILE CLOSEST TO BORING B-4 AND THE N. ABUTMENT PILE CLOSEST TO BORING B-5.



SITUATION PLAN

BERM SLOPE LOCATION TABLE						
POINTS	SOUTH ABUTMENT			NORTH ABUTMENT		
	STATION	OFFSET	ELEV.	STATION	OFFSET	ELEV.
A1	284+53.27	24.58'	1,147.80	285+92.17	24.58'	1,147.80
A2	284+74.31	24.58'	1,147.80	286+17.95	24.58'	1,147.80
B1	284+19.03	24.58'	1,159.18	286+23.45	24.58'	1,159.21
B2	284+46.58	24.58'	1,159.18	286+50.91	24.58'	1,159.21
W1	284+02.80	24.58'	1,165.14	286+44.10	24.58'	1,165.32
W2	284+25.90	24.58'	1,165.27	286+67.20	24.58'	1,165.21

BERM SLOPE ELEVATIONS REFLECT THE GRADING SURFACE

ESTIMATED BERM ARMORING QUANTITIES				
LOCATION	REVETMENT CL. E (TON)	REVET. REM. & REPL. (CY)	ENGINEERING FABRIC (SY)	CLASS 10 EX. (CY)
BERM LINING - SOUTH	950	110	1,140	655
BERM LINING - NORTH	725	480	1,570	905
TOTALS	1,675	590	2,710	1,560

EXCAVATION QUANTITY CALCULATED FROM GRADING SURFACE AND INCLUDES ONLY THE EXCAVATION REQUIRED TO EMBED THE REVETMENT.

CLASS E REVETMENT BASED ON DENSITY OF 1.6 TON/CY.

REKETMENT, REMOVE & REPLACED BASED ON A UNIFORM THICKNESS OF 2'-0, AND A DENSITY OF 1.6 TON/CY.

THE TOTAL REKETMENT NEEDED FOR EACH BERM IS AS FOLLOWS:
SOUTH BERM: 1,125 TONS
NORTH BERM: 1,490 TONS

SECTION THRU EMBEDDED REVETMENT BERM

BRIDGE COORDINATES				
LOCATION	CL S. ABUT. BRG.	CL PIER 1	CL PIER 2	CL N. ABUT. BRG.
WEST EDGE OF DECK	X=14048703.074 Y=8734565.737	X=14048706.013 Y=8734633.924	X=14048709.345 Y=8734711.186	X=14048712.285 Y=8734779.372
CL APPROACH ROADWAY	X=14048725.173 Y=8734577.257	X=14048728.113 Y=8734645.444	X=14048731.445 Y=8734722.705	X=14048734.384 Y=8734790.892
EAST EDGE OF DECK	X=14048747.274 Y=8734588.777	X=14048750.214 Y=8734656.964	X=14048753.545 Y=8734734.226	X=14048756.485 Y=8734802.412

NOTE: AN ELECTRONIC FILE CONTAINING THE BRIDGE COORDINATE DATA IS AVAILABLE AS PART OF THE E-FILES SUPPLIED WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL VERIFY THESE COORDINATES WITH THE PROJECT HORIZONTAL CONTROL INFORMATION PROVIDED IN THE ROAD PLANS.

REKETMENT LAYOUT:

- (R1) STA. 284+03, 71' LT.
- (R2) STA. 284+92, 63' LT.
- (R3) STA. 284+96, 63' LT.
- (R4) STA. 286+44, 61' LT.
- (R5) STA. 284+26, 73' RT.
- (R6) STA. 285+51, 52' RT.
- (R7) STA. 285+64, 54' RT.
- (R8) STA. 287+12, 115' RT.
- (R9) STA. 287+59, 70' RT.

GRADING CONTROL:

- (G1) STA. 284+92, 24.58' LT., EDGE BENCH, ELEV. 1,147.80
- (G2) STA. 285+41, 24.58' LT., EDGE BENCH, ELEV. 1,147.80
- (G3) STA. 285+20, 24.58' RT., EDGE BENCH, ELEV. 1,147.80
- (G4) STA. 285+70, 24.58' RT., EDGE BENCH, ELEV. 1,147.80
- (G5) STA. 287+37, 92' RT., END DIKE, ELEV. 1,159.21

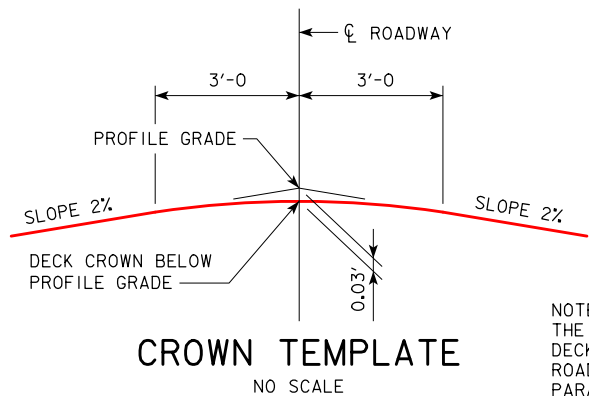
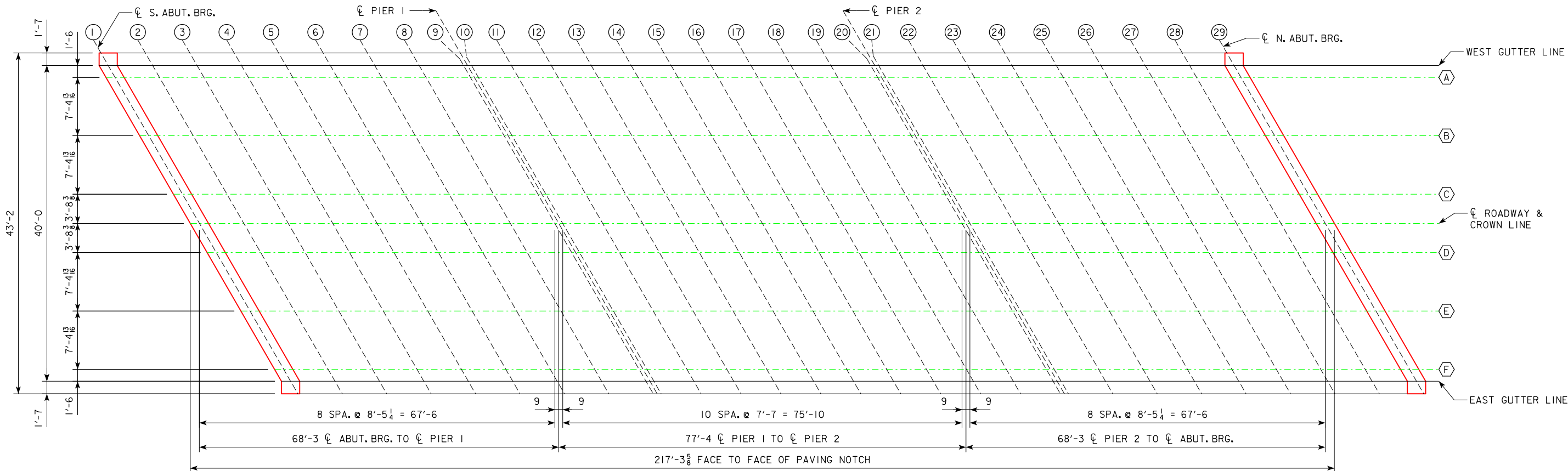
SITE PLAN

DESIGN FOR 30° SKEW (R.A.)
**213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE**
68'-3 END SPANS 77'-4 INTERIOR SPAN
SITUATION PLAN - SITE
STA. 285+35.00 (IA 12) NOVEMBER, 2020
PLYMOUTH COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 6 OF 9 FILE NO. 31633 DESIGN NO. 221

TOP OF BRIDGE DECK ELEVATIONS

LOCATION	S. ABUT. BEARING								CL PIER 1 BEARINGS											CL PIER 2 BEARINGS										N. ABUT. BEARING
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	
WEST GUTTER LINE		1165.40	1165.43	1165.46	1165.50	1165.53	1165.56	1165.59	1165.62	1165.64	1165.64	1165.66	1165.68	1165.69	1165.70	1165.70	1165.71	1165.71	1165.71	1165.71	1165.70	1165.70	1165.69	1165.68	1165.66	1165.64	1165.62	1165.59	1165.56	1165.53
BEAM LINE A	A	1165.43	1165.46	1165.50	1165.53	1165.56	1165.60	1165.62	1165.65	1165.67	1165.68	1165.69	1165.71	1165.72	1165.73	1165.74	1165.74	1165.74	1165.74	1165.74	1165.73	1165.73	1165.72	1165.71	1165.69	1165.67	1165.65	1165.62	1165.59	1165.56
BEAM LINE B	B	1165.59	1165.63	1165.66	1165.70	1165.73	1165.76	1165.79	1165.81	1165.83	1165.83	1165.85	1165.86	1165.87	1165.88	1165.89	1165.89	1165.89	1165.89	1165.88	1165.87	1165.87	1165.86	1165.85	1165.83	1165.81	1165.78	1165.75	1165.72	1165.69
BEAM LINE C	C	1165.76	1165.79	1165.83	1165.86	1165.89	1165.92	1165.95	1165.97	1165.99	1165.99	1166.01	1166.02	1166.03	1166.03	1166.04	1166.04	1166.04	1166.03	1166.03	1166.02	1166.01	1166.00	1165.98	1165.96	1165.94	1165.92	1165.89	1165.85	1165.82
CL ROADWAY AND CROWN LINE		1165.81	1165.85	1165.88	1165.91	1165.94	1165.97	1166.00	1166.02	1166.04	1166.04	1166.05	1166.06	1166.07	1166.08	1166.08	1166.08	1166.08	1166.07	1166.07	1166.06	1166.06	1166.04	1166.02	1166.00	1165.98	1165.95	1165.92	1165.89	1165.85
BEAM LINE D	D	1165.78	1165.81	1165.84	1165.88	1165.91	1165.93	1165.96	1165.98	1166.00	1166.00	1166.01	1166.02	1166.03	1166.03	1166.04	1166.04	1166.03	1166.03	1166.02	1166.01	1166.01	1165.99	1165.98	1165.95	1165.93	1165.90	1165.87	1165.84	1165.80
BEAM LINE E	E	1165.65	1165.68	1165.71	1165.75	1165.77	1165.80	1165.82	1165.84	1165.86	1165.86	1165.87	1165.88	1165.88	1165.89	1165.89	1165.88	1165.88	1165.87	1165.86	1165.85	1165.84	1165.82	1165.79	1165.77	1165.74	1165.71	1165.67	1165.63	
BEAM LINE F	F	1165.52	1165.55	1165.58	1165.61	1165.64	1165.66	1165.68	1165.70	1165.72	1165.72	1165.73	1165.73	1165.74	1165.74	1165.74	1165.74	1165.73	1165.72	1165.71	1165.70	1165.70	1165.68	1165.66	1165.63	1165.61	1165.57	1165.54	1165.50	1165.46
EAST GUTTER LINE		1165.49	1165.52	1165.56	1165.58	1165.61	1165.63	1165.66	1165.67	1165.69	1165.69	1165.70	1165.70	1165.71	1165.71	1165.71	1165.71	1165.70	1165.69	1165.68	1165.67	1165.65	1165.63	1165.60	1165.57	1165.54	1165.51	1165.47	1165.43	

⬡ - INDICATES CENTER LINE OF BEAM



NOTE:
THE TOP OF DECK ELEVATIONS FOR THE HIGH POINT ON THE BRIDGE DECK ARE 0.03 FEET BELOW THE HIGH POINT ON THE APPROACH ROADWAY TO ACCOUNT FOR THE ROUNDING OF THE DECK WITH A PARABOLIC TEMPLATE AT THE CROSS SLOPE INTERSECTION.

DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS77'-4 INTERIOR SPAN

TOP OF SLAB ELEVATIONS

STA. 285+35.00 (1A 12)NOVEMBER, 2020

PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

DESIGN SHEET NO. 7 OF 9FILE NO. 31633DESIGN NO. 221

TABLE OF BEAM LINE HAUNCH ELEVATIONS

BEAM LINE	☉ S. ABUT. BEARING								☉ PIER NO. 1 BEARINGS											☉ PIER NO. 2 BEARINGS										☉ N. ABUT. BEARING
	LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27	LINE 28	LINE 29	
A	1164.76	1164.82	1164.88	1164.93	1164.97	1164.99	1165.01	1165.01	1165.01	1165.01	1165.06	1165.10	1165.13	1165.15	1165.16	1165.16	1165.15	1165.13	1165.10	1165.06	1165.06	1165.08	1165.09	1165.09	1165.07	1165.04	1165.00	1164.95	1164.89	
B	1164.93	1164.99	1165.04	1165.09	1165.13	1165.16	1165.17	1165.17	1165.16	1165.17	1165.21	1165.25	1165.28	1165.30	1165.31	1165.31	1165.30	1165.27	1165.24	1165.21	1165.21	1165.22	1165.23	1165.22	1165.21	1165.18	1165.14	1165.08	1165.02	
C	1165.09	1165.15	1165.21	1165.26	1165.30	1165.32	1165.33	1165.33	1165.32	1165.32	1165.37	1165.40	1165.43	1165.45	1165.46	1165.46	1165.44	1165.42	1165.39	1165.35	1165.35	1165.36	1165.37	1165.36	1165.34	1165.31	1165.27	1165.21	1165.15	
D	1165.11	1165.17	1165.23	1165.28	1165.31	1165.33	1165.34	1165.34	1165.33	1165.33	1165.37	1165.41	1165.44	1165.45	1165.46	1165.46	1165.44	1165.42	1165.38	1165.34	1165.34	1165.35	1165.36	1165.35	1165.33	1165.30	1165.25	1165.20	1165.13	
E	1164.98	1165.04	1165.10	1165.14	1165.18	1165.20	1165.20	1165.20	1165.19	1165.19	1165.23	1165.27	1165.29	1165.31	1165.31	1165.31	1165.29	1165.26	1165.23	1165.19	1165.19	1165.20	1165.20	1165.19	1165.17	1165.14	1165.09	1165.03	1164.97	
F	1164.85	1164.91	1164.96	1165.01	1165.04	1165.06	1165.07	1165.06	1165.05	1165.05	1165.09	1165.12	1165.15	1165.16	1165.17	1165.16	1165.14	1165.11	1165.08	1165.03	1165.03	1165.04	1165.04	1165.03	1165.01	1164.97	1164.92	1164.86	1164.80	

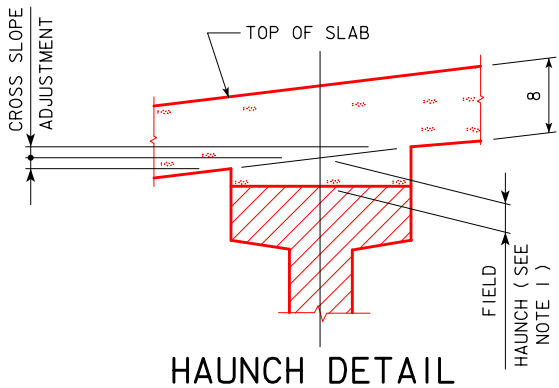
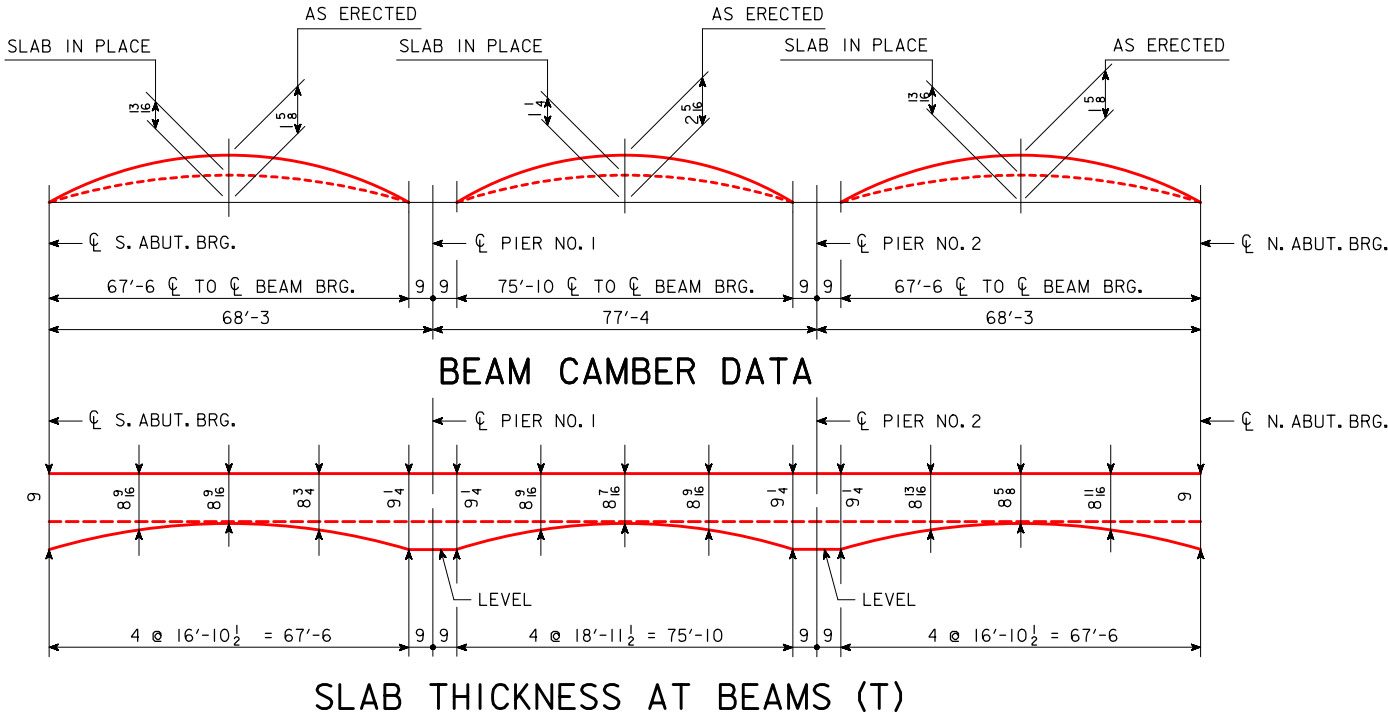
MISCELLANEOUS DATA TABLE

	BEAM LINE		℄ S. ABUT. BEARING								℄ PIER NO. 1 BEARINGS											℄ PIER NO. 2 BEARINGS											℄ S. ABUT. BEARING
			LINE 1	LINE 2	LINE 3	LINE 4	LINE 5	LINE 6	LINE 7	LINE 8	LINE 9	LINE 10	LINE 11	LINE 12	LINE 13	LINE 14	LINE 15	LINE 16	LINE 17	LINE 18	LINE 19	LINE 20	LINE 21	LINE 22	LINE 23	LINE 24	LINE 25	LINE 26	LINE 27	LINE 28	LINE 29		
ANTICIPATED DEFLECTION DUE TO SLAB (IN.)	ALL		0	$\frac{5}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{16}$	0	0	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{7}{8}$	$1\frac{1}{16}$	$1\frac{1}{8}$	$1\frac{1}{16}$	$\frac{7}{8}$	$\frac{5}{8}$	$\frac{3}{8}$	0	0	$\frac{5}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{5}{16}$	0		
CROSS SLOPE ADJUSTMENTS (IN.)	ALL		$\frac{3}{16}$																														
ALLOWABLE FIELD HAUNCH IN. (FT.)	MAX.	ALL	2 (0.167)																														
	MIN.	ALL	$-\frac{5}{16}$ (-0.028) (EMBEDMENT)																														

NOTE:
ESTIMATED SLAB THICKNESS DIMENSIONS INCLUDE AN 8" UNIFORM DECK THICKNESS AND THE ESTIMATED HAUNCH AT EACH LOCATION. THE ESTIMATED HAUNCH IS NOT GUARANTEED FOR CONSTRUCTION. THESE VALUES ARE USED BY THE DESIGNER TO ESTIMATE CONCRETE QUANTITIES.

NOTE:
HAUNCH LOCATIONS ARE AT THE SAME LOCATION AS THE ENCIRCLED LETTERS AND NUMBERS SHOWN ON SLAB ELEVATIONS SHEET.

NOTE 1:
TO CALCULATE FIELD HAUNCH REQUIRED AT EACH LOCATION, SURVEY THE BEAM TOPS CONSISTENT WITH THE SPACINGS SHOWN ON THE "TOP OF SLAB ELEVATIONS LAYOUT". SUBTRACT THE SURVEYED BEAM SHOT FROM THE "BEAM LINE HAUNCH ELEVATION". THIS VALUE WILL BE THE HAUNCH NEEDED (SEE "FIELD HAUNCH" IN HAUNCH DETAIL). THE "BEAM LINE HAUNCH ELEVATION" INCLUDES ADJUSTMENTS FOR SLAB THICKNESSES AND ANTICIPATED DEFLECTIONS. NO ADDITIONAL CALCULATIONS ARE REQUIRED. IF THE FIELD HAUNCH EXCEEDS THE MAXIMUMS AND MINIMUMS SHOWN IN INCHES AND DECIMALS OF FEET IN THE MISCELLANEOUS DATA TABLE, ADJUSTMENTS TO THE GRADE OR ADDITIONAL HAUNCH REINFORCEMENT WILL BE REQUIRED.



DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS77'-4 INTERIOR SPAN

BEAM HAUNCH & MISC. DATA TABLE

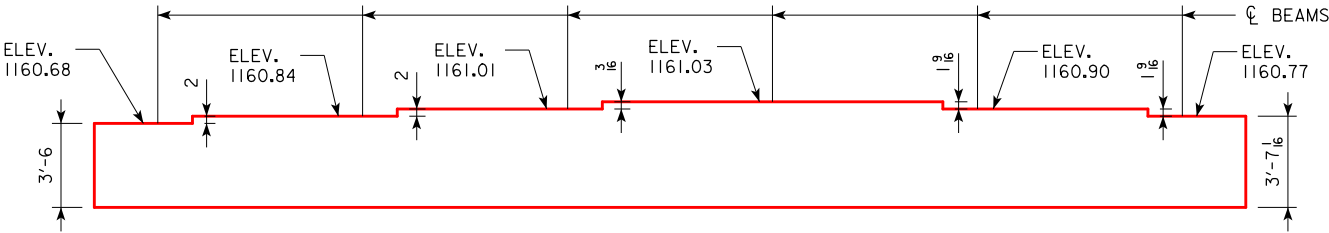
STA. 285+35.00 (1A 12)

NOVEMBER, 2020

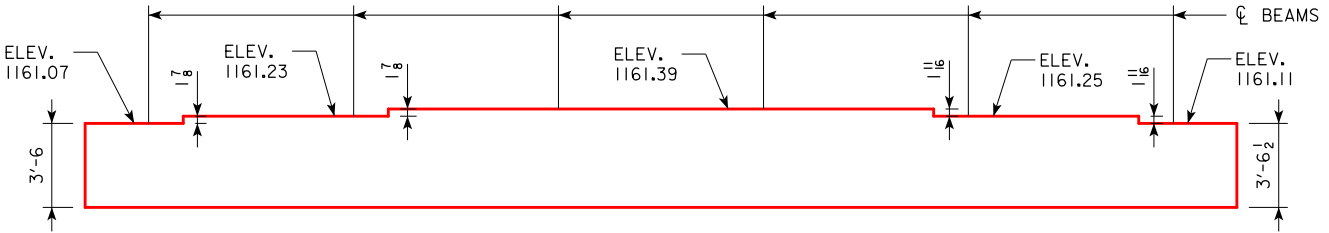
PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION

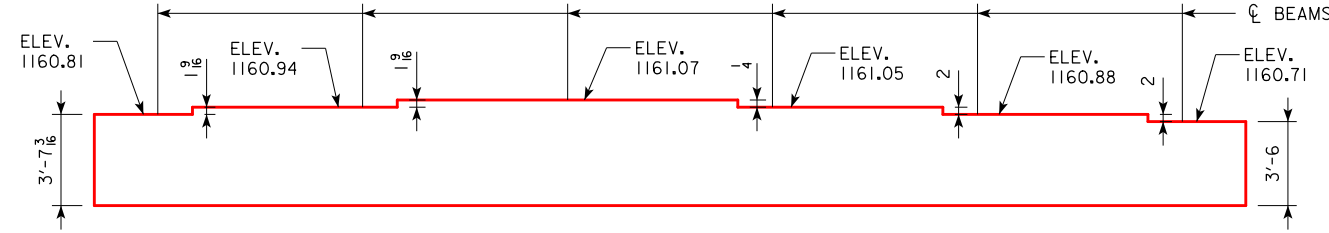
DESIGN SHEET NO. 8 OF 9FILE NO. 31633DESIGN NO. 221



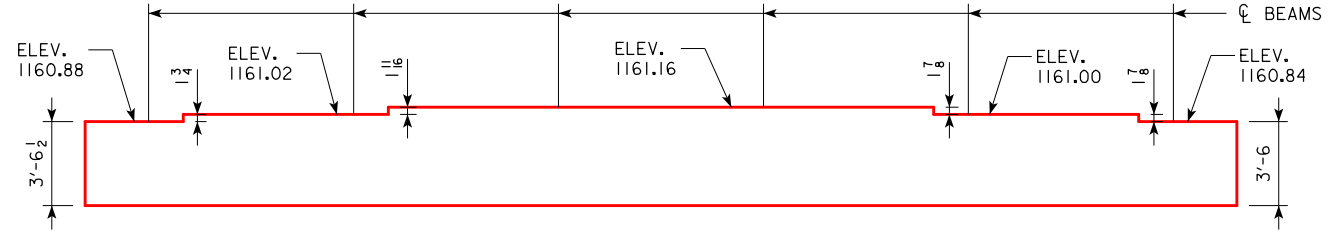
S. ABUTMENT STEP DIAGRAM
(LOOKING UP STATION)



PIER NO. 1 STEP DIAGRAM
(LOOKING UP STATION)



N. ABUTMENT STEP DIAGRAM
(LOOKING UP STATION)



PIER NO. 2 STEP DIAGRAM
(LOOKING UP STATION)

NOTE:
BRIDGE SEAT ELEVATIONS ARE SET BASED ON THEORETICAL CAMBER AND BEAM DEFLECTIONS. THESE BRIDGE SEATS WILL PROVIDE A THEORETICAL BEAM HAUNCH WITHIN DESIGN PARAMETERS. FIELD HAUNCHES ARE DETERMINED USING SURVEYED TOP OF BEAM ELEVATIONS AND "BEAM LINE HAUNCH ELEVATION" DATA. ALLOWABLE MAXIMUM AND MINIMUM "FIELD HAUNCH" VALUES ARE GIVEN IN INCHES AND DECIMALS OF FEET IN THE "MISCELLANEOUS DATA" TABLE. "CROSS SLOPE ADJUSTMENT" VALUES WILL AID THE CONTRACTOR IN DETERMINING ACTUAL FORMED HAUNCH DIMENSIONS AT THE EDGES OF THE TOP FLANGE. REFER TO DESIGN SHEET 7.

DESIGN FOR 30° SKEW (R.A.)
**213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE**
68'-3 END SPANS 77'-4 INTERIOR SPAN
BEAM SEAT ELEVATIONS
STA. 285+35.00 (1A 12) NOVEMBER, 2020
PLYMOUTH COUNTY
IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 9 OF 9 FILE NO. 31633 DESIGN NO. 221

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H40-04-14	SUPERSTRUCTURE DETAILS-MISC.
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H40-46-14	PILE BENT PIERS FOR 0° SKEW
H40-47-14	PILE BENT PIERS HP14 PILES FOR 0° SKEW
H40-48-14	PILE BENT PIERS FOR 15° SKEW
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H40-61-14	TEE PIER-HP10x57 SRL-2 PILE FOOTINGS 0° SKEW, H=16' TO 24'
H40-62-14	TEE PIER-HP10x57 SRL-2 PILE FOOTINGS 0° SKEW, H=25' TO 40'
H40-63-14	TEE PIER-SPREAD FOOTINGS, 0° SKEW, H=16' TO 24'
H40-64-14	TEE PIER-SPREAD FOOTINGS, 0° SKEW, H=25' TO 40'
H40-65-14	TEE PIER CAP AND COLUMN, 15° SKEW
H40-66-14	TEE PIER CAP AND COLUMN, 15° SKEW
H40-67-14	TEE PIER-HP10x57 SRL-1 PILE FOOTINGS, 15° SKEW, H=16' TO 24'
H40-68-14	TEE PIER-HP10x57 SRL-1 PILE FOOTINGS, 15° SKEW, H=25' TO 40'
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STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL-2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON STRUCTURAL RESISTANCE LEVELS (SRL-1 & SRL-2), SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATIONS, OFFICE OF BRIDGES AND STRUCTURES, WEBSITE.

LATEST REVISION DATE

Norman L. McQuinn
APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES

SEPTEMBER, 2014

INDEX SHEET

H40-01-14

GENERAL NOTES:

THE H40-14 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 40' ROADWAY PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES WITH LENGTHS OF 138'-10, 151'-4, 163'-10, 176'-4, 188'-10, 201'-4, 213'-10, 226'-4 AND 243'-0.

THESE BRIDGES MAY BE BUILT ON A 0°, 15°, 30° OR 45° SKEW. THESE PLANS SHOW THE BRIDGES SKEWED IN ONE DIRECTION, BUT ALL DIMENSIONS AND DETAILS WOULD BE THE SAME FOR THE OPPOSITE SKEW.

FOR CLARITY, MOST SECTIONS SHOWN ON THE FOLLOWING SHEETS ARE DRAWN WITH BARRIER RAIL ONLY. THESE SECTIONS WILL BE IDENTICAL FOR OPEN RAIL DESIGN WITH ANY MODIFICATIONS SHOWN ON SHEET H40-42-14 AND H40-43-14.

THESE BRIDGES ARE DESIGNED FOR HL93 LOADING PLUS 20 LBS.PER SQ.FT.OF ROADWAY FOR FUTURE WEARING SURFACE. CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT FOR SLAB DESIGN BASED ON PRE LRFD 2005 INTERIMS.

THE FLOOR SLAB AS SHOWN INCLUDES ½" INTEGRAL WEARING SURFACE.

THE ABUTMENTS FOR THESE BRIDGES ARE BUILT INTEGRAL WITH THE SUPERSTRUCTURE. THEREFORE, IT IS IMPORTANT THAT A PROPER JOINT FOR EXPANSION BE PROVIDED BETWEEN THE BRIDGE AND APPROACH PAVING, WHEN APPROACH PAVING IS NEEDED.

THE INTEGRAL ABUTMENT DESIGN UTILIZED ON THESE BRIDGES RESTRICTS THEIR USE IN THE FOLLOWING MANNER:

- (1) THE 201'-4, 213'-10, 226'-4 AND 243'-0 BRIDGES SHALL USE STEEL PILES AT THE ABUTMENTS.
- (2) THESE BRIDGES ARE NOT TO BE USED WHEN POINT BEARING FOR THE ABUTMENT STEEL PILING WOULD BE OBTAINED ON ROCK AT A DISTANCE LESS THAN 15 FEET FROM THE BOTTOM OF FOOTING.
- (3) THE ABUTMENT PILING ARE TO BE DRIVEN THROUGH OVERSIZED HOLES PREBORED TO A MINIMUM OF 10 FEET BELOW THE BOTTOM OF FOOTING. THE PREBORED HOLES SHALL BE IN ACCORDANCE WITH ARTICLE 2501.03, Q OF THE STANDARD SPECIFICATIONS. THE ELEVATION OF THE BOTTOM OF THE PREBORED HOLE SHALL BE SHOWN ON THE PLANS.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES ON EITHER A CREST VERTICAL CURVE OR A STRAIGHT GRADE. BECAUSE OF THE INFINITE NUMBER OF GRADE POSSIBILITIES IT WILL BE NECESSARY TO SHOW ON THE PLANS THE ABUTMENT AND PIER STEP DIMENSIONS. TO HELP IN OBTAINING THIS STEP INFORMATION SEE "EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS" ON SHEET H40-02-14.

THE ABUTMENT FOOTING AND PIER CAP CONCRETE QUANTITIES SHOWN IN THESE PLANS ARE CALCULATED BASED ON A 0.3% GRADE. FOR HIGHER GRADES, THESE CONCRETE QUANTITIES FOR BRIDGES SKEWED AT 15°, 30°, AND 45° MAY NEED TO BE INCREASED. IN ADDITION, THE LAYOUT OF THE PIER CAP STEP REINFORCING STEEL IS GRADE DEPENDENT FOR BRIDGES SKEWED AT 15°, 30°, AND 45°. SEE SHEETS H40-17-14, H40-24-14, AND H40-31-14 TO DETERMINE THE ADDITIONAL CONCRETE QUANTITIES REQUIRED AND FOR THE LAYOUT AND QUANTITY OF THE PIER CAP STEP REINFORCING STEEL.

PROVIDE TOP OF SLAB ELEVATIONS AND WING ELEVATIONS A, B AND C AS NOTED ON THE STANDARD SHEETS (LONGITUDINAL SECTION).

VARIOUS TYPES OF PIERS MAY BE USED WITH THESE STANDARDS. IT SHOULD BE NOTED THAT THE DETAILS FOR THE PIER DIAPHRAGM ON THE SUPERSTRUCTURE DEPEND ON THE TYPE OF PIER USED.

THE INTEGRAL ABUTMENTS, PILE BENTS, AND TEE PIERS FOR THESE H40 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS.

- INTEGRAL ABUTMENTS: TIMBER PILES (LIMITED BY BRIDGE LENGTH) OR HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 (SRL-1)
- PILE BENTS: STANDARD CONCRETE-FILLED STEEL PIPE PILES (PIOL), STANDARD PRESTRESSED CONCRETE PILES (PIOL), OR STANDARD H-PILES (PIOL AND SRL-1)
- TEE PIERS: HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 OR 2 (SRL-1 OR SRL-2) OR SPREAD FOOTINGS

STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL 2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON SRL-1 AND SRL-2, SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATION, OFFICE OF BRIDGES AND STRUCTURES WEB SITE.

BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED IOWA STATE UNIVERSITY RESEARCH, FOR PILE FOUNDATIONS THE DESIGNER WILL NEED TO DETERMINE THE CONSTRUCTION CONTROL METHOD, CONTRACT LENGTH, AND DRIVING TARGET AND GIVE THAT INFORMATION ON THE FRONT SHEET OF THE PLANS. BRIDGE DESIGN MANUAL CADD NOTES E177, E718, E719, E818, AND E819 ARE APPROPRIATE FOR THAT PURPOSE. THE NOTES, AS WELL AS THE BRIDGE DESIGN MANUAL AND DESIGN EXAMPLES, ARE AVAILABLE ON THE OFFICE OF BRIDGES AND STRUCTURES WEB SITE: [HTTP://WWW.IOWADOT.GOV/BRIDGE/INDEX.HTM](http://www.iowadot.gov/bridge/index.htm).

THESE STANDARDS ARE USING NON-COATED, EPOXY COATED AND STAINLESS STEEL REINFORCING BARS. THE DESIGNER SHOULD NOTE WHERE THESE DIFFERENT TYPES OF BARS ARE USED THROUGHOUT THESE STANDARDS.

FOR PIERS SUBJECT TO SCOUR THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION. SCOUR ELEVATION SHALL BE SHOWN ON THE FRONT SHEET.

CONCRETE INTERMEDIATE DIAPHRAGMS SHALL BE USED FOR OVERPASS BRIDGES. THE DESIGNER SHALL ADJUST THE CONCRETE AND REINFORCING QUANTITIES ACCORDINGLY.

3" WING PVC PIPE IS INCIDENTAL TO STRUCTURAL CONCRETE.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5d1 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4th Ed, SERIES OF 2007.
REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 3,500 PSI.
FOR STANDARD PRESTRESSED CONCRETE BEAMS, SEE SHEETS H40-32-14 THRU H40-37-14

SPECIFICATIONS:

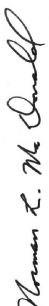
DESIGN:
AASHTO LRFD 4th Ed, SERIES OF 2007.

CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2012, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.


THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES. HOWEVER, THE FOLLOWING ADDITIONAL INFORMATION IS REQUIRED FOR USE ON PRIMARY ROUTES. FOR SECONDARY ROUTES THE ENGINEER MAY NOT REQUIRE ALL SHEETS TO BE PROVIDED:

1. TITLE SHEET WITH ENGINEERS SEAL
2. ESTIMATED QUANTITIES TOTALS INCLUDING CLASS 20 EXCAVATION FOR BRIDGE
3. SUMMARY QUANTITIES SHEET
4. SITUATION PLAN LAYOUT OF BRIDGE
5. TOP OF SLAB ELEVATIONS LAYOUT
6. BOTTOM OF ABUTMENT FOOTING ELEVATIONS
7. BOTTOM OF PIER CAP ELEVATIONS
8. PILING DESIGN INFORMATION
9. SLOPE PROTECTION LAYOUT IF NEEDED
10. CONDUIT LAYOUT
11. LIGHTING LAYOUT IF NEEDED

LATEST REVISION DATE



APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES

SEPTEMBER, 2014

GENERAL NOTES

H40-01A-14

EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

THE DESIGNER SHALL SHOW ON THE PLANS THE 6 ELEVATIONS AND THE 5 STEP DIMENSIONS REQUIRED FOR EACH OF THE PIER TOP AND ABUTMENT BRIDGE SEATS.

THE BOXED IN DETAILS IN THE FOLLOWING EXAMPLES SHOW HOW THE INFORMATION SHOULD BE INDICATED ON THE PLANS.

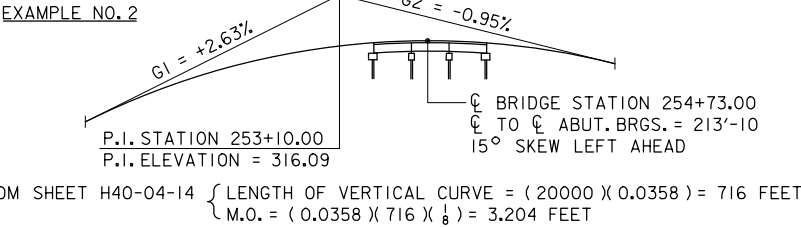
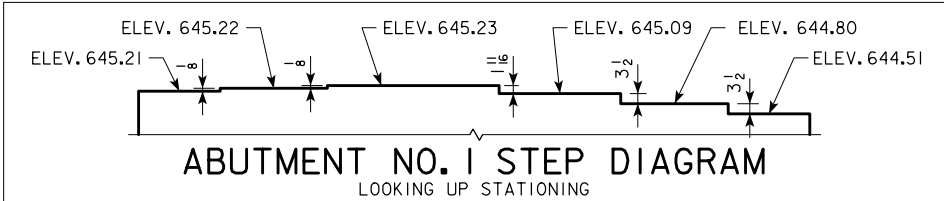
EXAMPLE NO. 1
A STRAIGHT GRADE OF -3.25% WITH THE P.I. STATION OF 103+75.00 AND ELEVATION OF 653.29. THE BRIDGE LENGTH IS 213'-10" CL TO CL OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

STATIONS					
CL BRIDGE STA.	=	105+85.00			
± 1/2 OF L2	±	38.67			
CL PIER BRGS.	=	105+46.33	106+23.67		
± LI	-	68.25	+ 68.25		
CL ABUTMENT BRGS.		104+78.08	106+91.92		

ELEVATIONS ALONG PROFILE GRADE LINE (P.G.L. ELEV.)					
CL ABUT. BRG. =	653.29-[(104+78.08)-(103+75.00)](0.0325) =	649.94			
CL PIER BRG. =	653.29-[(105+46.33)-(103+75.00)](0.0325) =	647.72			
CL PIER BRG. =	653.29-[(106+23.67)-(103+75.00)](0.0325) =	645.21			
CL ABUT. BRG. =	653.29-[(106+91.92)-(103+75.00)](0.0325) =	642.99			

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING
(BEAM SPACING X TAN. SK.Δ)(GRADE) = (7.401) TAN 30°(0.0325) = 0.14'

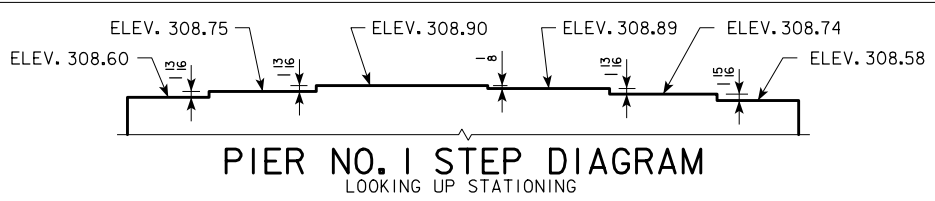
ABUTMENT NO. 1						
BEAMS	EXTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	EXTERIOR
PGL ELEV.	649.94	649.94	649.94	649.94	649.94	649.94
SK. ΔCORRECT	+35	+21	+07	-0.07	-0.21	-0.35
SLAB CROWN	-0.34	-0.19	-0.04	-0.04	-0.19	-0.34
TOP SLAB ELEV.	649.95	649.96	649.97	649.83	649.54	649.25
- "U" (4'-8 1/8)	-4.74	-4.74	-4.74	-4.74	-4.74	-4.74
BR. SEAT ELEV.	645.21	645.22	645.23	645.09	644.80	644.51



STATIONS					
CL BRIDGE STA.	=	254+73.00			
± 1/2 OF L2	±	38.67			
CL PIER BRGS.	=	254+34.33	255+11.67		
± LI	-	68.25	+ 68.25		
CL ABUTMENT BRGS.	=	253+66.08	255+79.92		

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING
(BEAM SPACING X TAN. SK.Δ)(GRADE) = (7.401) TAN 15° = 1.98'

PIER NO. 1						
BEAMS	EXTERIOR	INTERIOR	INTERIOR	INTERIOR	INTERIOR	EXTERIOR
STATION	254+39.28	254+37.30	254+35.32	254+33.34	254+31.36	254+29.38
PGL ELEV.	+313.55	+313.55	+313.55	313.54	313.54	313.53
SLAB CROWN	-0.34	-0.19	-0.04	-0.04	-0.19	-0.34
TOP SLAB ELEV.	313.21	313.36	313.51	313.50	313.35	313.19
- "U" (4'-7 5/8)	-4.61	-4.61	-4.61	-4.61	-4.61	-4.61
BR. SEAT ELEV.	308.60	308.75	308.90	308.89	308.74	308.58



TEE PIER NOTES:

THE TEE PIERS SHOWN IN THESE PLANS ARE DESIGNED FOR USE WITH THE H40-14 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS. THE PIER MAY BE USED FOR EITHER GRADE SEPARATION OR STREAM CROSSING STRUCTURES. THE PIERS WERE DESIGNED FOR THE FOLLOWING STREAM FORCE AND ICE LOADING CONDITIONS, AND SHOULD NOT BE USED WHERE THESE LOADING CONDITIONS ARE EXCEEDED.

ICE FORCE:
ICE FORCES WERE APPLIED AT A HEIGHT OF H/2 + 1'-6" ABOVE THE BOTTOM OF THE PIER FOOTING, WHERE H IS THE OVERALL HEIGHT OF PIER. THE EFFECTIVE ICE STRENGTH WAS 24 KSF FOR 1'-7" OF ICE DEPTH. A PRIMARY ICE FORCE (F) WAS CALCULATED ACCORDING TO THE LRFD SPECIFICATIONS AND APPLIED TO THE PIER STEM AS FOLLOWS:
CASE 1: 100% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 15% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.
CASE 2: 50% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 34% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.

STREAM FLOW:
THE STREAM VELOCITY USED WAS 5 FT/SEC WITH THE C_D COEFFICIENT EQUAL TO 1.4. THE RESULTING STREAM FORCE WAS ASSUMED TO ACT PARALLEL TO THE PIER'S LONG AXIS. IT WAS ASSUMED THAT SUPERSTRUCTURE ELEMENTS WILL CLEAR HIGH WATER BY APPROXIMATELY 3'-0".

FOOTING GEOMETRY:
IT WAS ASSUMED THAT THE PIER FOOTING WILL BE SET APPROXIMATELY 6'-0" BELOW THE ADJACENT STREAMBED OR GROUND SURFACE. IT WAS ALSO ASSUMED THAT THERE ARE NO SIGNIFICANT UNBALANCED EARTH PRESSURES APPLIED TO THE PIER.


ALL BRIDGES WITH TEE PIERS DETAILED ON THESE STANDARDS ARE INTENDED TO HAVE ONE FIXED PIER AND ONE EXPANSION PIER. THE PILE LAYOUT AND REINFORCEMENT SHOWN ARE THE SAME FOR EITHER FIXED OR EXPANSION PIER. THE ONLY DISTINCTION BETWEEN FIXED PIER AND EXPANSION PIER LIES IN THE SELECTION OF BEARINGS AND PRESENCE OF THE KEYWAY IN THE TOP OF THE CAP. EACH BRIDGE SHALL HAVE ONE SET OF FIXED BEARINGS AND ONE SET OF EXPANSION BEARINGS, WHICH MAY BE USED ON EITHER PIER 1 OR PIER 2. THE KEYWAY IN THE TOP OF THE CAP SHOULD BE ELIMINATED FROM THE EXPANSION PIER.

HP10x57 STEEL PILE SHALL BE USED IN THE PILE FOOTINGS OF THE PIERS FOR EITHER FRICTION OR POINT BEARING PILE CONDITIONS. FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK. NOMINAL STRUCTURAL RESISTANCE WAS TAKEN AS 243 KIPS FOR HP10x57 SRL-1 FRICTION BEARING PILES AND 365 KIPS FOR HP10x57 SRL-2 POINT BEARING PILES. A NOMINAL UPLIFT RESISTANCE OF 42 KIPS PER PILE WAS USED IN THE DESIGN OF THE PIER FOOTINGS. THE PIER SHALL NOT BE USED AT SITES WHERE THIS UPLIFT FORCE CANNOT BE ACHIEVED DUE TO SPECIFIC CONDITIONS SUCH AS NEAR SURFACE ROCK LAYERS.

WHEN PIERS ARE USED IN GRADE SEPARATION STRUCTURES, EPOXY COATED REINFORCEMENT MAY BE REQUIRED FOR PIER COLUMNS. CONSULT CURRENT POLICY FOR GUIDANCE ON THE USE OF EPOXY COATED REINFORCEMENT IN SUCH CASES. ADJUST THE d1 COLUMN BAR PROJECTION INTO THE CAP AND d1/d2 LAP DISTANCE ACCORDINGLY.

LATEST REVISION DATE

Norman L. McDaniel
APPROVED BY BRIDGE ENGINEER

 Highway Division

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
SEPTEMBER, 2014

GENERAL INFORMATION

H40-02-14

GENERAL NOTES:

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

ALL REINFORCING BARS ARE TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.

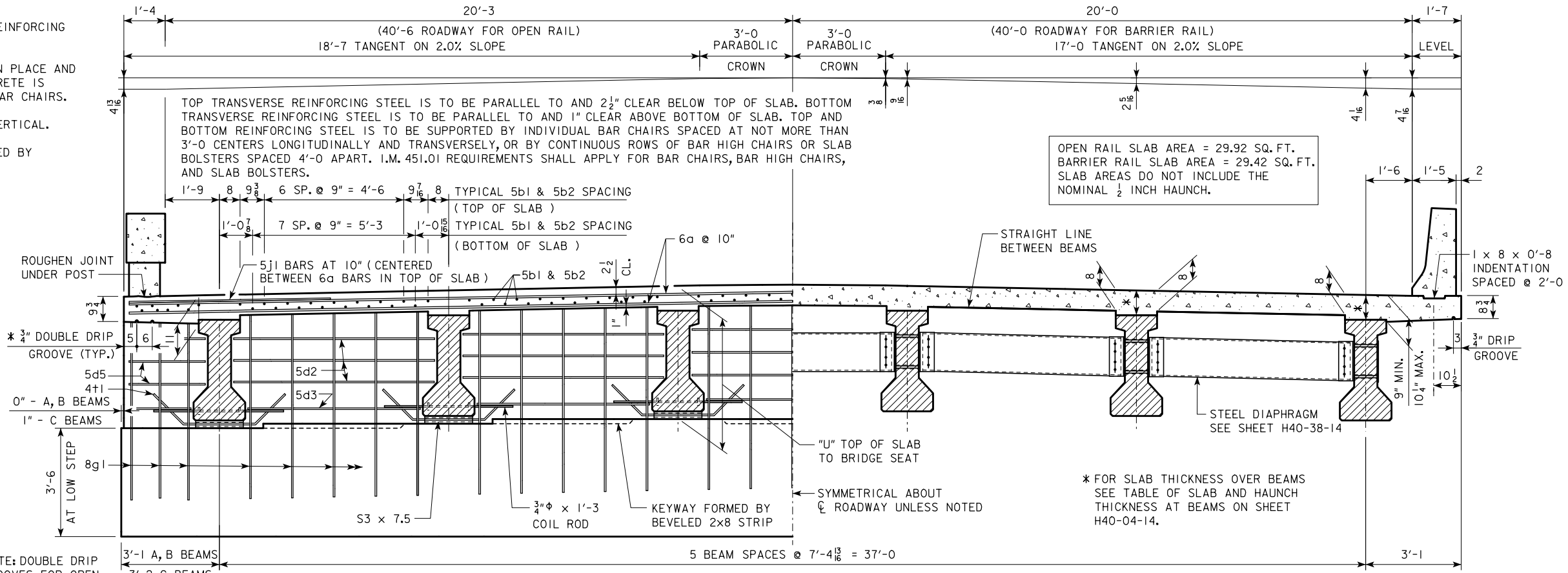
FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

WEIGHT OF DRAINS IS INCLUDED IN THE STRUCTURAL STEEL QUANTITY.

THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE FLOOR SLAB.

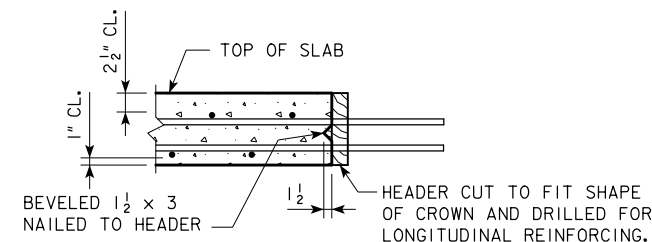
ALL REINFORCING STEEL IS TO BE GRADE 60.

COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".

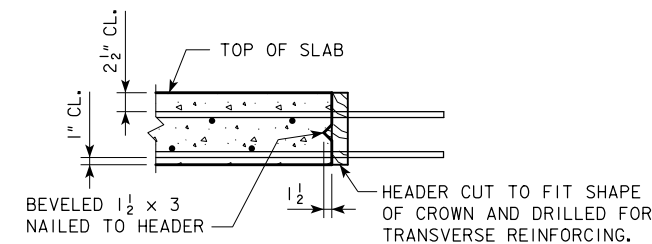


HALF SECTION NEAR ABUTMENT
(OPEN RAIL SHOWN)

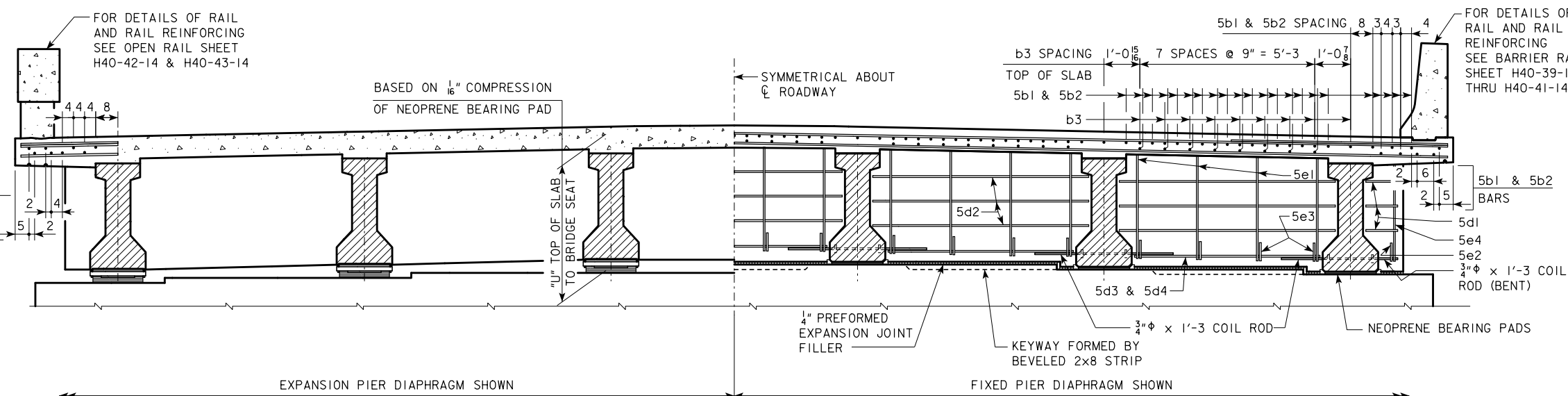
HALF SECTION NEAR MID SPAN
(BARRIER RAIL SHOWN)



TRANSVERSE SLAB
CONSTRUCTION JOINT



LONGITUDINAL SLAB
CONSTRUCTION JOINT



SECTION NEAR PIER

LENGTH OF S3 x 7.5 (ABUTMENT BEAM SEAT)	
BEAM BOTTOM FLANGE WIDTH	LENGTH OF S3 x 7.5
1'-5	1'-3 1/2
1'-8	1'-6 1/2

LATEST REVISION DATE

Norman L. McDaniel
APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

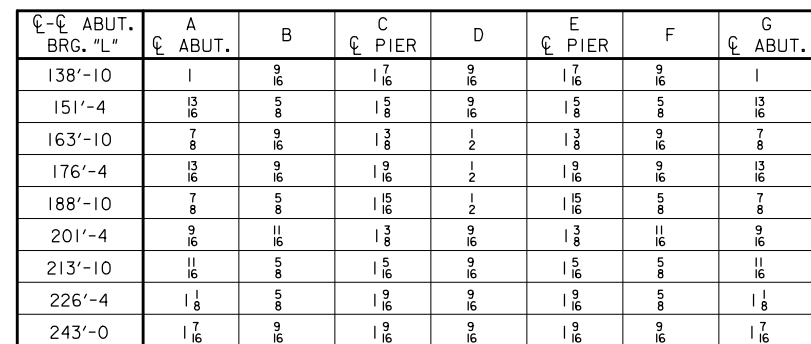
STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE

**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**

SEPTEMBER, 2014

SUPERSTRUCTURE DETAILS

H40-03-14

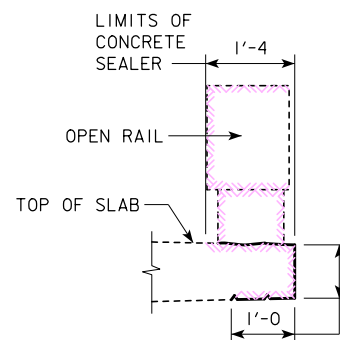


(G1-G2) IS THE ALGEBRAIC DIFFERENCE OF THE APPROACH GRADES EXPRESSED IN DECIMAL FORM. G1 NEED NOT HAVE THE SAME VALUE AS G2. MAXIMUM VALUE OF G1 OR G2 IS 5%. LENGTH OF CURVE AND M.O. ARE IN FEET.

Figure 10.10 illustrates a typical cross-section of a continuous slab bridge. The bridge consists of three spans: a first span of length L_1 , a second span of length L_2 , and a third span of length L_1 . The bridge is supported by two piers (labeled C and E) and two abutments (labeled A and G). The slab is shown with a cross-section of 8 units. The beam haunch is indicated between the piers. The total length of the bridge is labeled as "L" CL-CL ABUTMENT BEARING.

℄-℄ ABUT. BRG. "L"	A ℄ ABUT.	B	C ℄ PIER	D	E ℄ PIER	F	G ℄ ABUT.
138'-10	1 1/16	1 2	1 5/8	9/16	1 5/8	1 2	1 1/16
151'-4	7/8	9/16	1 1/16	1 2	1 1/16	9/16	7/8
163'-10	15/16	1 2	1 5/8	1 2	1 5/8	1 2	15/16
176'-4	15/16	1 2	1 7/8	1 2	1 7/8	1 2	15/16
188'-10	1	9/16	2 5/16	9/16	2 5/16	9/16	1
201'-4	3/4	5/8	1 3/4	9/16	1 3/4	5/8	3/4
213'-10	7/8	1 2	1 3/4	1 2	1 3/4	1 2	7/8
226'-4	1 5/16	1 2	2 1/16	9/16	2 1/16	1 2	1 5/16
243'-0	1 7/8	1 2	2 1/16	9/16	2 1/16	1 2	1 7/8

SLAB AND HAUNCH THICKNESS AT BEAMS FOR STRAIGHT GRADE



CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP, EDGE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAIL ON THE TOP, TRAFFIC FACE SIDE, BOTTOM OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

Figure 1 is a cross-sectional diagram of a concrete curb and gutter. The curb has a height of 9 3/4 inches and a top width of 12 inches. The gutter is 5 inches wide and 6 inches deep. The concrete has a strength of 3,000 psi. The diagram also shows a 'STRAIGHT LINE' and a 'STRAIGHT LINE BETWEEN HAUNCHES'.

Diagram illustrating the cross-section of a T-beam with dimensions and reinforcement details:

- Dimensions:**
 - Slab width: 1000
 - Slab thickness: 150
 - Stem width: 300
 - Stem height: 300
 - Total height: 450
- Reinforcement Details:**
 - Top reinforcement (circles with crosses) is placed in the slab.
 - Bottom reinforcement (circles with dots) is placed in the stem.
 - Development length for top bars is indicated as 150.
 - Development length for bottom bars is indicated as 100.

MS & OPEN RAIL

STRAIGHT LINE BETWEEN HAUNCHES

1'-7" LEVEL

MIN. 9"

MAX. 10 1/4"

TOP OF SLAB

3/4" DRIP GROOVE

3"

STRAIGHT LINE

TYPICAL SLAB AND HAUNCH DETAIL

NOTE: THE SLAB THICKNESS (T) AT THE BEAMS, (8" SLAB PLUS HAUNCH) IS BASED ON THE ANTICIPATED BEAM CAMBER REMAINING AFTER PLACING THE SLAB, BUT IS NOT GUARANTEED FOR CONSTRUCTION. IF BEAM IS UNDER CAMBERED INCREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F). IF THE BEAM IS OVER CAMBERED DECREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F) TO A MAXIMUM OF $\frac{1}{2}$ " EMBEDMENT IN THE SLAB. IF MORE THAN $\frac{1}{2}$ " EMBEDMENT IS REQUIRED OR IF THE HAUNCH EXCEEDS $2\frac{1}{2}$ " THE GRADE LINE IS TO BE REVISED.



Technical drawing of a drain detail showing top, side, and cross-sectional views with dimensions and annotations.

Top View: Shows a rectangular drain opening with a radius $R=1'-0"$ on one side. Dimensions include a total width of $4'$, a distance of $2'$ from the edge to the start of the radius, and a distance of $1'$ from the centerline to the edge of the drain. A note indicates a "1" DEPRESSION IN SLAB CONCRETE AT DRAIN".

Side View: Shows the drain opening with a depth of $1'-0"$. A note indicates a "1" DEPRESSION IN SLAB CONCRETE AT DRAIN".

Detail View: A circular detail view showing the connection between the drain and the slab. It shows a $1 \times \frac{1}{8} \times 0'-10"$ plate welded on opposite sides of the drain to serve as an anchor. The plate has a width of $3\frac{1}{2}"$ and a thickness of $\frac{1}{8}"$. The distance from the centerline to the edge of the plate is $1'-2"$.

Bottom View: Shows the drain opening with a width of $4'$ and a depth of $1'-0"$. A note indicates a "1" DEPRESSION IN SLAB CONCRETE AT DRAIN".

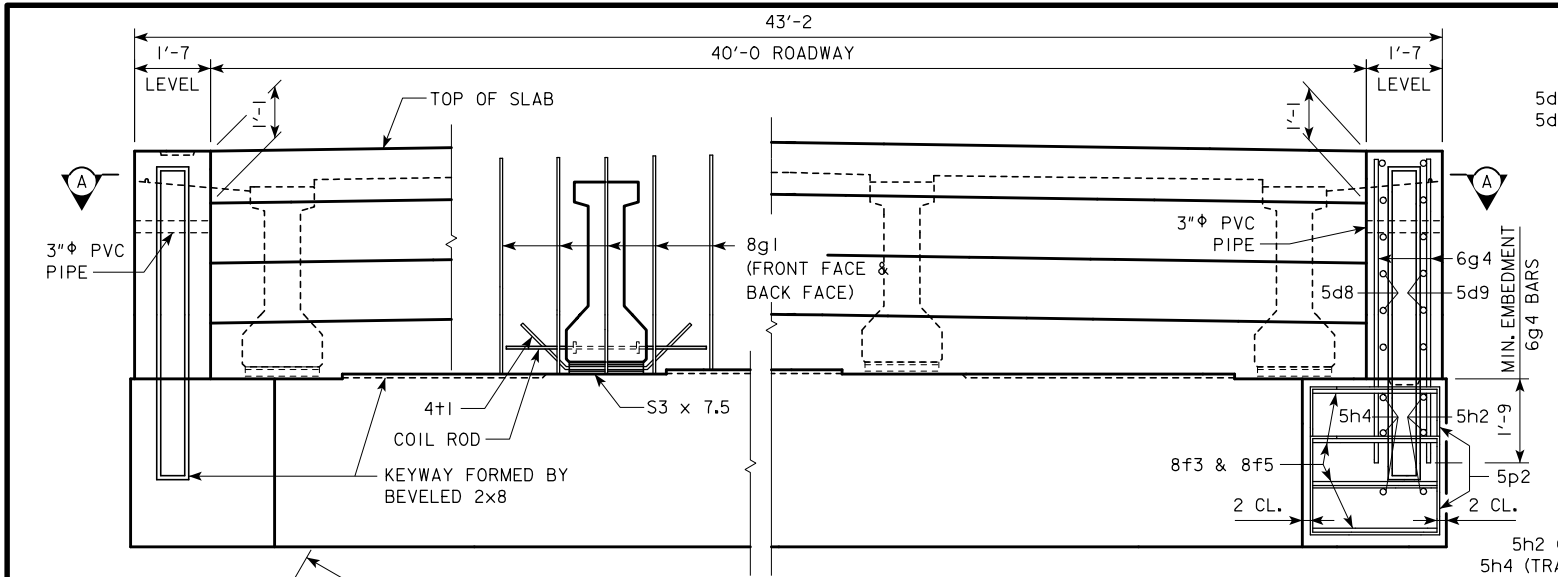
Annotations:

- $1 \times \frac{1}{8} \times 0'-10"$ WELDED ON OPPOSITE SIDES OF DRAIN TO SERVE AS ANCHOR.
- $L \ 1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8} \times 0'-4"$ WELDED TO BOTH SIDES OF DRAIN WITH $2 - \frac{1}{4}"$ HOLES IN EACH OUTSTANDING LEG FOR NAILING TO FORMS.
- $\frac{1}{4}"$ STEEL PLATE (WELDED) OR 4×8 OUTSIDE DIMENSION ROLLED TUBE WITH $\frac{1}{4}"$ WALL THICKNESS.
- $1'-0"$ MIN.

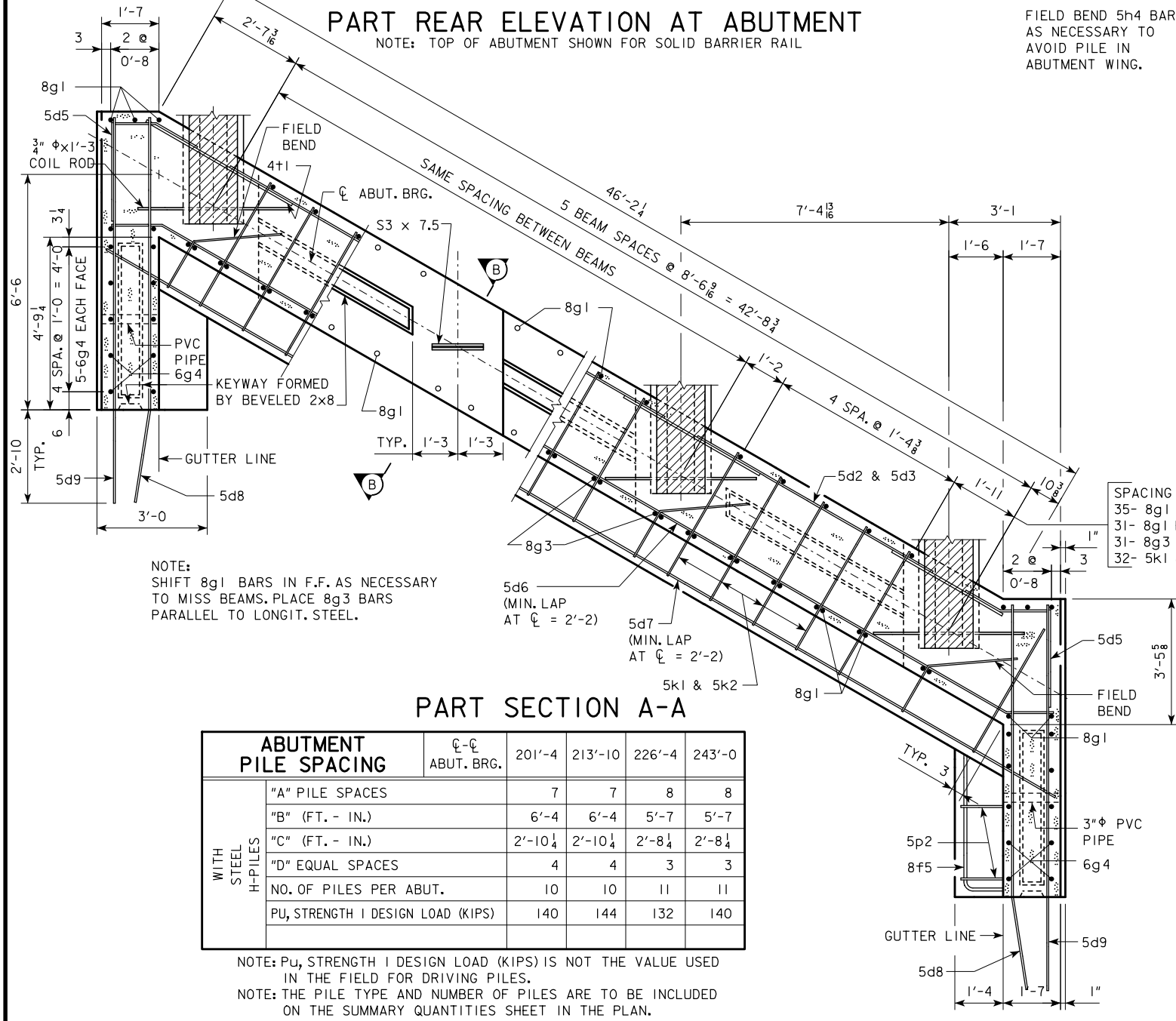
USE FOR BARRIER RAIL ONLY.
NOT REQUIRED FOR OPEN RAIL.

NOTE :
DRAINS ARE TO BE GALVANIZED AFTER FABRICATION.
SEE " SITUATION SKETCH " FOR LOCATION OF DRAINS.
WEIGHT OF DRAINS IS INCLUDED IN THE QUANTITY
FOR " STRUCTURAL STEEL " ON THE SUMMARY QUANTITIES
SHEET IN THE PLAN. WEIGHT IS BASED ON ROLLED TUBE.

DATA FOR ONE DRAIN			
BEAM SIZE	A	B	C
WT. LBS.	85	96	106
LENGTH FT.	4'-4 $\frac{3}{4}$	4'-11 $\frac{3}{4}$	5'-5 $\frac{3}{4}$

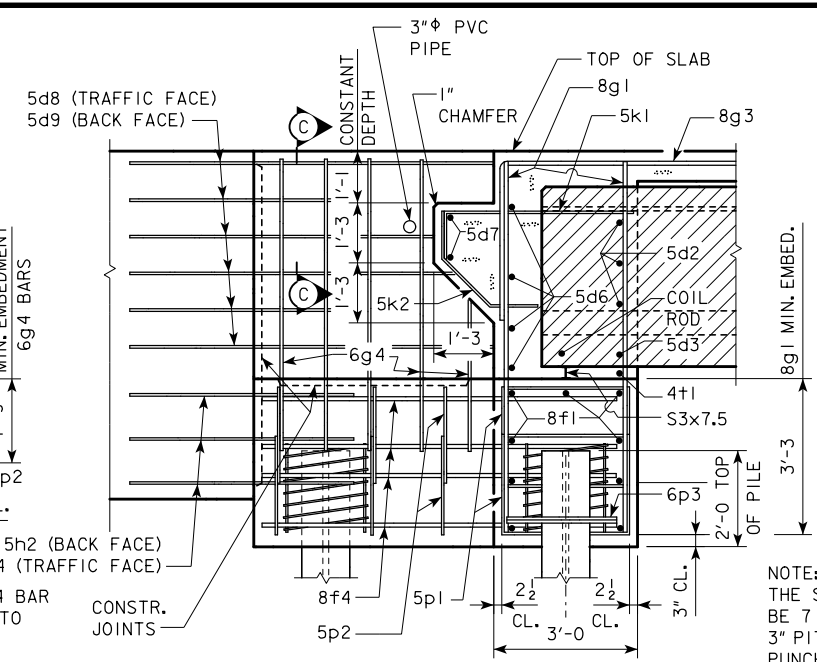


PART REAR ELEVATION AT ABUTMENT
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



ABUTMENT PILE SPACING		CL-CL ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES		7	7	8	8
	"B" (FT. - IN.)		6'-4	6'-4	5'-7	5'-7
	"C" (FT. - IN.)		2'-10 1/4	2'-10 1/4	2'-8 1/4	2'-8 1/4
	"D" EQUAL SPACES		4	4	3	3
	NO. OF PILES PER ABUT.		10	10	11	11
	PU, STRENGTH I DESIGN LOAD (KIPS)		140	144	132	140

NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.
NOTE: THE PILE TYPE AND NUMBER OF PILES ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.



PART SECTION B-B

ABUTMENT NOTES:
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

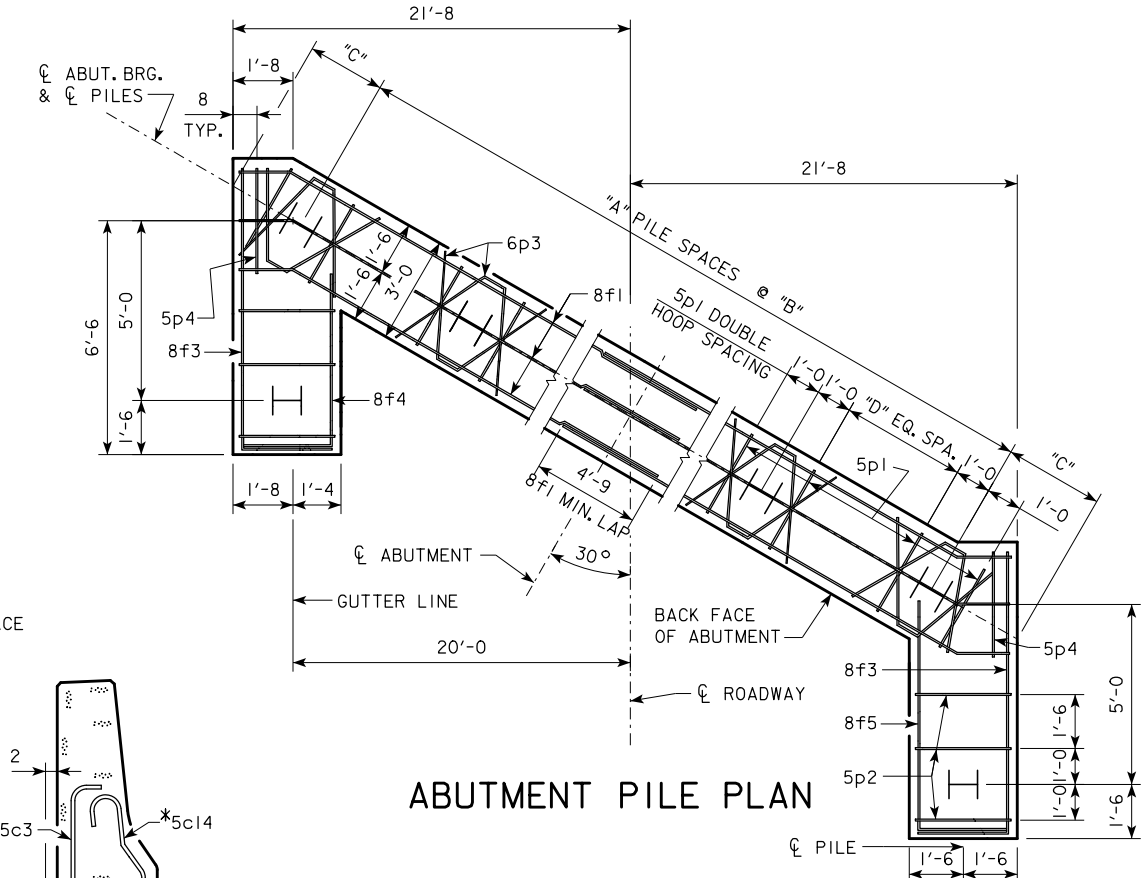
IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

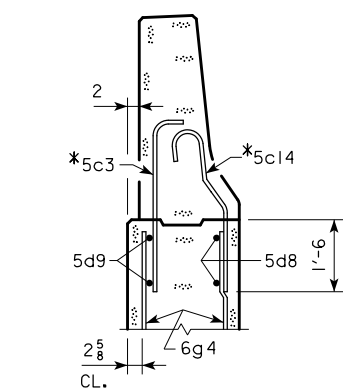
BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

NOTE:
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L 7/8 x 7/8 x 1/8 SPACERS PUNCHED TO HOLD SPIRAL.



ABUTMENT PILE PLAN



PART SECTION C-C

* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN BARRIER RAIL QUANTITIES.

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		ABUTMENT DETAILS 30° SKEW C BEAMS	
		H40-19-14	

PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEET

APPENDIX

BAR

(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H40-38-14.)

LITTER

(REQUIRED AT ONE

62 KEYWAY FORMED

NOTE:

DETAILS

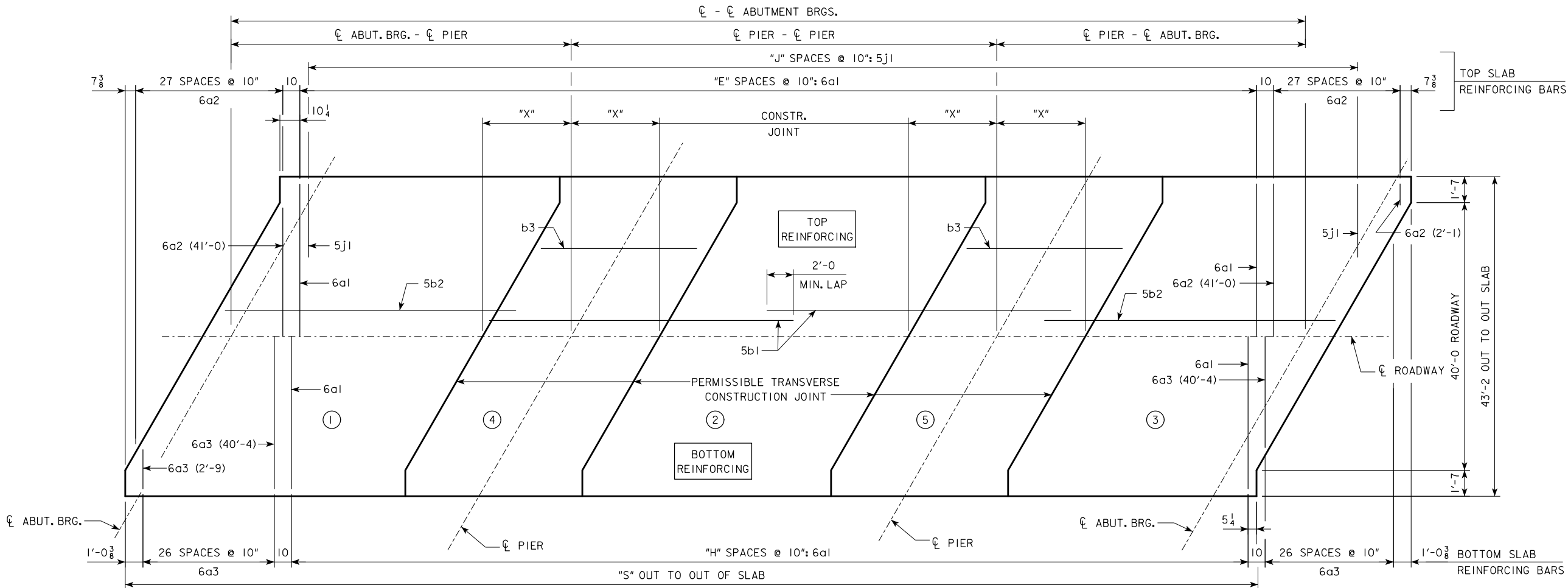
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PRETENSIONED, PRESTRESSED

SEPTEMBER, 2014

1. *Journal of the American Medical Association*, 1997; 278: 1039-1044.

REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.



SLAB LAYOUT
(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN	NO.	6-A50	6-A55	6-B59	6-B63	6-B67	6-C71	6-C75	6-C80	6-C80	
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN	NO.	12-A42	12-A46	12-B50	12-B55	12-B59	12-C63	12-C67	12-C71	12-C80	
CONCRETE RAIL (BARRIER OR OPEN)	L.F.	312.6	337.6	362.6	387.6	412.6	456.7	481.7	506.7	540.0	
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS	NO.	30	30	32	34	34	-----	-----	-----	-----	
NO. OF STEEL H-PILES FOR TWO ABUTMENTS (HP 10 x 57)	NO.	14	14	14	14	16	20	20	22	22	
PREBORED HOLES (w/ WOOD PILES)	L.F.	300	300	320	340	340	-----	-----	-----	-----	
PREBORED HOLES (w/ STEEL H-PILES)	L.F.	140	140	140	140	160	200	200	220	220	
WING ARMORING	S.Y.	3.6	3.6	3.6	3.6	3.6	5.7	5.7	5.7	5.7	

NOTE:
FOR QUANTITIES OF STRUCTURAL CONCRETE, REINFORCING STEEL AND STRUCTURAL STEEL, REFER
TO THE SUMMARY QUANTITIES SHEET IN THE BRIDGE PLANS.

Δ NOTE:
CONCRETE QUANTITIES SHALL BE LISTED ON THE SUMMARY QUANTITIES SHEET.

Δ CONCRETE PLACEMENT QUANT.		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCLUDING HAUNCH, ABUT. DIAPHRAGM, & WINGWALLS** , SECTIONS 1 & 3	WITH BARRIER RAIL	C.Y.	124.0	132.0	146.2	154.4	162.4	180.2	188.4	197.0	216.2
	WITH OPEN RAIL	C.Y.	125.3	133.4	147.8	156.1	164.2	182.1	190.4	199.1	218.6
SLAB INCLUDING HAUNCH, SECTION 2	WITH BARRIER RAIL	C.Y.	43.5	47.0	50.5	54.0	57.3	61.1	64.6	68.1	68.1
	WITH OPEN RAIL	C.Y.	44.2	47.8	51.3	54.9	58.3	62.1	65.6	69.2	69.2
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	WITH BARRIER RAIL	C.Y.	52.8	55.2	62.0	64.4	67.2	72.2	74.4	76.8	76.8
	WITH OPEN RAIL	C.Y.	53.3	55.7	62.6	65.0	67.8	72.8	75.1	77.5	77.5
ABUTMENT WINGS		C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***		C.Y.	39.1	39.1	38.9	38.8	38.8	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***		C.Y.	40.8	40.8	40.8	40.8	40.8	48.4	48.4	48.4	48.4

GENERAL DATA		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8	3'-7 ¹³ ₁₆	4'-2 ⁷ ₈	4'-2 ¹³ ₁₆	4'-2 ⁷ ₈	4'-8 ⁹ ₁₆	4'-8 ¹¹ ₁₆	4'-9 ⁸ ₈	4'-9 ⁷ ₁₆
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 ³ ₈	3'-6 ⁹ ₁₆	4'-1 ⁵ ₁₆	4'-1 ¹ ₂	4'-1 ⁷ ₈	4'-7 ⁵ ₁₆	4'-7 ¹ ₄	4'-7 ¹ ₂	4'-7 ¹ ₂
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 ¹ ₁₆	3'-7 ⁷ ₈	4'-2 ¹⁵ ₁₆	4'-2 ¹⁵ ₁₆	4'-3	4'-8 ³ ₄	4'-8 ⁷ ₈	4'-9 ⁵ ₁₆	4'-9 ⁷ ₈
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 ⁹ ₁₆	3'-6 ³ ₄	4'-1 ⁹ ₁₆	4'-1 ¹³ ₁₆	4'-2 ¹ ₄	4'-7 ¹¹ ₁₆	4'-7 ¹¹ ₁₆	4'-8	4'-8
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	446.0	480.7	549.2	585.8	622.7	743.2	784.2	825.8	866.1
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	264.7	274.5	283.9	293.1	302.2	311.0	322.9	341.9	362.6
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	141	156	171	186	201	216	231	246	266
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	142	157	172	187	202	217	232	247	267
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	165	180	195	210	225	240	255	270	290
OUT TO OUT OF SLAB		"S"	142'-3 ⁵ ₈	154'-9 ⁵ ₈	167'-3 ⁵ ₈	179'-9 ⁵ ₈	192'-3 ⁵ ₈	204'-9 ⁵ ₈	217'-3 ⁵ ₈	229'-9 ⁵ ₈	246'-5 ⁵ ₈
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR ¹₁₆ INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3¹₁₆ INCHES TO "U" VALUES SHOWN.

** WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.

LATEST REVISION DATE

07-15

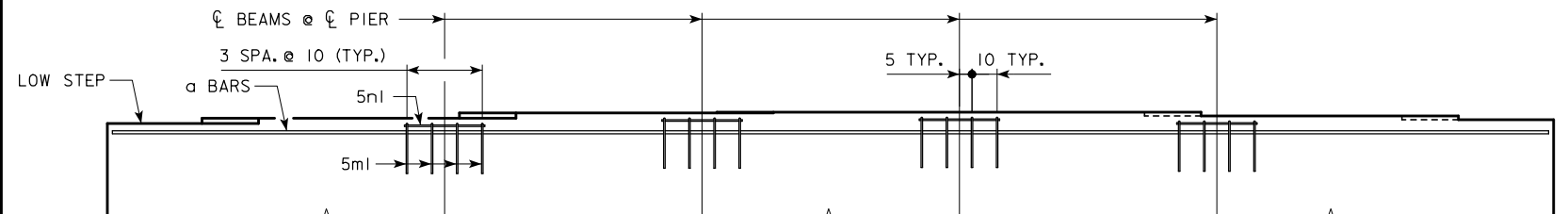
APPROVED BY BRIDGE ENGINEER
Norman L. McDaniel



STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
SEPTEMBER, 2014

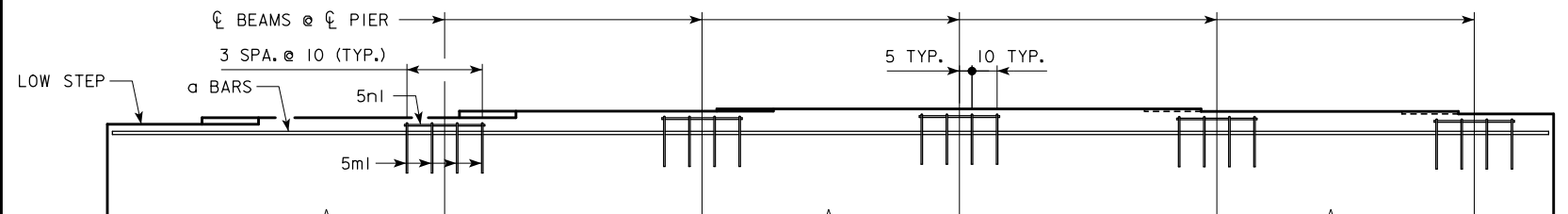
SUPERSTRUCTURE DETAILS
30° SKEW

H40-22-14



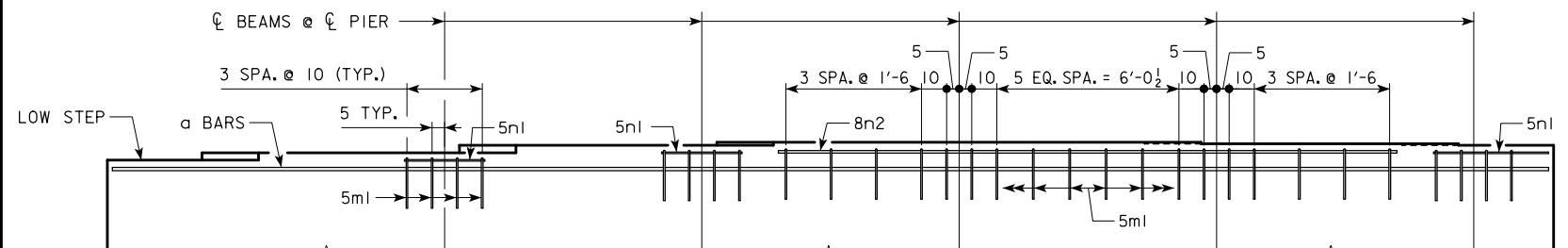
PART ELEVATION VIEW OF PIER CAP

GRADE (G): $G \leq 0.6\%$



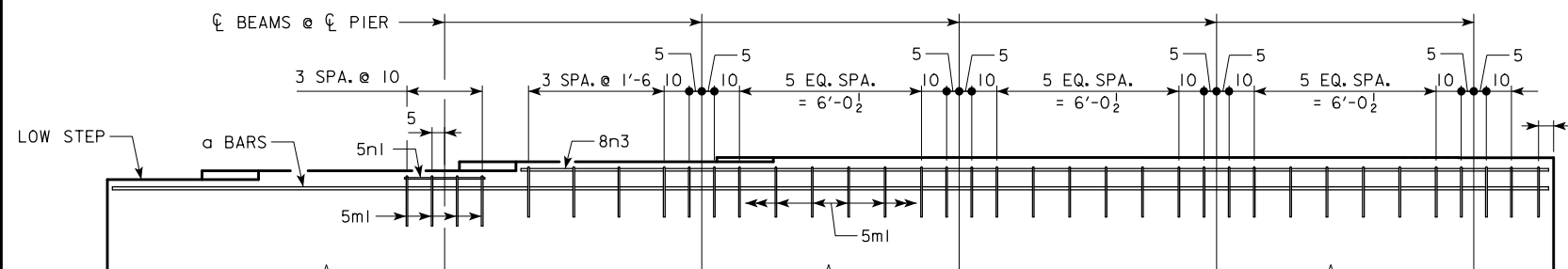
PART ELEVATION VIEW OF PIER CAP

GRADE (G): $0.6\% < G \leq 1.6\%$



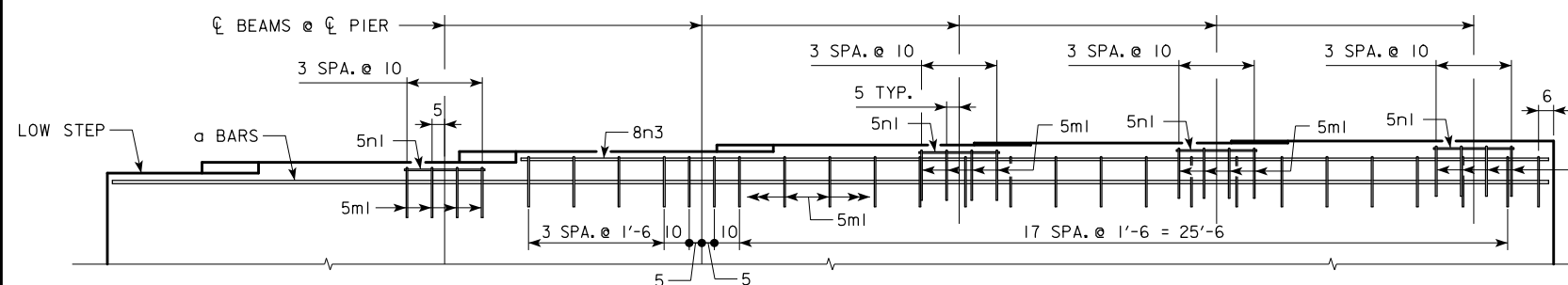
PART ELEVATION VIEW OF PIER CAP

GRADE (G): $1.6\% < G \leq 2.3\%$



PART ELEVATION VIEW OF PIER CAP

GRADE (G): $2.3\% < G \leq 3.4\%$



PART ELEVATION VIEW OF PIER CAP

GRADE (G): $3.4\% < G \leq 5.0\%$

STEP REINFORCING BAR LIST ONE TEE PIER

BAR	LENGTH	SHAPE	G ≤ 0.6%			0.6% < G ≤ 1.6%			1.6% < G ≤ 2.3%			2.3% < G ≤ 3.4%			3.4% < G ≤ 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5n1	6'-10		16	5	114	20	5	143	30	5	214	36	5	257	41	5	292
5n1	2'-8		16	5	45	20	5	56	12	5	33	4	5	11	16	5	45
8n2	22'-4		--	--	--	--	--	--	4	8	239	--	--	--	--	--	--
*8n3	VARIES		--	--	--	--	--	--	--	--	--	4	8	373	4	8	373
TOTAL (LB.)			159			199			486			641			710		

G = GRADE (%)

*8n3 BARS VARY FROM 34'-2 TO 35'-9

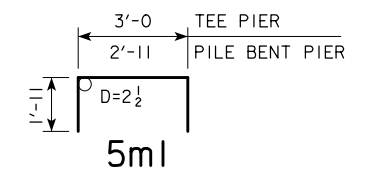
STEP REINFORCING BAR LIST ONE PILE BENT PIER

BAR	LENGTH	SHAPE	G ≤ 0.6%			0.6% < G ≤ 1.6%			1.6% < G ≤ 2.3%			2.3% < G ≤ 3.4%			3.4% < G ≤ 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5n1	6'-9		16	5	113	20	5	141	30	5	211	36	5	253	41	5	289
5n1	2'-8		16	5	45	20	5	56	12	5	33	4	5	11	16	5	45
8n2	22'-4		--	--	--	--	--	--	4	8	239	--	--	--	--	--	--
*8n3	VARIES		--	--	--	--	--	--	--	--	--	4	8	373	4	8	373
TOTAL (LB.)			158			197			483			637			707		

G = GRADE (%)

*8n3 BARS VARY FROM 34'-2 TO 35'-9

BENT BAR DETAILS



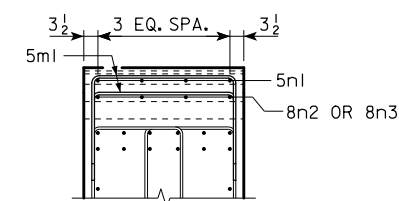
NOTE: ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

NOTE: THE REINFORCING STEEL QUANTITIES ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITIES ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTES:

THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES SHOULD BE EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.



TYPICAL SECTION

ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
EACH ABUTMENT FOOTING					
A, B BEAMS	----	1.0	1.6	2.2	2.8
C BEAMS	----	1.2	1.9	2.6	3.3
EACH TEE PIER CAP - ALL BEAMS					
EACH PILE BENT PIER - ALL BEAMS					
0.5					
1.1					
1.7					
2.4					
3.1					

LATEST REVISION DATE

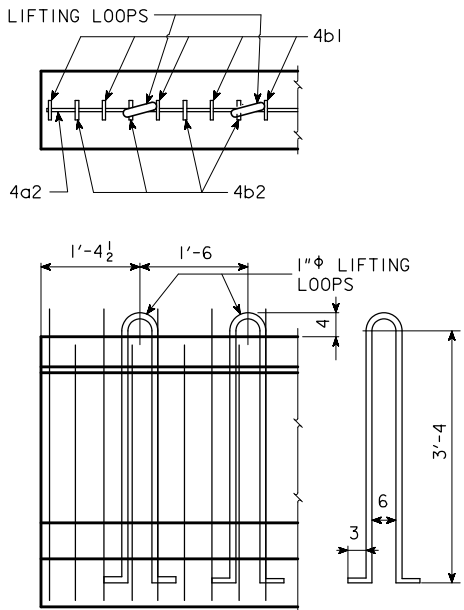
APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
SEPTEMBER, 2014

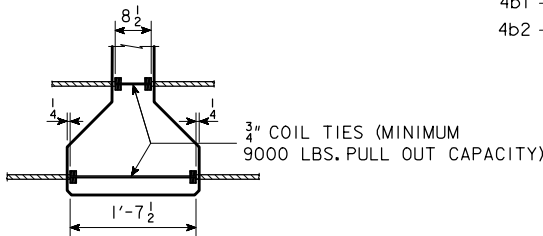
ADDITIONAL QUANTITIES
30° SKEW

H40-24-14



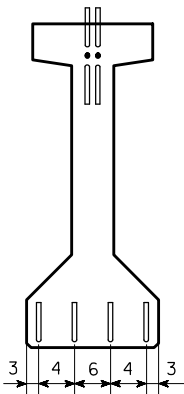
LIFTING LOOP DETAIL

ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE STRUCTURAL GRADE.

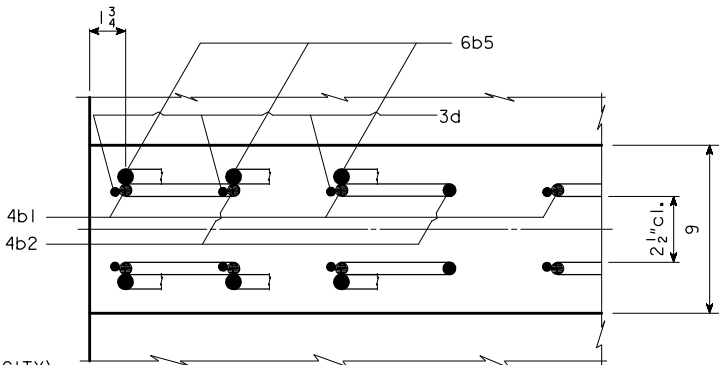


COIL TIE DETAIL

NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.

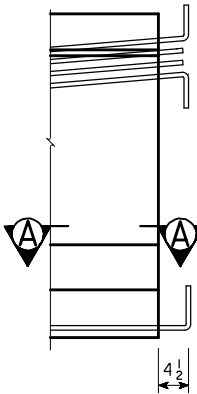


STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM







THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS. FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

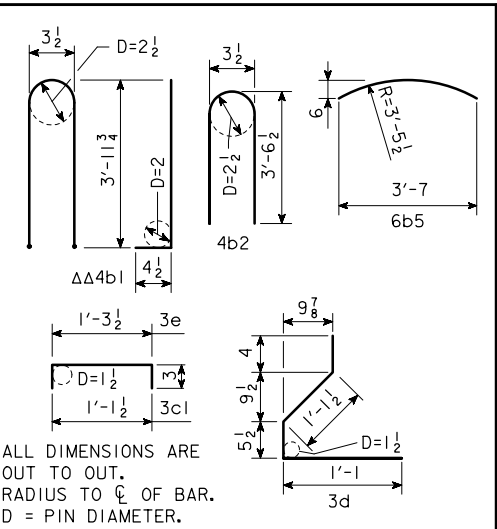


TYPICAL AT BOTH BEAM ENDS

** WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.
ΔΔ 4b1 BARS TO BE EPOXY COATED.

REINFORCING BAR LIST

REINFORCING BAR LIST											
BEAM \ SPAN		C63 63'-4		C67 67'-6		C71 71'-8		C75 75'-10		C80 80'-0	
BAR SHAPE		NO. LENGTH		NO. LENGTH		NO. LENGTH		NO. LENGTH		NO. LENGTH	
6a1		—	—	—	—	4	37'-8	4	39'-9	4	41'-10
4a2		—	2 5'-0	2	5'-0	2	5'-0	2	5'-0	2	5'-0
8a3		—	—	—	—	—	—	—	—	2	40'-0
ΔΔ	4b1		46 8'-10	48 8'-10	54 8'-10	58 8'-10	60 8'-10				
	4b2		12 7'-2	12 7'-2	12 7'-2	12 7'-2	12 7'-2				
	6b5		4 3'-9	8 3'-9	8 3'-9	12 3'-9	16 3'-9				
	3c1		46 1'-8	48 1'-8	54 1'-8	58 1'-8	60 1'-8				
**	3d		116 3'-0	120 3'-0	132 3'-0	140 3'-0	144 3'-0				
	3e		26 1'-10	26 1'-10	26 1'-10	26 1'-10	26 1'-10				



ALL DIMENSIONS ARE OUT TO OUT. RADIUS TO ϕ OF BAR. D = PIN DIAMETER.

C BEAM DATA

BEAM	SPAN LENGTH ϕ-ϕ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)				DEFLECTION (in.) Δ _D				PERMISSIBLE SPACING				WEIGHT (TONS)		CONCRETE (C. Y.)	REINFORCING STEEL-(lb)
				STRAIGHT	DEFLECTED			AT RELEASE		AFTER LOSSES		IMMEDIATE ^① (ELASTIC) Δ _I		TIME (PLASTIC) Δ _T ^②		HL93 LOADING							
												CONC. STEEL DIAPH. DIAPH.	CONC. STEEL DIAPH. DIAPH.			CONC. STEEL DIAPH. DIAPH.	CONC. STEEL DIAPH. DIAPH.						
C63	63'-4	64'-4	0.60	16	—	681	—	0.70		1.24	0.59	0.54	0.15	0.14			7'-6	7'-6	18.9		9.34	536	
C67	67'-6	68'-6	0.60	18	—	766	—	0.92		1.62	0.76	0.71	0.19	0.18			7'-6	7'-6	20.1		9.95	576	
*C71	71'-8	72'-8	0.60	14	4	766	16	1.21		2.13	0.88	0.82	0.22	0.20			7'-6	7'-6	21.4		10.55	855	
*C75	75'-10	76'-10	0.60	14	6	851	22	1.33		2.34	1.07	0.99	0.27	0.25			7'-6	7'-6	22.6		11.16	925	
*C80	80'-0	81'-0	0.60	16	6	937	21	1.64		2.90	1.31	1.24	0.33	0.31			7'-6	7'-6	23.8		11.76	1191	

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2635 #) OR ONE STEEL DIAPHRAGM (285 #) AT ϕ OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT ϕ OF SPAN, Δ_D , DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) $\Delta_D = \Delta_I + \Delta_T$ FOR SIMPLE SPAN.
(B) $\Delta_D = \Delta_I + \frac{3}{4}\Delta_T$ FOR END SPANS OF CONTINUOUS BRIDGE.
(C) $\Delta_D = \Delta_I + \frac{1}{2}\Delta_T$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% $f's$,
 $f's = 270$ ksi AND $A_s = 0.217$ sq. in.

* MINIMUM CONCRETE $f'c$ (AT 28 DAYS) SHALL BE 6,000 psi. MINIMUM $f'ci$ AT RELEASE SHALL BE 5,000 psi.

SPECIFICATIONS:

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2007, WITH MINOR MODIFICATIONS.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2007:

REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH SECTION 5, $f'c = 5000$ psi (EXCEPT AS NOTED)

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, $f's = 270,000$ psi.

NOTES:

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 lb. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.

ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.

TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570.

BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS.

BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS.

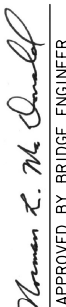
ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.


IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.

IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

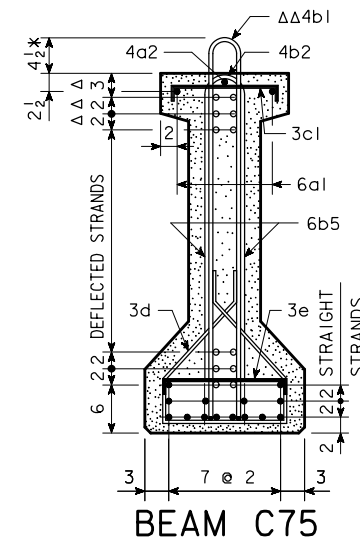
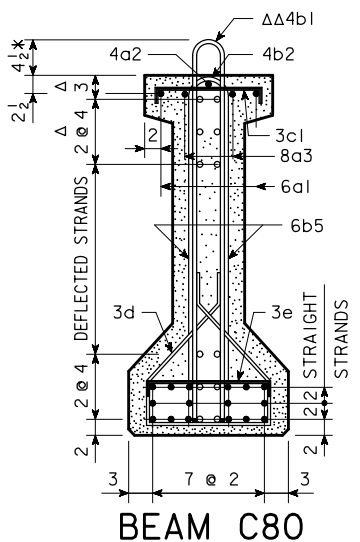
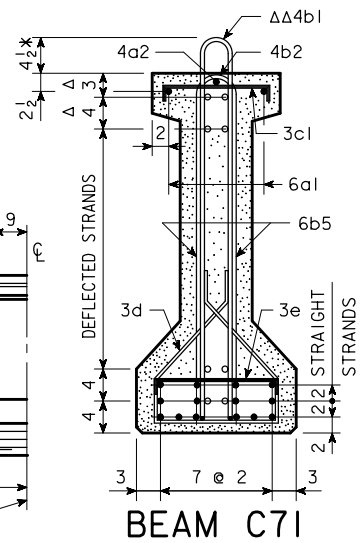
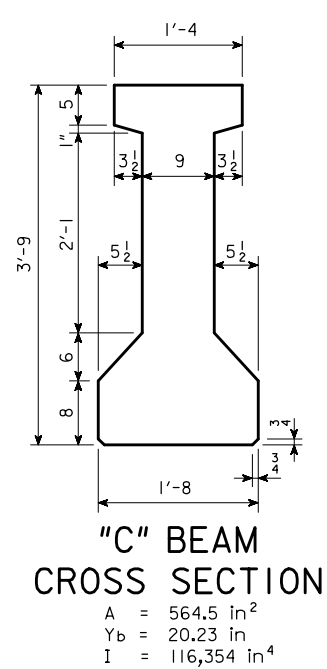
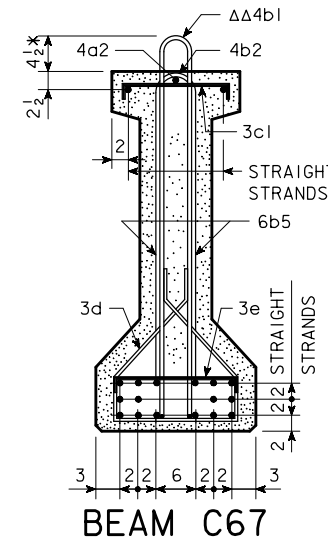
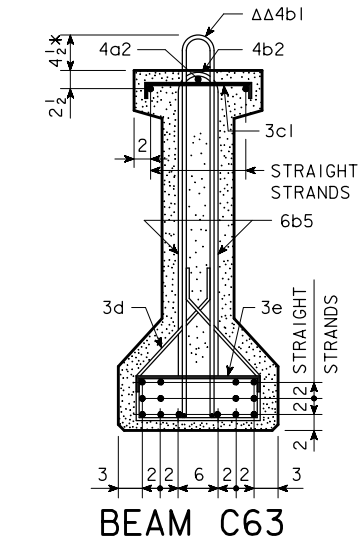
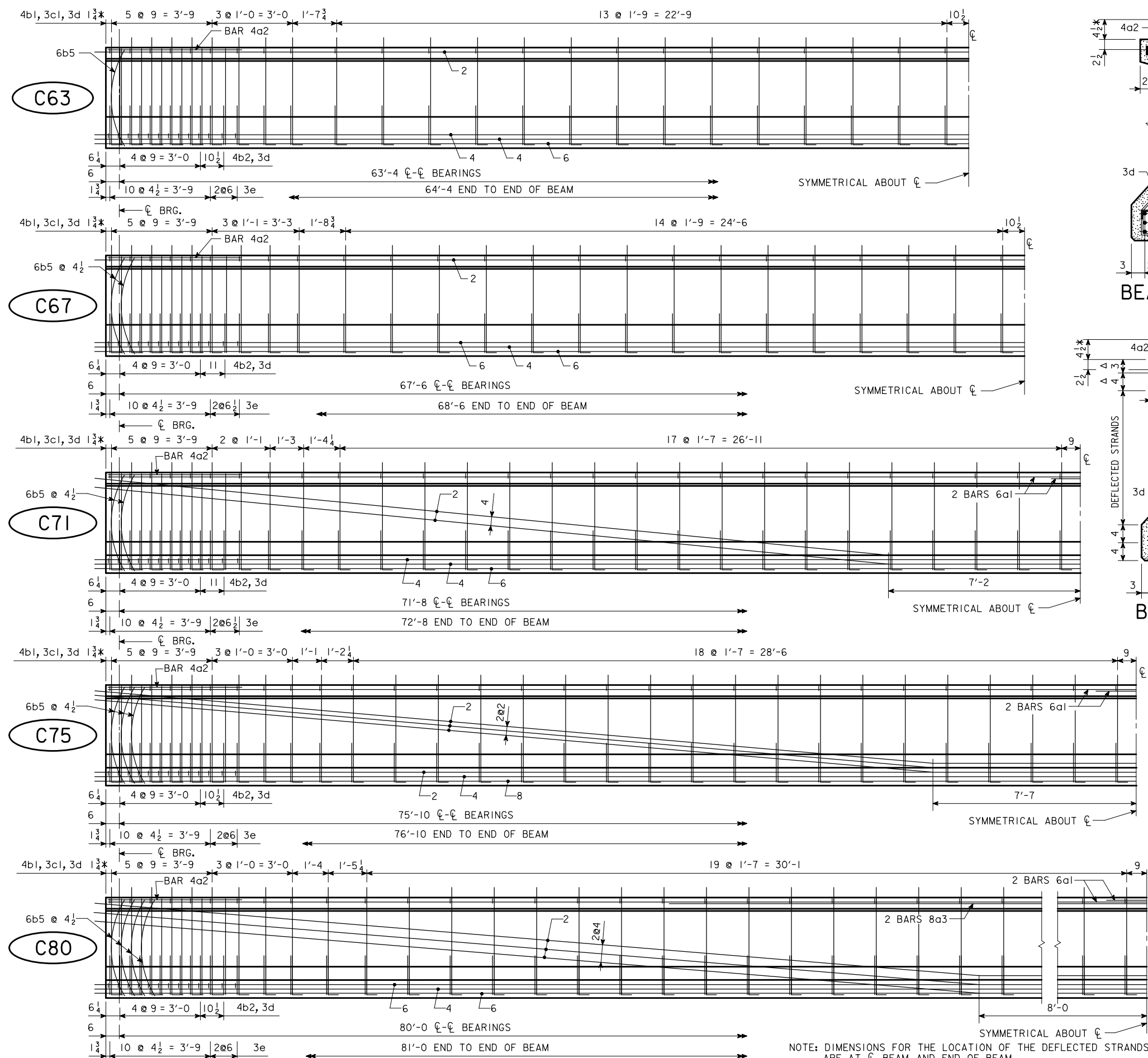
0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE α BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

LATEST REVISION DATE


APPROVED BY BRIDGE ENGINEER


STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
SEPTEMBER, 2014

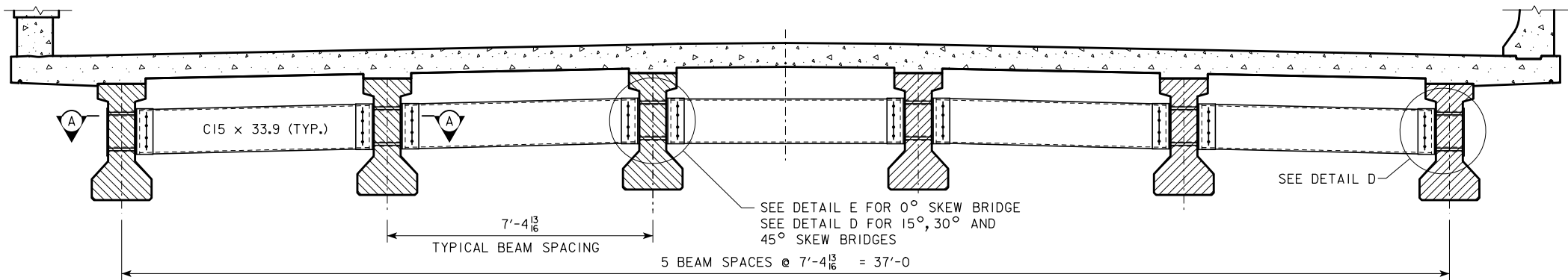
C BEAM DETAILSH40-36-14



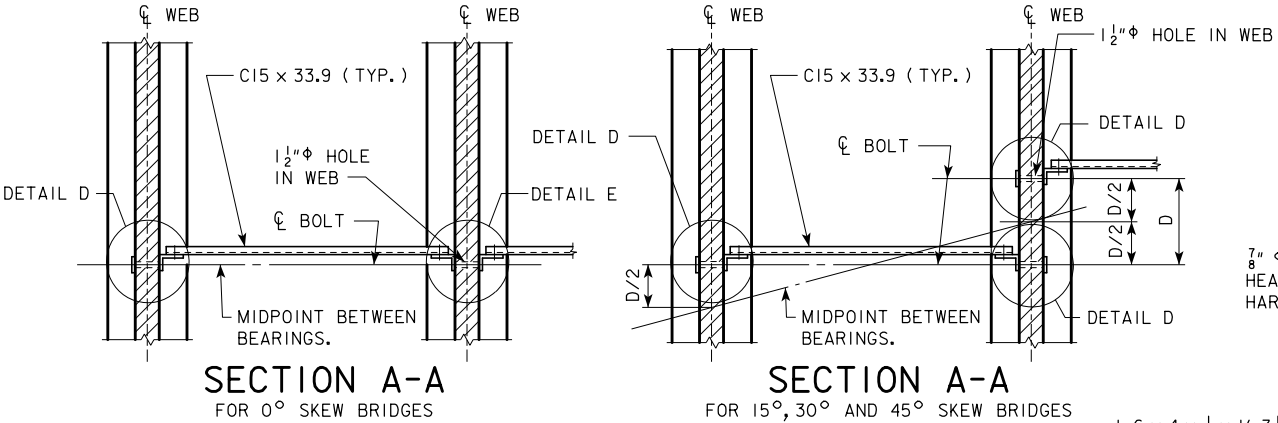
NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.
 * KEEP
 Δ DIMENSIONS AT END OF BEAM
 ΔΔ EPOXY COATED BARS

NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT C-C BEAM AND END OF BEAM.

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		C BEAM DETAILS	
		H40-37-14	



SECTION SHOWING INTERMEDIATE DIAPHRAGM



INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

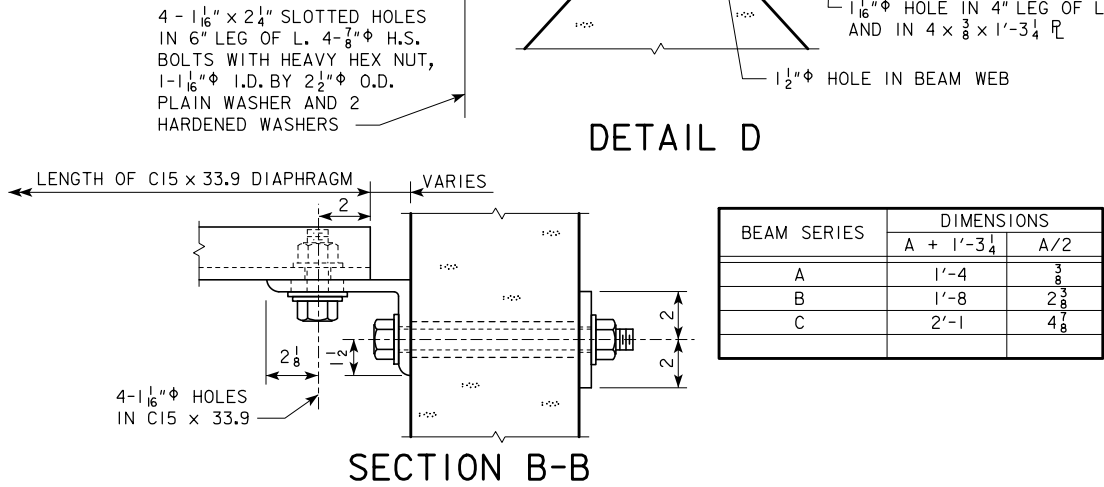
ONE CONNECTION DETAIL "E"						
2 - 7/8" ϕ \times LENGTH H.S. BOLTS WITH NUTS AND WASHERS						
WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "E" (LB.)	BRIDGE SKEW		BRIDGE SKEW	
			0°	15°, 30° & 45°	0°	15°, 30° & 45°
			NUMBER OF DETAIL "E"		WEIGHT (LB.)	
6	9	4.30	12	0	51.6	0.0
9	12	5.34	12	0	64.1	0.0
2 - L6 \times 4 \times 1/2 \times 1'-3 1/4" = 41.2 LB			12	0	494.4	0.0

ONE CONNECTION DETAIL "D"						
2 - 7/8" ϕ \times LENGTH H.S. BOLTS WITH NUTS AND WASHERS						
WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "D" (LB.)	BRIDGE SKEW		BRIDGE SKEW	
			0°	15°, 30° & 45°	0°	15°, 30° & 45°
			NUMBER OF DETAIL "D"		WEIGHT (LB.)	
6	9	4.30	6	30	25.8	129.0
9	12	5.34	6	30	32.0	160.2
1 - BACKING PL 4 \times 3/8 \times 1'-3 1/4" = 6.5 LB			6	30	39.0	195.0
1 - L 6 \times 4 \times 1/2 \times 1'-3 1/4" = 20.6 LB			6	30	123.6	618.0

* ONE C15 \times 33.9 DIAPHRAGM					
WEB THICKNESS (IN.)	BEAM SPACING	LENGTH	NO. OF DIAPH.	UNIT WEIGHT (LB.)	WEIGHT (LB.)
6	7'-4 13/16	6'-7 7/16	15	224.4	3366.2
9	7'-4 13/16	6'-4 1/16	15	215.9	3239.0

DIAPHRAGM CONNECTION BOLTS		
8 - 7/8" ϕ \times 0'-2 3/4" H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM = 10.3 LB		
* THE LENGTH OF THE C15 \times 33.9 IS BASED ON A VARIABLE CLEARANCE OF 1/16" TO 2/16" BETWEEN THE FACE OF BEAM WEB AND END OF C15 \times 33.9.		
TOTAL WEIGHT		
WEB THICKNESS (IN.)	BRIDGE SKEW	
	0°	15°, 30° & 45°
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	6	4255
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	9	4147

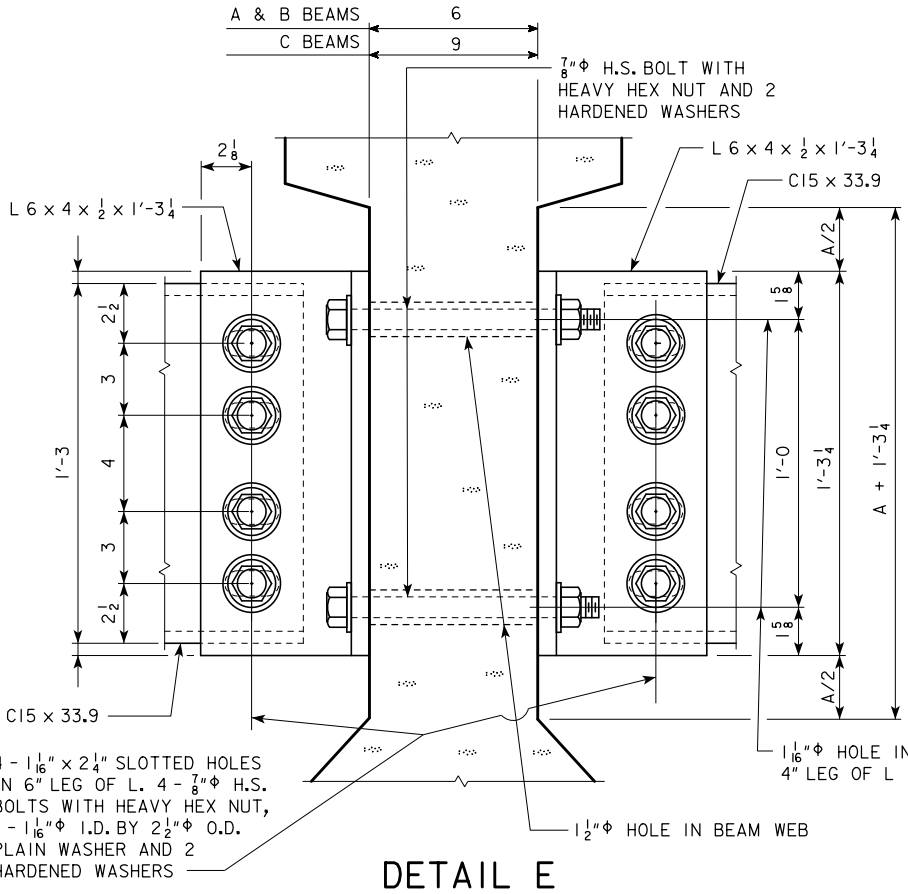
NOTE:
THE STRUCTURAL STEEL DIAPHRAGM WEIGHTS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.



NOTES:

- ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
- SHOP DRAWINGS OF THE STEEL DIAPHRAGMS SHOWING LAYOUT AND DETAILS OF THE DIAPHRAGMS SHALL BE SUBMITTED FOR APPROVAL.
- ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.
- THE 1 1/2" ϕ HOLES FOR THE 7/8" ϕ H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.
- THE 7/8" ϕ H.S. BOLTS THROUGH THE WEB SHALL HAVE A THREAD LENGTH OF 3" MIN. AND 4" MAX. AND SHALL MEET THE REQUIREMENTS OF ASTM A449.
- ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BRIDGE FLOOR CONCRETE.

CONCRETE DIAPHRAGM DETAILS SHALL BE PROVIDED IN THE BRIDGE PLANS FOR OVERHEAD BRIDGES. DESIGNER SHALL ADJUST THE CONCRETE, REINFORCING AND STRUCTURAL STEEL QUANTITIES ACCORDINGLY.



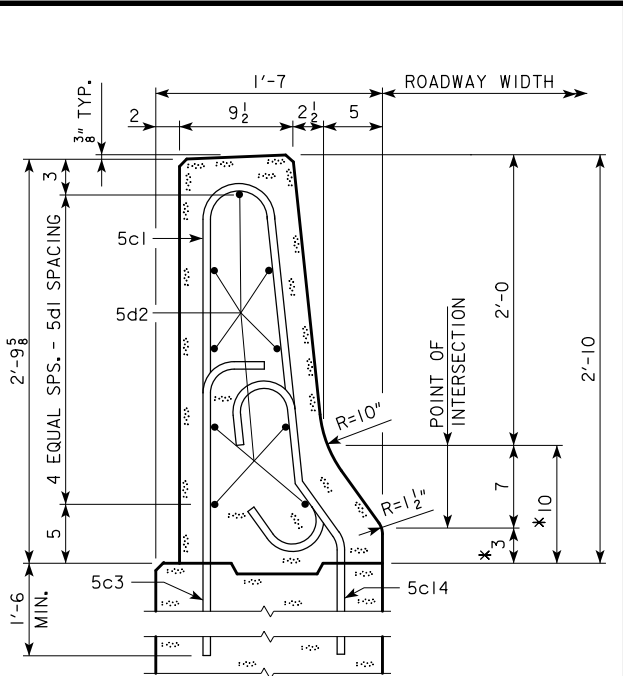
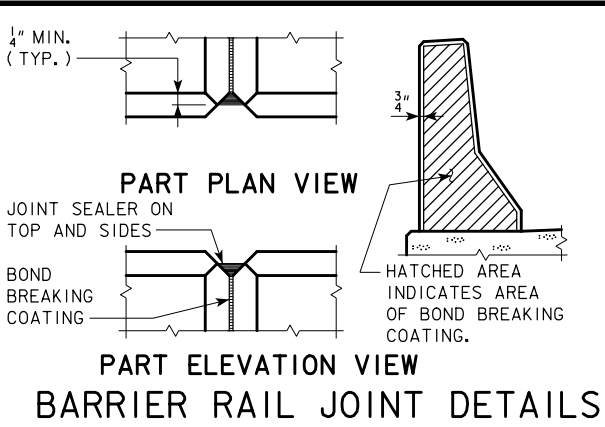
LATEST REVISION DATE

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
SEPTEMBER, 2014

INTERMEDIATE STEEL DIAPHRAGMS

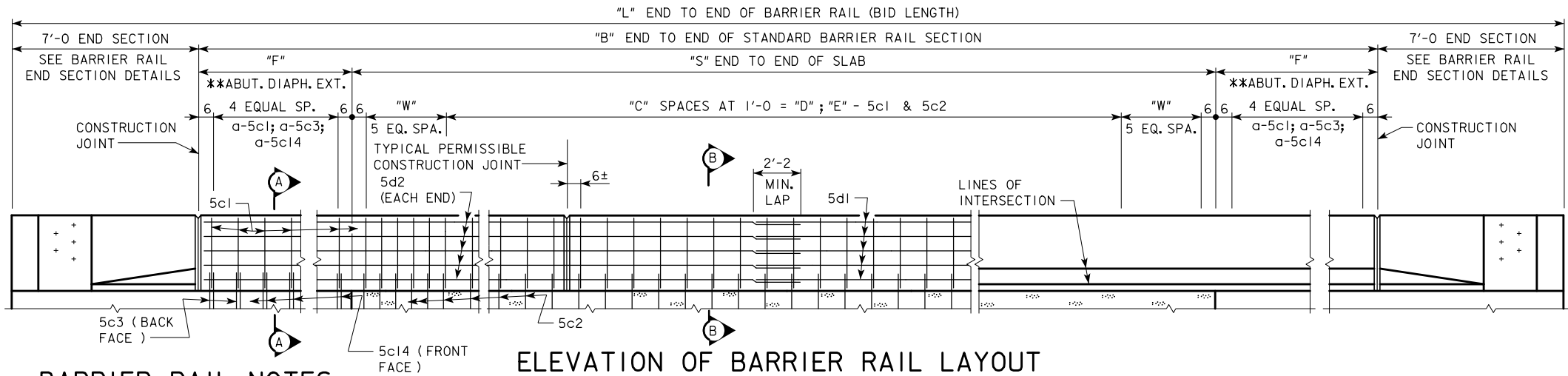
H40-38-14

TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS																		
℄-℄ ABUT. BRG		138'-10				151'-4				163'-10				176'-4				℄-℄ ABUT. BRG
SKEW		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
DIMENSION OR NUMBER	L (FT.-IN.)	155'-10	155'-11¼	156'-3⅝	157'-0⅞	168'-4	168'-5¼	168'-9⅝	169'-6⅞	180'-10	180'-11¼	181'-3⅝	182'-0⅞	193'-4	193'-5¼	193'-9⅝	194'-6⅞	L (FT.-IN.)
	B (FT.-IN.)	141'-10	141'-11¼	142'-3⅝	143'-0⅞	154'-4	154'-5¼	154'-9⅝	155'-6⅞	166'-10	166'-11¼	167'-3⅝	168'-0⅞	179'-4	179'-5¼	179'-9⅝	180'-6⅞	B (FT.-IN.)
	S (FT.-IN.)	141'-10	141'-11¼	142'-3⅝	143'-0⅞	154'-4	154'-5¼	154'-9⅝	155'-6⅞	166'-10	166'-11¼	167'-3⅝	168'-0⅞	179'-4	179'-5¼	179'-9⅝	180'-6⅞	S (FT.-IN.)
	C	133	133	133	133	145	145	145	145	158	158	158	158	170	170	170	170	C
	D (FT.-IN.)	133'-0	133'-0	133'-0	133'-0	145'-0	145'-0	145'-0	145'-0	158'-0	158'-0	158'-0	158'-0	170'-0	170'-0	170'-0	170'-0	D (FT.-IN.)
	E	134	134	134	134	146	146	146	146	159	159	159	159	171	171	171	171	E
	F (FT.-IN.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	F (FT.-IN.)
DIMENSION OR NUMBER	W (FT.-IN.)	3'-11	3'-11⅝	4'-1¾	4'-6½	4'-2	4'-2⅝	4'-4¾	4'-9½	3'-11	3'-11⅝	4'-1¾	4'-6½	4'-2	4'-2⅝	4'-4¾	4'-9½	W (FT.-IN.)
	a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	a



* DENOTES THE MAXIMUM VALUE FOR THIS DIMENSION. THIS DIMENSION MAY VARY DUE TO CONSTRUCTION INACCURACIES.

TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS																		
℄-℄ ABUT. BRG		188'-10				201'-4				213'-10				226'-4				℄-℄ ABUT. BRG
SKEW		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
DIMENSION OR NUMBER	L (FT.-IN.)	205'-10	205'-11¼	206'-3⅝	207'-0⅞	228'-4	228'-4	228'-4	228'-4	240'-10	240'-10	240'-10	240'-10	253'-4	253'-4	253'-4	253'-4	L (FT.-IN.)
	B (FT.-IN.)	191'-10	191'-11¼	192'-3⅝	193'-0⅞	214'-4	214'-4	214'-4	214'-4	226'-10	226'-10	226'-10	226'-10	239'-4	239'-4	239'-4	239'-4	B (FT.-IN.)
	S (FT.-IN.)	191'-10	191'-11¼	192'-3⅝	193'-0⅞	204'-4	204'-5¼	204'-9⅝	205'-6⅞	216'-10	216'-11¼	217'-3⅝	218'-0⅞	229'-4	229'-5¼	229'-9⅝	230'-6⅞	S (FT.-IN.)
	C	183	183	183	183	195	195	195	195	208	208	208	208	220	220	220	220	C
	D (FT.-IN.)	183'-0	183'-0	183'-0	183'-0	195'-0	195'-0	195'-0	195'-0	208'-0	208'-0	208'-0	208'-0	220'-0	220'-0	220'-0	220'-0	D (FT.-IN.)
	E	184	184	184	184	196	196	196	196	209	209	209	209	221	221	221	221	E
	F (FT.-IN.)	0	0	0	0	5'-0	4'-11⅝	4'-9¼	4'-4½	5'-0	4'-11⅝	4'-9¼	4'-4½	5'-0	4'-11⅝	4'-9¼	4'-4½	F (FT.-IN.)
DIMENSION OR NUMBER	W (FT.-IN.)	3'-11	3'-11⅝	4'-1¾	4'-6½	4'-2	4'-2⅝	4'-4¾	4'-9½	3'-11	3'-11⅝	4'-1¾	4'-6½	4'-2	4'-2⅝	4'-4¾	4'-9½	W (FT.-IN.)
	a	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	a



BARRIER RAIL NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

ALL BARRIER RAIL REINFORCING STEEL IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN OR NOTED. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M.452.

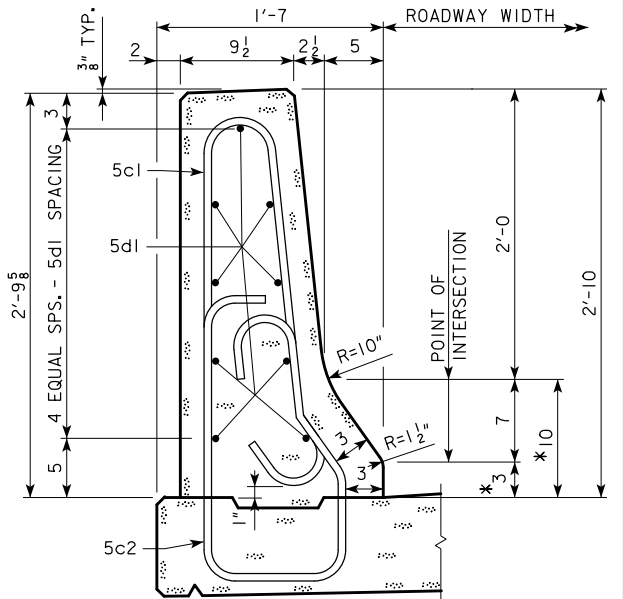
THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL ℄ GRADE.

CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03, A, 2, OF THE STANDARD SPECIFICATIONS. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

** APPLIES TO 201'-4, 213'-10, 226'-4 & 243'-0 BRIDGES ONLY.



PART SECTION B-B

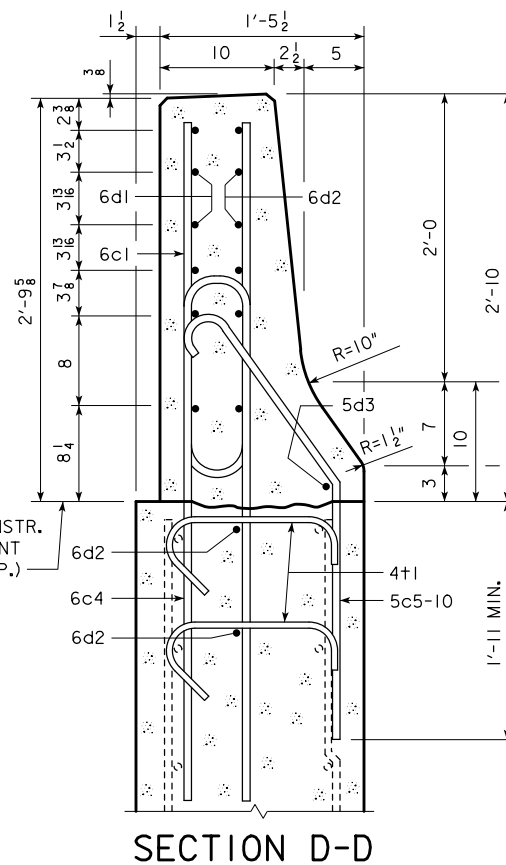
LATEST REVISION DATE	<i>Norman L. McDaniel</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		BARRIER RAIL DETAILS SHEET 1 OF 3	H40-39-14



PART VIEW F-F


The image contains three detailed technical drawings of a bridge pier, labeled VIEW A-A, SECTION B-B, and SECTION C-C. Each drawing shows the pier's profile with reinforcement details, dimensions, and labels for various components.




- VIEW A-A:** Shows the front elevation of the pier. Dimensions include a total height of 2'-3" MIN., a base width of 10, and a top width of 8. Reinforcement bars are labeled 6c2 and 6c3. A label "1'-6" is on the left side.
- SECTION B-B:** Shows a cross-section of the pier. Dimensions include a total height of 2'-3" MIN. (TYP), a base width of 10, and a top width of 7 1/2. Reinforcement bars are labeled 6c1 and 6d. A label "1'-6" is on the left side. A label "TOP OF ABUT. WING" points to the top of the pier. A label "1" ϕ HOLES" points to the reinforcement bars.
- SECTION C-C:** Shows a cross-section of the pier. Dimensions include a total height of 2'-3" MIN. (TYP), a base width of 10, and a top width of 7 1/2. Reinforcement bars are labeled 6c4 and 6d2. A label "1'-6" is on the left side. A label "TOP OF ABUT. WING" points to the top of the pier. A label "1" ϕ HOLES" points to the reinforcement bars.



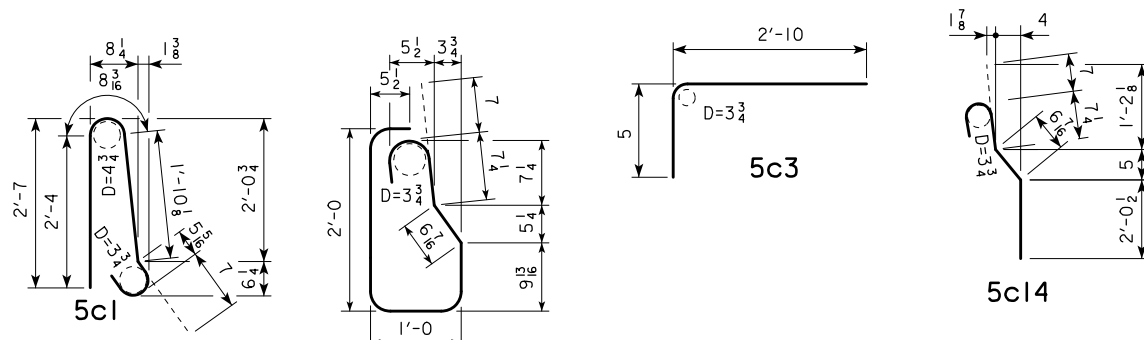
BAR	"X"
5c5	0'-6 1/2
5c6	0'-8 1/2
5c7	0'-10 1/4
5c8	1'-0 1/4
5c9	1'-2
5c10	1'-4

H40-40-14

EPOXY COATED REINFORCING STEEL-TWO BARRIER RAILS																														
(NOTE: THESE REINFORCING BARS TO BE USED ON ALL SKEWS)																														
BRIDGE LENGTH				138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
STANDARD SECTION	5c1	VERTICAL		288	5'-11	1,777	312	5'-11	1,925	338	5'-11	2,086	362	5'-11	2,234	388	5'-11	2,394	432	5'-11	2,666	458	5'-11	2,826	482	5'-11	2,974	516	5'-11	3,184
	5d1	LONGITUDINAL-STANDARD SECTION	—	36	40'-0	1,502	54	40'-0	2,253	54	40'-0	2,253	54	40'-0	2,253	72	40'-0	3,004	72	40'-0	3,004	72	40'-0	3,004	90	40'-0	3,755	90	40'-0	3,755
	5d2	LONGITUDINAL-STANDARD SECTION, ENDS	—	36	34'-8	1,302	36	22'-0	826	36	28'-3	1,061	36	34'-6	1,295	36	21'-10	820	36	32'-5	1,217	36	38'-8	1,452	36	26'-0	976	36	34'-4	1,289
EPOXY COATED REINFORCING STEEL TOTAL LBS.				4,581			5,004			5,400			5,782			6,218			6,887			7,282			7,705			8,228		

STAINLESS STEEL REINFORCING STEEL-TWO BARRIER RAILS																																							
(NOTE: THESE REINFORCING BARS TO BE USED ON ALL SKEWS)																																							
BRIDGE LENGTH				138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0											
SECTION	BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT									
STANDARD SECTION	5c2	VERTICAL		288	6'-0	1,802	312	6'-0	1,952	338	6'-0	2,115	362	6'-0	2,265	388	6'-0	2,428	412	6'-0	2,578	438	6'-0	2,741	462	6'-0	2,891	496	6'-0	3,104									
	5c3	VERTICAL		----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	20	3'-3	68	20	3'-3	68	20	3'-3	68	20	3'-3	68									
	5c14	VERTICAL		----	----	0	----	----	0	----	----	0	----	----	0	----	----	0	20	3'-10	80	20	3'-10	80	20	3'-10	80	20	3'-10	80									
STAINLESS STEEL REINFORCING STEEL TOTAL LBS.							1,802				1,952				2,115				2,265				2,428				2,726				2,889				3,039				3,252

BENT BAR DETAILS



5c1

5c2

5c3

5c14

NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

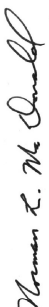
NOTE: REINFORCING STEEL QUANTITIES ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.


CONCRETE PLACEMENT SUMMARY - C.Y.										
BRIDGE LENGTH		138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STANDARD SECTION	* 2 x "B" @ 0.1052 C.Y. PER FT.	30.1	32.7	35.4	38.0	40.6	45.1	47.7	50.4	53.9
BARRIER RAIL END SECTION	4 @ 0.65 C.Y.	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
TOTAL C.Y.		32.7	35.3	38.0	40.6	43.2	47.7	50.3	53.0	56.5

* SEE SHEET H40-39-14 FOR DIMENSION "B". CONCRETE QUANTITIES SHOWN ARE BASED ON 45° SKEW BID LENGTHS.

CONCRETE BARRIER RAIL QUANTITIES - L.F.										
BRIDGE LENGTH		138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
CONCRETE BARRIER RAILING	0° SKEW	311.7	336.7	361.7	386.7	411.7	456.7	481.7	506.7	540.0
CONCRETE BARRIER RAILING	15° SKEW	311.9	336.9	361.9	386.9	411.9	456.7	481.7	506.7	540.0
CONCRETE BARRIER RAILING	30° SKEW	312.6	337.6	362.6	387.6	412.6	456.7	481.7	506.7	540.0
CONCRETE BARRIER RAILING	45° SKEW	314.2	339.2	364.2	389.2	414.2	456.7	481.7	506.7	540.0

LATEST REVISION DATE

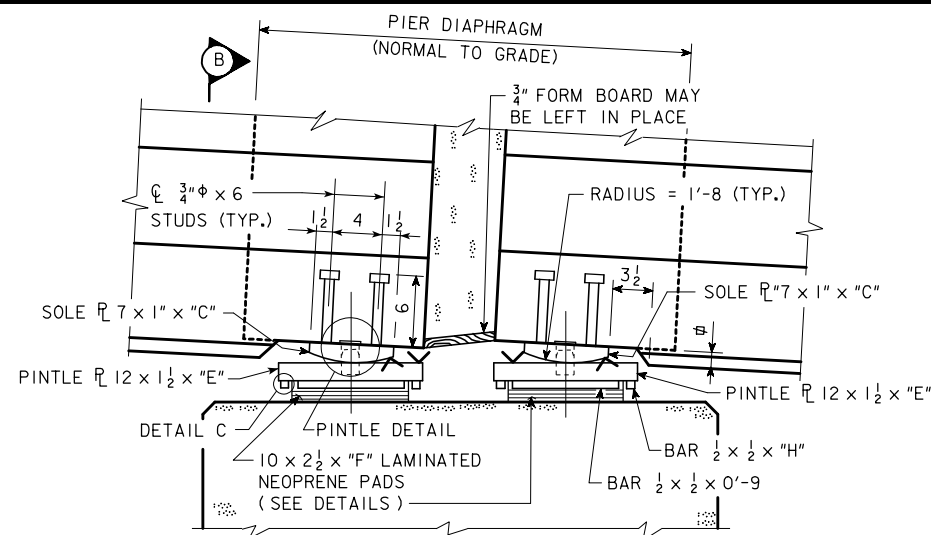

APPROVED BY BRIDGE ENGINEER

 Highway Division

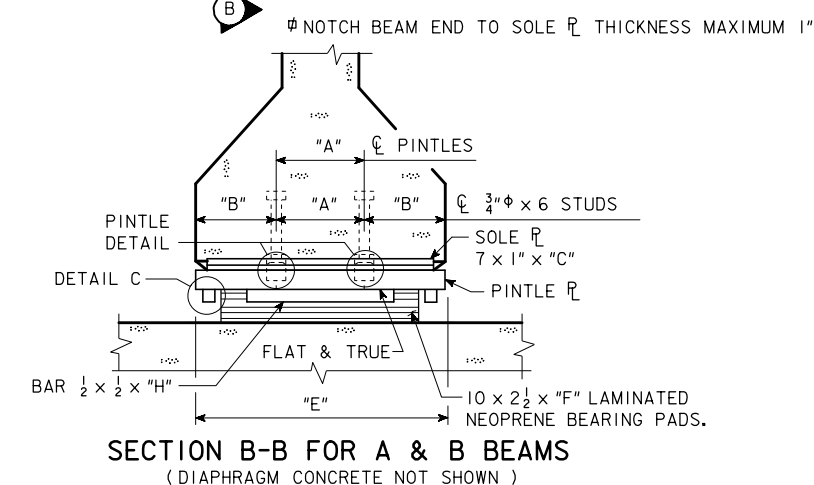
STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES
SEPTEMBER, 2014

BARRIER RAIL DETAILS
SHEET 3 OF 3

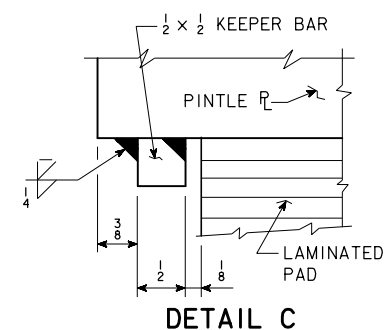
H40-41-14



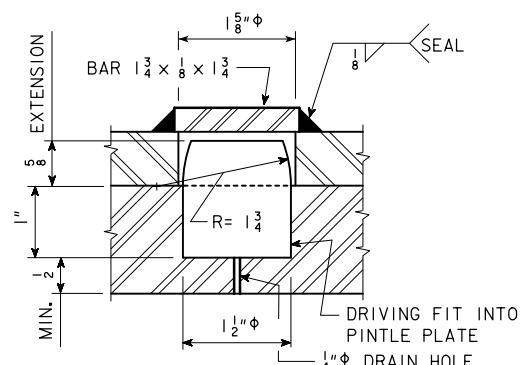
PART ELEVATION



SECTION B-B FOR A & B BEAMS
(DIAPHRAGM CONCRETE NOT SHOWN)



DETAIL C

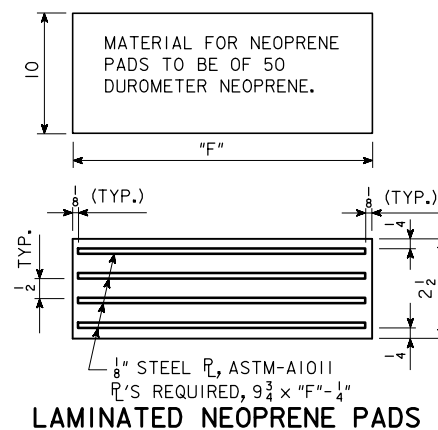


PINTLE DETAIL

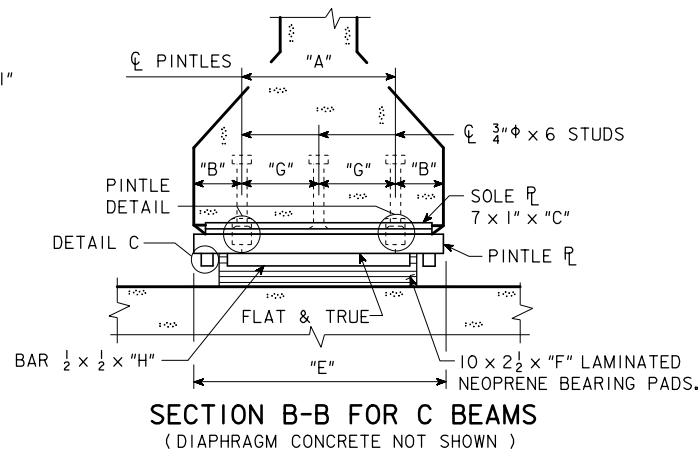
EXPANSION PIER BEARING NOTES:

SURFACES MARKED "V" SHALL BE FINISHED ANSI 250.
PINTLE PLATES ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL QUANTITY".
COSTS OF ANCHORED CURVED SOLE PLATES AND NEOPRENE PADS ARE TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".
THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.
SOLE PLATES ARE TO BE SET IN FORMS WHEN BEAMS ARE CAST AND THE BOTTOM OF BEAMS FORMED OUT AS SHOWN TO EXCLUDE CONCRETE.
SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING :
ASTM A 514 GRADE B
ASTM A 709 GRADE HPS 70W

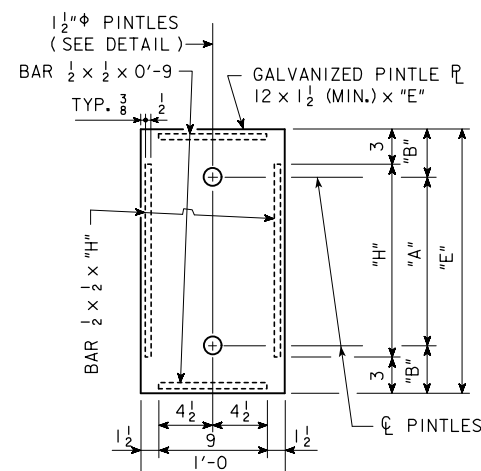
EXPANSION PIER LAMINATED NEOPRENE PAD / CURVED SOLE PLATE ASSEMBLY



LAMINATED NEOPRENE PADS

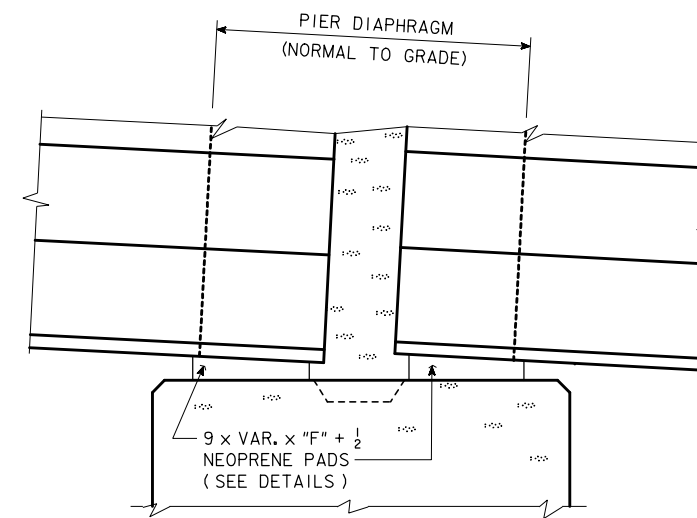


SECTION B-B FOR C BEAMS
(DIAPHRAGM CONCRETE NOT SHOWN)

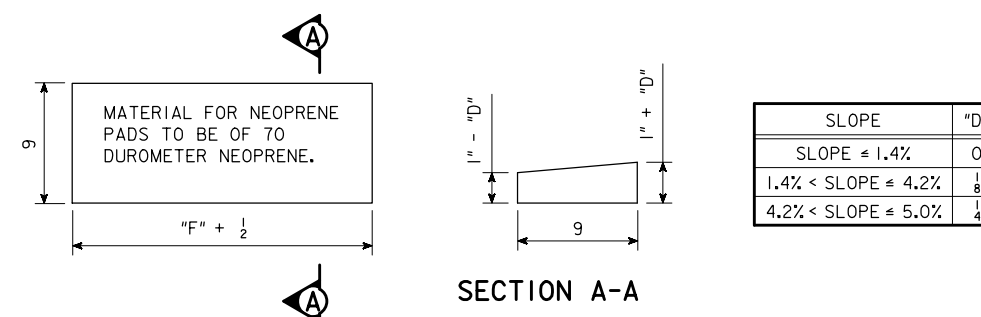


PLAN OF PINTLE PLATE

STRUCTURAL STEEL			
DATA FOR ONE BEARING			
BEAM SIZE	A	B	C
WEIGHT (LBS.)	89	89	106
DOES NOT INCLUDE CURVED SOLE PLATE			
NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.			



PART ELEVATION



PLAN OF NEOPRENE PAD

SLOPE _{SPAN 1} = 100%	P/G ELEV. @ NEAR ABUT. - P/G ELEV. @ PIER 1 SPAN 1 LENGTH
SLOPE _{SPAN 2} = 100%	P/G ELEV. @ PIER 1 - P/G ELEV. @ PIER 2 SPAN 2 LENGTH
SLOPE _{SPAN 3} = 100%	P/G ELEV. @ PIER 2 - P/G ELEV. @ FAR ABUT. SPAN 3 LENGTH

SLOPE CALCULATION FORMULA

FIXED PIER

FIXED PIER BEARING NOTES:

IF CALCULATED SLOPE FOR A GIVEN SPAN EXCEEDS 1.4%, THE NEOPRENE BEARING PADS AT THE FIXED PIER FOR THAT SPAN SHALL BE TAPERED. REFER TO TABLE FOR DIMENSIONS OF TAPERED PADS.
COST OF NEOPRENE PADS SHALL BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

VARIABLE DIMENSIONS

	BEAM BOTTOM FLANGE WIDTH	
	A & B BEAMS 1'-5	C BEAMS 1'-8
"A"	0'-6	1'-0
"B"	0'-5 1/2	0'-4
"C"	1'-3 1/2	1'-6 1/2
"E"	1'-5	1'-8
"F"	1'-3	1'-6
"G"		0'-6
"H"	0'-11	1'-2

LATEST REVISION DATE

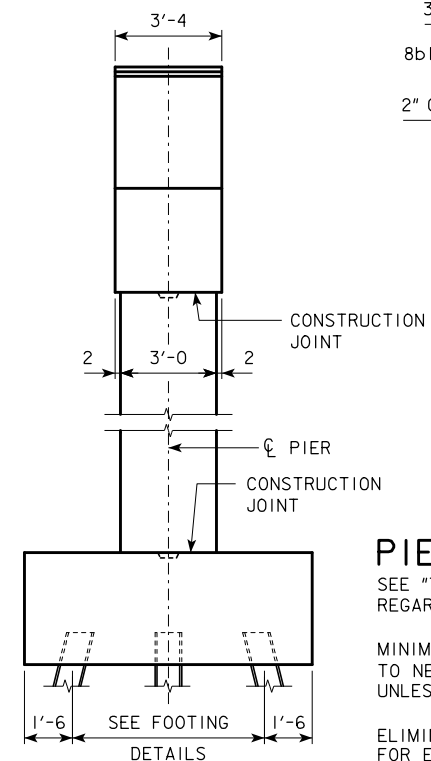
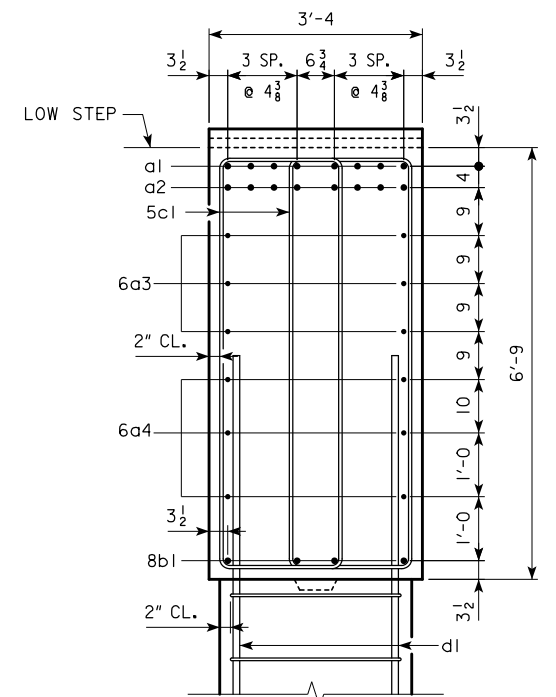
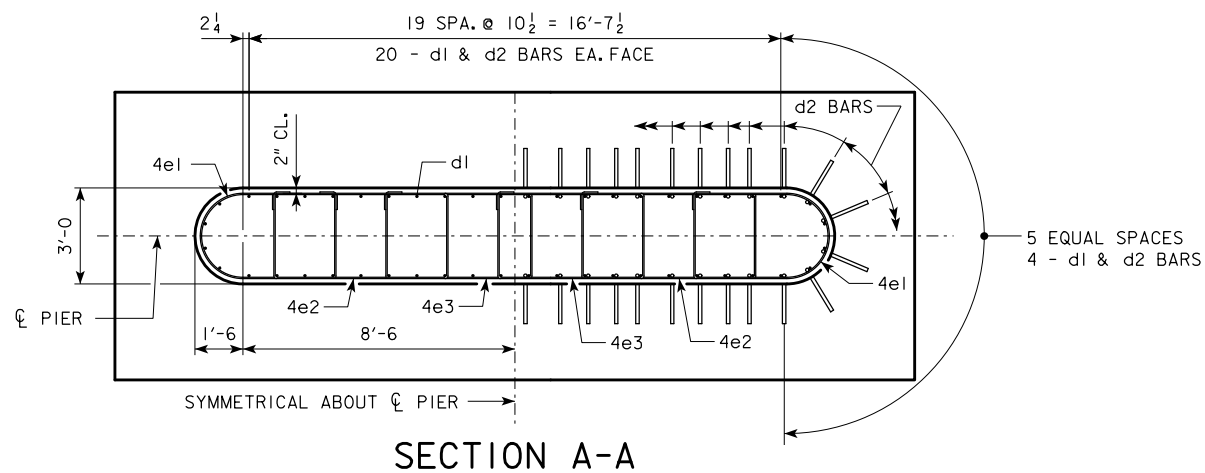
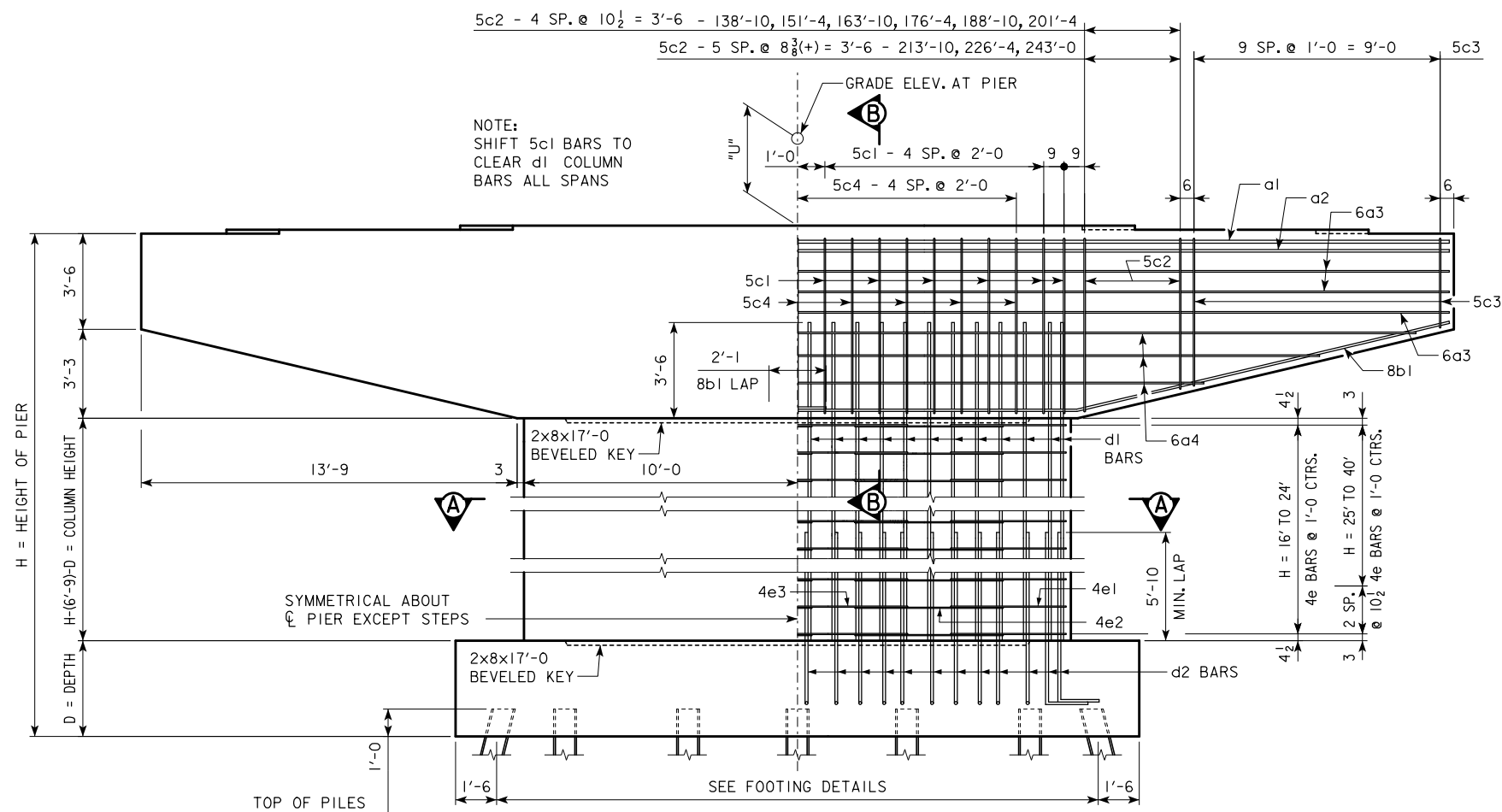
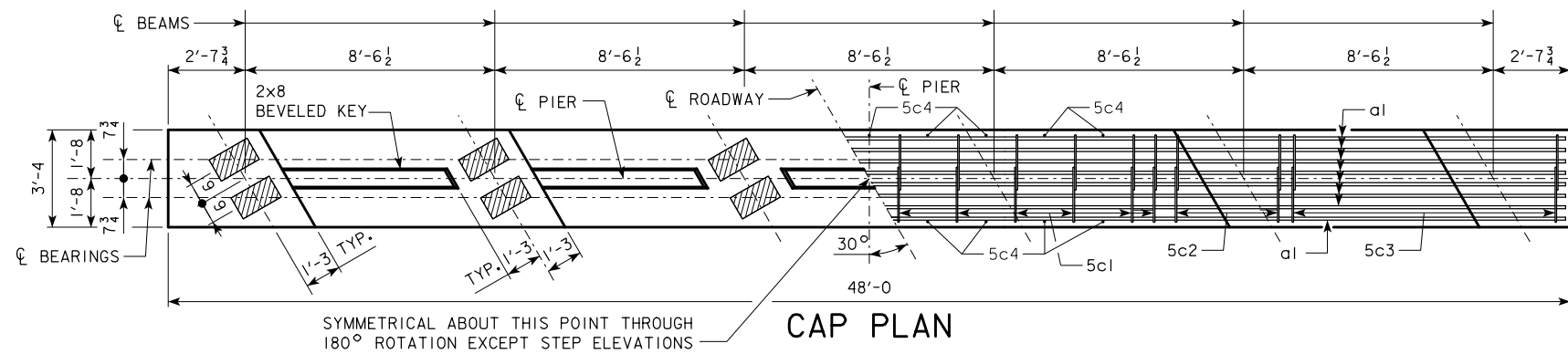
APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
**PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES**
SEPTEMBER, 2014

PIER BEARING DETAILS

H40-44-14



PIER NOTES:


SEE "TEE PIER NOTES" ON H40-02-14 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.

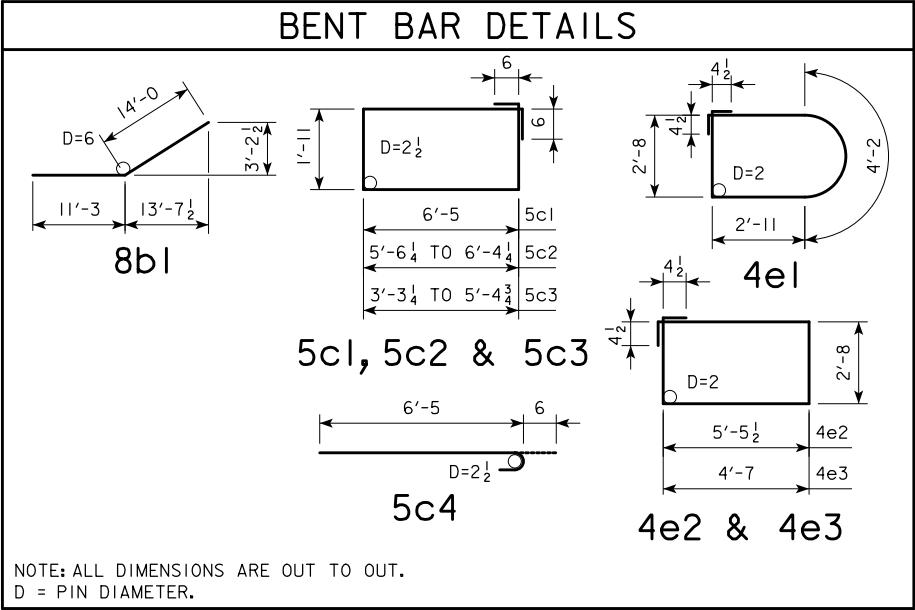
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.

FOR SIZE OF BEARING PADS, SEE H40-44-14.

SEE SHEET H40-22-14 FOR "U" DIMENSION.





LATEST REVISION DATE	<i>Harmon L. McDaniel</i> APPROVED BY BRIDGE ENGINEER	 IOWA DOT Highway Division	
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE	
		PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES	
		SEPTEMBER, 2014	
		TEE PIER CAP AND COLUMN 30° SKEW	H40-73-14



NOTE: THE REINFORCING STEEL QUANTITIES FOR THE CAP AND COLUMN ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITIES FOR THE CAP AND COLUMN ARE TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

CAP																														
REINFORCING STEEL	C - C ABUT. BEARINGS			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
	BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
	a1	47'-8	————	8	8	1018	8	8	1018	8	9	1297	8	9	1297	8	9	1297	8	10	1641	8	10	1641	8	10	1641	8	10	1641
	a2	47'-8	————	8	8	1018	8	8	1018	8	8	1018	8	8	1018	8	9	1297	8	9	1297	8	9	1297	8	10	1641	8	10	1641
	6a3	47'-8	————	6	6	430	6	6	430	6	6	430	6	6	430	6	6	430	6	6	430	6	6	430	6	6	430	6	6	430
	6a4	VARIES	————	6	6	342	6	6	342	6	6	342	6	6	342	6	6	342	6	6	342	6	6	342	6	6	342	6	6	342
	8b1	25'-3	————	8	8	539	8	8	539	8	8	539	8	8	539	8	8	539	8	8	539	8	8	539	8	8	539	8	8	539
	5c1	17'-8	□	24	5	442	24	5	442	24	5	442	24	5	442	24	5	442	24	5	442	24	5	442	24	5	442	24	5	442
	5c2	VARIES	□	20	5	349	20	5	349	20	5	349	20	5	349	20	5	349	20	5	349	24	5	418	24	5	418	24	5	418
	5c3	VARIES	□	40	5	563	40	5	563	40	5	563	40	5	563	40	5	563	40	5	563	40	5	563	40	5	563	40	5	563
5c4	6'-11	————	18	5	130	18	5	130	18	5	130	18	5	130	18	5	130	18	5	130	18	5	130	18	5	130	18	5	130	
①	TOTAL (LB.)			4831			4831			5110			5110			5389			5733			5802			6146			6146		
STRUCTURAL CONCRETE (CY)				35.8			35.8			35.8			35.8			35.8			35.8			35.8			35.8			35.8		

COLUMN																					
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL																TOTAL WEIGHT (LB.)		
			d1 BAR 				4e1 BAR 				4e2 BAR 				4e3 BAR 						
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT			
16	5'-9	12.4	48	10	9'-3	1911	12	4	13'-5	108	12	4	17'-0	136	12	4	15'-3	122	2277		
17	6'-9	14.5	48	10	10'-3	2117	14	4	13'-5	125	14	4	17'-0	159	14	4	15'-3	143	2544		
18	7'-9	16.7	48	10	11'-3	2324	16	4	13'-5	143	16	4	17'-0	182	16	4	15'-3	163	2812		
19	8'-9	18.8	48	10	12'-3	2530	18	4	13'-5	161	18	4	17'-0	204	18	4	15'-3	183	3078		
20	9'-9	21.0	48	10	13'-3	2737	20	4	13'-5	179	20	4	17'-0	227	20	4	15'-3	204	3347		
21	10'-9	23.1	48	10	14'-3	2943	22	4	13'-5	197	22	4	17'-0	250	22	4	15'-3	224	3614		
22	11'-9	25.3	48	10	15'-3	3150	24	4	13'-5	215	24	4	17'-0	273	24	4	15'-3	244	3882		
23	12'-9	27.4	48	10	16'-3	3356	26	4	13'-5	233	26	4	17'-0	295	26	4	15'-3	265	4149		
24	13'-9	29.6	48	10	17'-3	3563	28	4	13'-5	251	28	4	17'-0	318	28	4	15'-3	285	4417		
25	14'-3	30.6	48	10	17'-9	3666	30	4	13'-5	269	30	4	17'-0	341	30	4	15'-3	306	4582		
26	15'-3	32.8	48	10	18'-9	3873	32	4	13'-5	287	32	4	17'-0	363	32	4	15'-3	326	4849		
27	16'-3	34.9	48	10	19'-9	4079	34	4	13'-5	305	34	4	17'-0	386	34	4	15'-3	346	5116		
28	17'-3	37.1	48	10	20'-9	4286	36	4	13'-5	323	36	4	17'-0	409	36	4	15'-3	367	5385		
29	18'-3	39.3	48	10	21'-9	4492	38	4	13'-5	341	38	4	17'-0	432	38	4	15'-3	387	5652		
30	19'-3	41.4	48	10	22'-9	4699	40	4	13'-5	358	40	4	17'-0	454	40	4	15'-3	407	5918		
31	20'-3	43.6	48	10	23'-9	4905	42	4	13'-5	376	42	4	17'-0	477	42	4	15'-3	428	6186		
32	21'-3	45.7	48	10	24'-9	5112	44	4	13'-5	394	44	4	17'-0	500	44	4	15'-3	448	6454		
33	22'-3	47.9	48	10	25'-9	5319	46	4	13'-5	412	46	4	17'-0	522	46	4	15'-3	469	6722		
34	23'-3	50.0	48	10	26'-9	5525	48	4	13'-5	430	48	4	17'-0	545	48	4	15'-3	489	6989		
35	24'-3	52.2	48	10	27'-9	5732	50	4	13'-5	448	50	4	17'-0	568	50	4	15'-3	509	7257		
36	25'-3	54.3	48	10	28'-9	5938	52	4	13'-5	466	52	4	17'-0	591	52	4	15'-3	530	7525		
37	26'-3	56.5	48	10	29'-9	6145	54	4	13'-5	484	54	4	17'-0	613	54	4	15'-3	550	7792		
38	27'-3	58.6	48	10	30'-9	6351	56	4	13'-5	502	56	4	17'-0	636	56	4	15'-3	570	8059		
39	28'-3	60.8	48	10	31'-9	6558	58	4	13'-5	520	58	4	17'-0	659	58	4	15'-3	591	8328		
40	29'-3	62.9	48	10	32'-9	6764	60	4	13'-5	538	60	4	17'-0	681	60	4	15'-3	611	8594		

① SEE SHEET H40-24-14 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

LATEST REVISION DATE

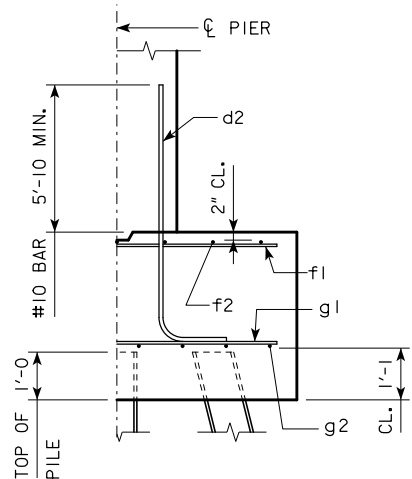
Harman L. McDaniel
APPROVED BY BRIDGE ENGINEER

Highway Division

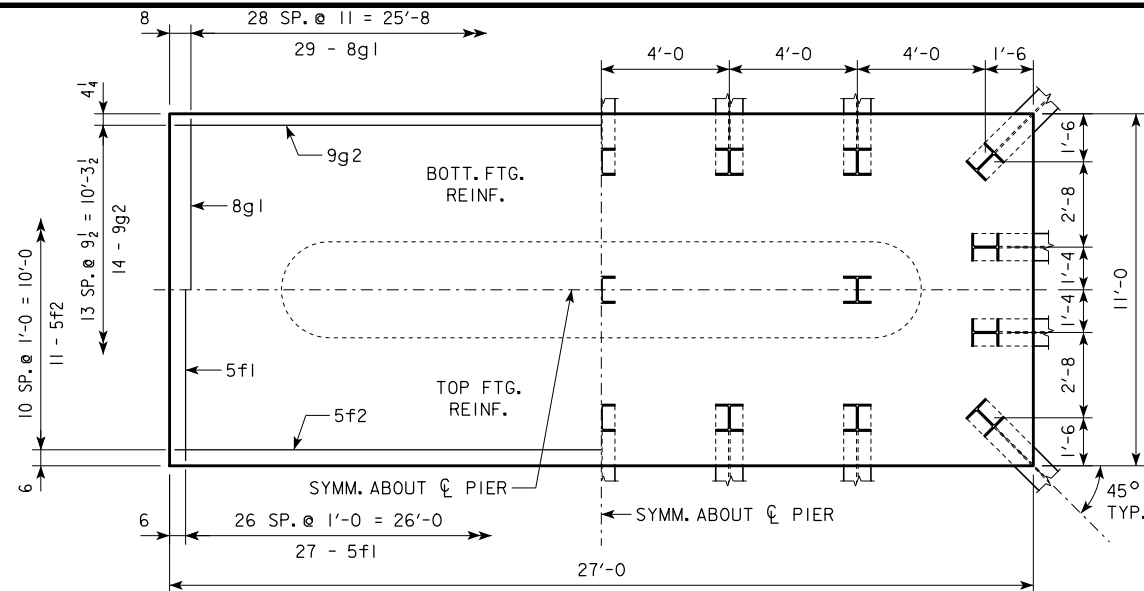
STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGES
SEPTEMBER, 2014

TEE PIER
CAP AND COLUMN
30° SKEW

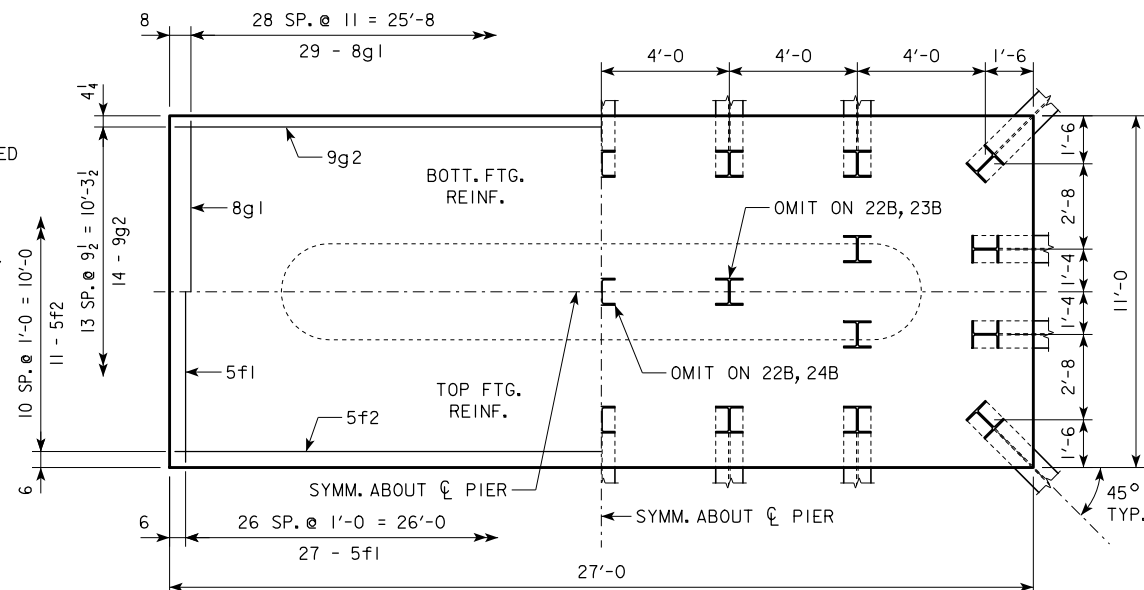
H40-74-14



TYPICAL SECTION

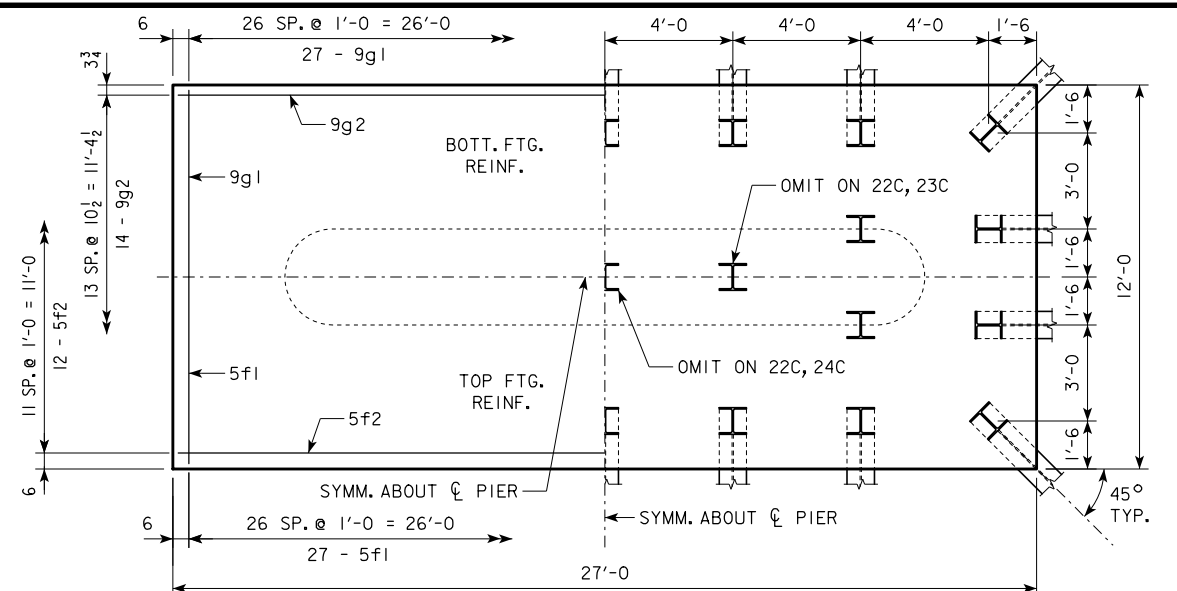


4'-0 x 11'-0 x 27'-0 FOR 21B

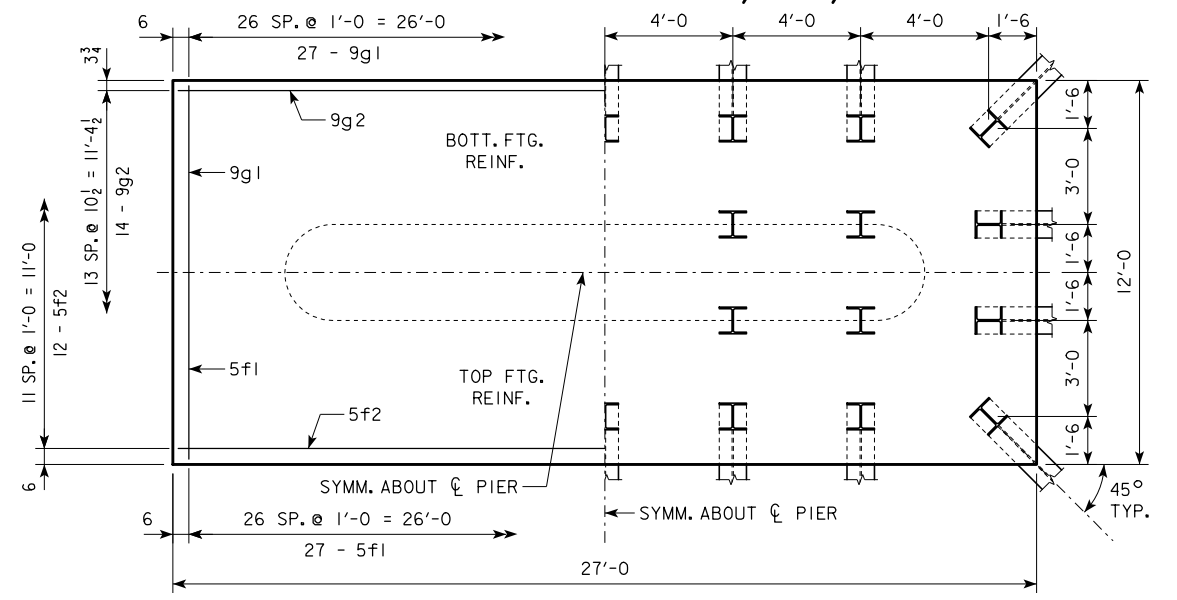


4'-0 x 11'-0 x 27'-0 FOR 22B, 23B, 24B & 25A

① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



4'-0 x 12'-0 x 27'-0 FOR 22C, 23C, 24C & 25B



4'-0 x 12'-0 x 27'-0 FOR 26A

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H40-73-14.

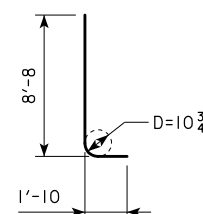
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

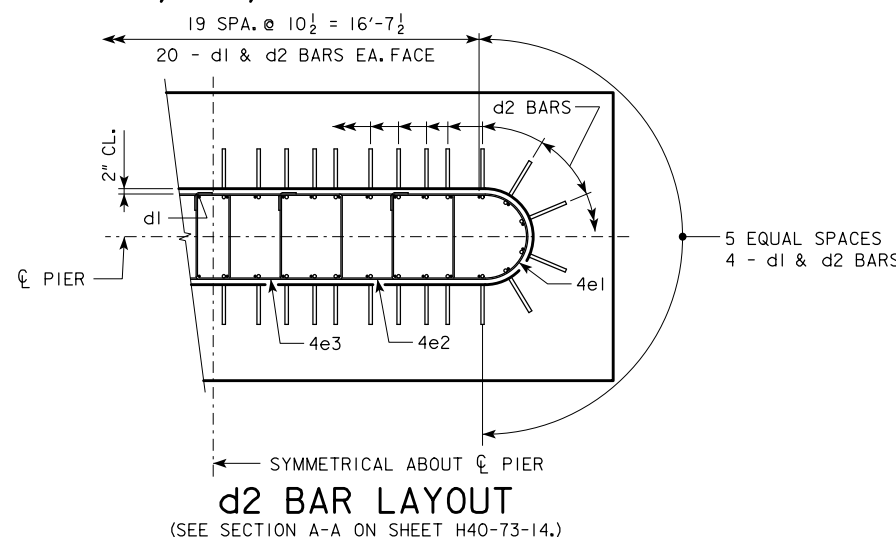
H IN FT.	CL - CL ABUT. BRG.	NO. & LAYOUT	① LFRD PU, STRENGTH I DES. LOAD (KIPS)	FOOTING SIZE
201'-4	21B		144	4' x 11' x 27'
213'-10	22B		141	
226'-4	23B		143	
243'-0	24B		144	
201'-4	22B		139	4' x 11' x 27'
213'-10	22B		144	
226'-4	23B		146	
243'-0	24B		146	
201'-4	22B		142	4' x 11' x 27'
213'-10	22B		147	
226'-4	24B		144	
243'-0	25A		145	
201'-4	22C		144	4' x 12' x 27'
213'-10	23C		144	
226'-4	24C		145	
243'-0	25B		147	
201'-4	23C		143	4' x 12' x 27'
213'-10	24C		143	
226'-4	25B		145	
243'-0	26A		145	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
4' x 11' x 27'	d2	48 - #10 AS SHOWN	10'-6	2169	4870	44.0
	f1	27 - #5 @ 1'-0	10'-8	300		
	f2	11 - #5 @ 1'-0	26'-8	306		
	g1	29 - #8 @ 0'-11	10'-8	826		
	g2	14 - #9 @ 0'-9 1/2	26'-8	1269		
4' x 12' x 27'	d2	48 - #10 AS SHOWN	10'-6	2169	5172	48.0
	f1	27 - #5 @ 1'-0	11'-8	329		
	f2	12 - #5 @ 1'-0	26'-8	334		
	g1	27 - #9 @ 1'-0	11'-8	1071		
	g2	14 - #9 @ 0'-10 1/2	26'-8	1269		



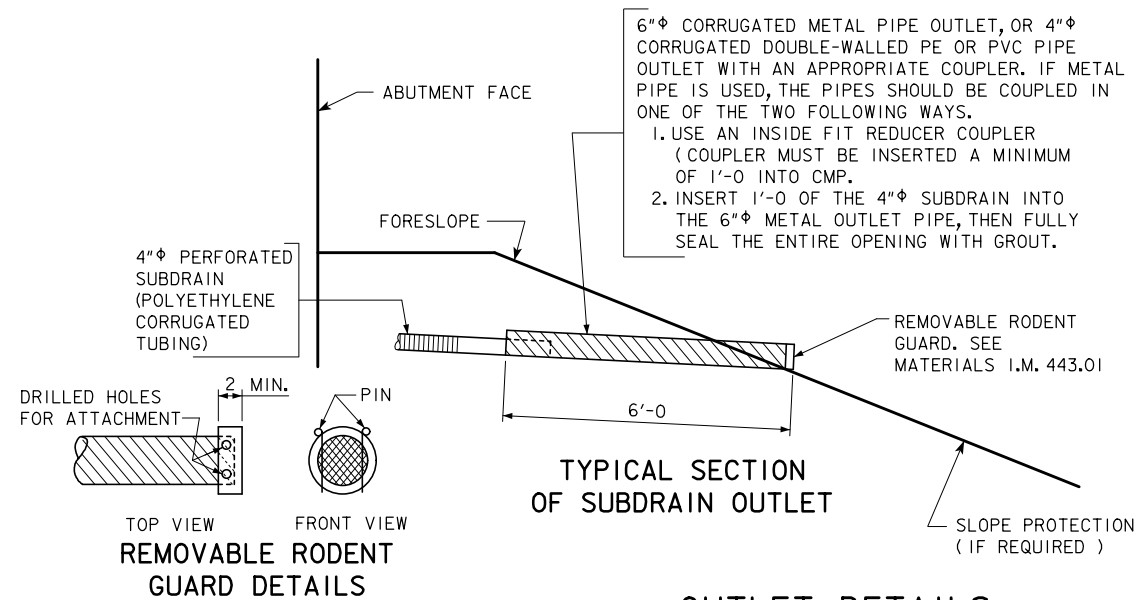
d2

NOTE: D = PIN DIAMETER. DIMENSIONS ARE OUT TO OUT.

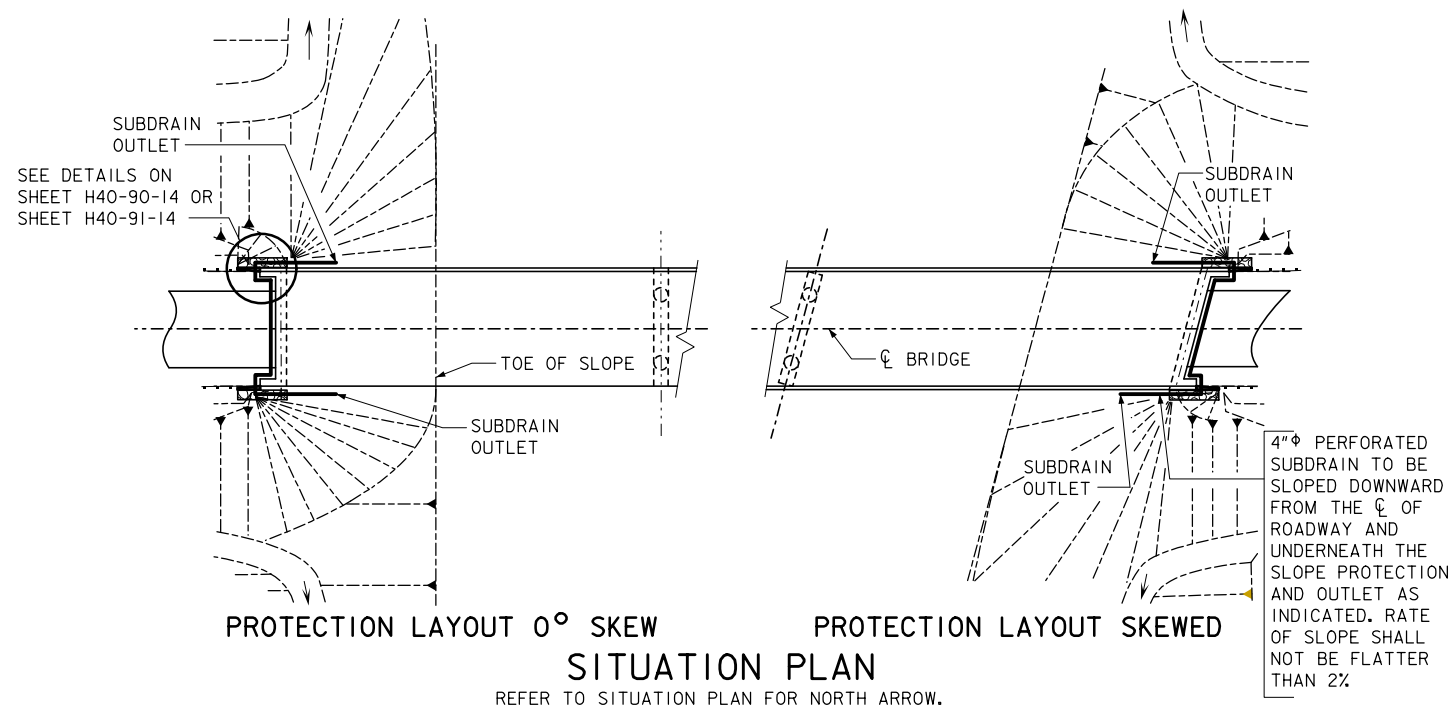


d2 BAR LAYOUT
(SEE SECTION A-A ON SHEET H40-73-14.)

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		TEE PIER-HPI0x57 SRL-1 STEEL PILE FOOTINGS 30° SKEW - H=25' TO 40'	
		H40-76-14	

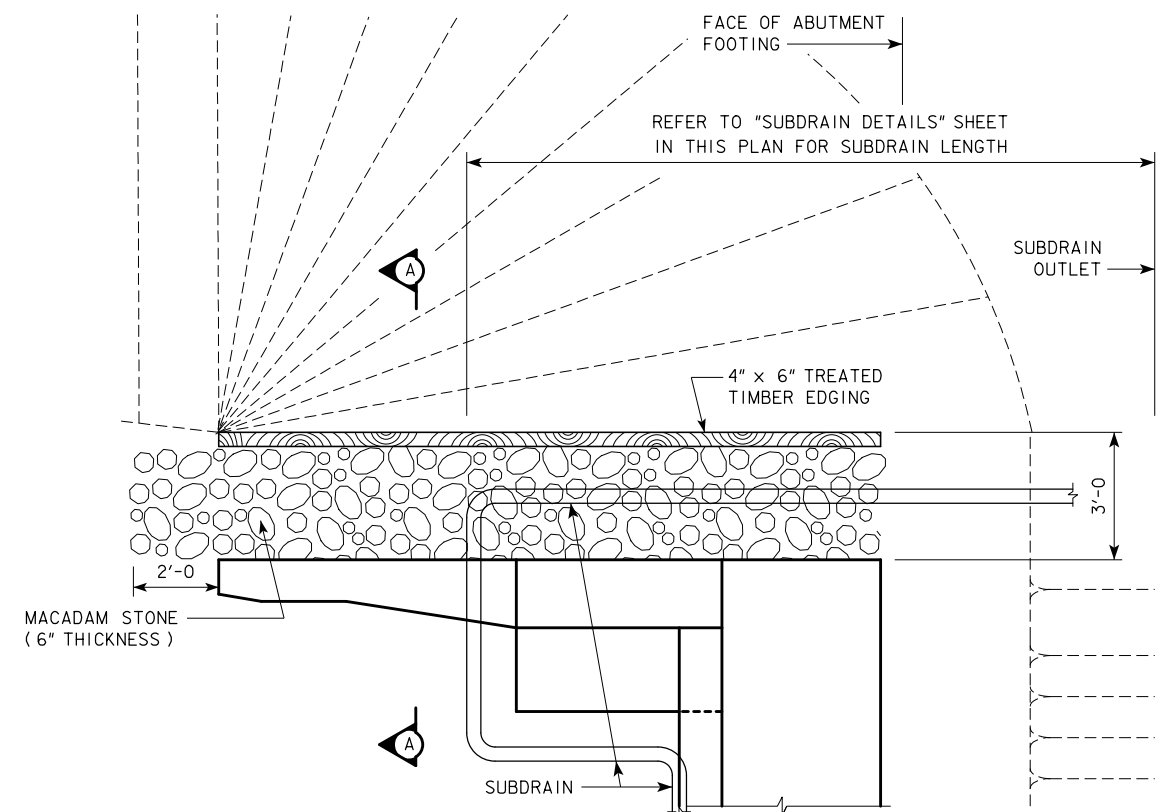


OUTLET DETAILS

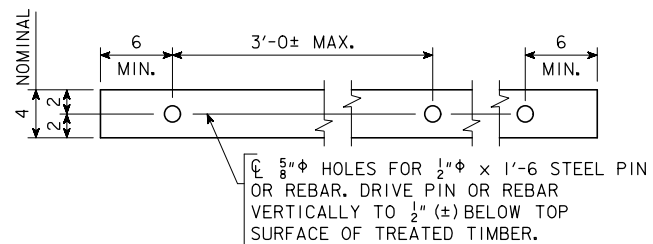


NOTE:
SEE ABUTMENT BACKFILL DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

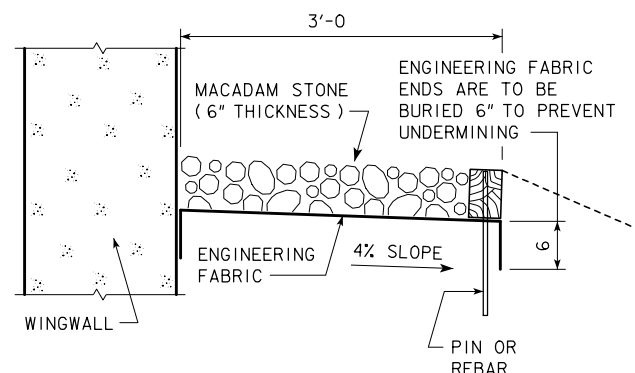
LATEST REVISION DATE	<i>Norman L. McQuinn</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		SUBDRAIN DETAILS	H40-89-14



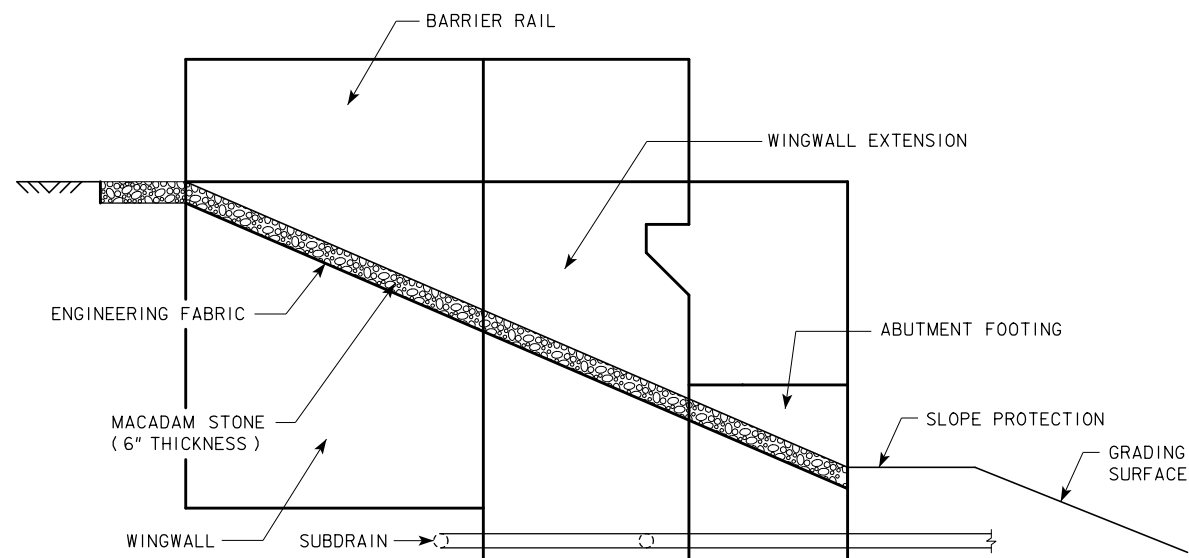
TOP VIEW OF WING ARMORING WITH WING EXTENSION



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A



PROFILE VIEW OF WING ARMORING WITH WING EXTENSION
(SHOWN FOR INTEGRAL ABUTMENT WITH WING EXTENSIONS)

SUBDRAIN NOTES:

SEE H40-89-14 AND "GENERAL ELEVATION DATA" SHEETS FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE BRIDGE CONTRACTOR IS TO INSTALL SUBDRAINS BEHIND THE ABUTMENT. THE SUBDRAINS SHALL BE 4" IN DIAMETER AND BE IN ACCORDANCE WITH ARTICLE 4143.01, B, OF THE STANDARD SPECIFICATIONS. THE SUBDRAIN OUTLET SHALL CONSIST OF A 6'-0 LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF BRIDGE BERMS. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

MACADAM STONE WING ARMORING NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC AND BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS.

THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

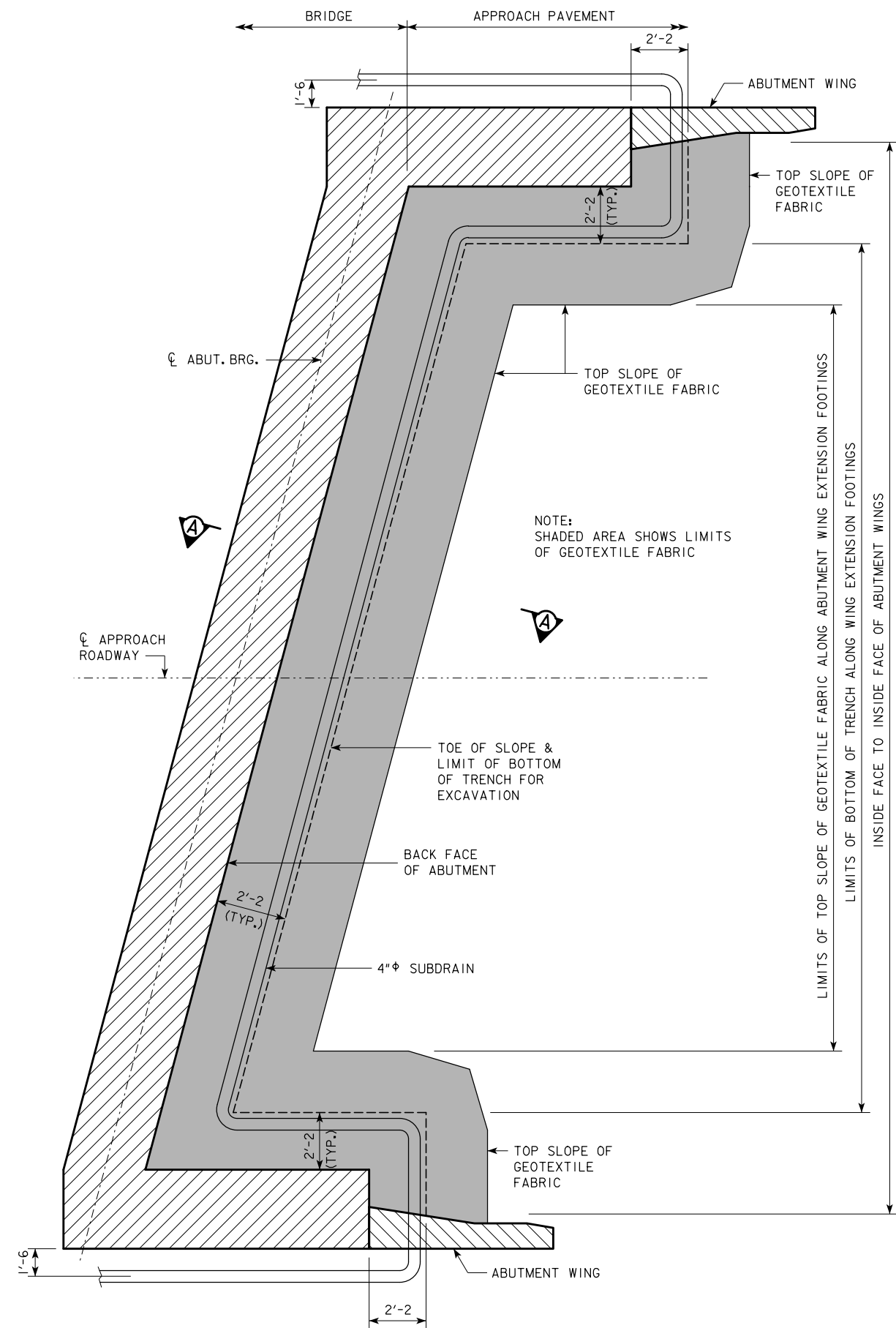
THE MACADAM STONE SHALL BE IN ACCORDANCE WITH ARTICLE 4122.02, OF THE STANDARD SPECIFICATIONS, FOR COARSE MATERIAL (NO CHOKE STONE IS ALLOWED).

WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, AND BE IN ACCORDANCE WITH SECTION 4161 OF THE STANDARD SPECIFICATIONS.

THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

THE BRIDGE WING ARMORING SHALL BE BID AS "BRIDGE WING ARMORING - MACADAM STONE" IN SQUARE YARDS AND SHALL INCLUDE COSTS OF ALL MATERIAL AND LABOR TO CONSTRUCT THE WING ARMORING AS SHOWN ON THESE PLANS.

LATEST REVISION DATE	<i>Harmon L. McDaniel</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		WING ARMORING DETAILS C BEAMS	H40-91-14



SKewed ABUTMENT PLAN WITH WING EXTENSIONS
(SKEWED LEFT AHEAD SHOWN, SKEWED RIGHT AHEAD SIMILIAR)

ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE SUBGRADE HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED IN THE BASE OF THE EXCAVATION AND EXTENDED VERTICALLY UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE FLOODABLE BACKFILL SHALL BE PLACED IN INDIVIDUAL LIFTS, SURFACE FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBDRAIN AND PROGRESS TO THE LOW POINT WHERE THE SUBDRAIN EXITS THE FABRIC. TO ENSURE UNIFORM SURFACE FLOODING, WATER RUNNING FULL IN A 2-INCH DIAMETER HOSE SHOULD BE SPRAYED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS FOR 5 MINUTES WITHIN EACH INCREMENT.

FLOODABLE BACKFILL LIFT PLACEMENT, FLOODING, AND COMPACTION SHALL PROGRESS UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING, SUBDRAINS, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

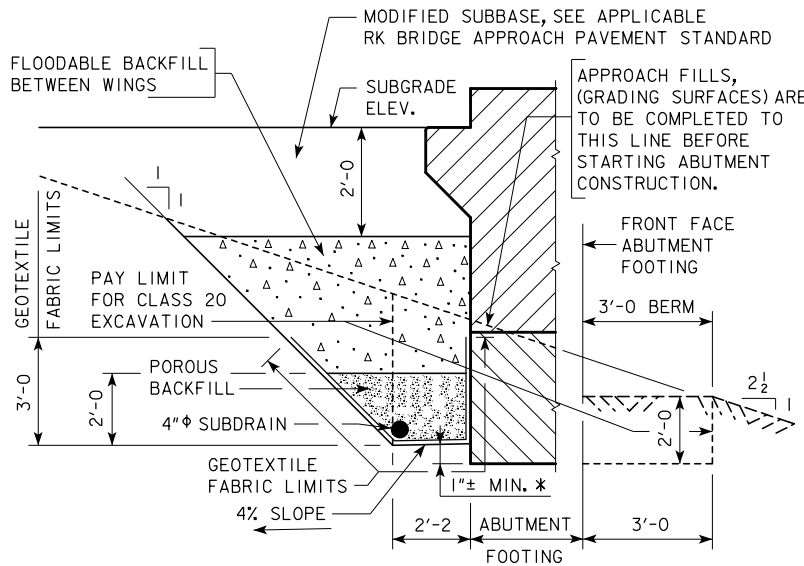
NOTE:
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM CL APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SHALL SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



SECTION A-A BACKFILL DETAILS

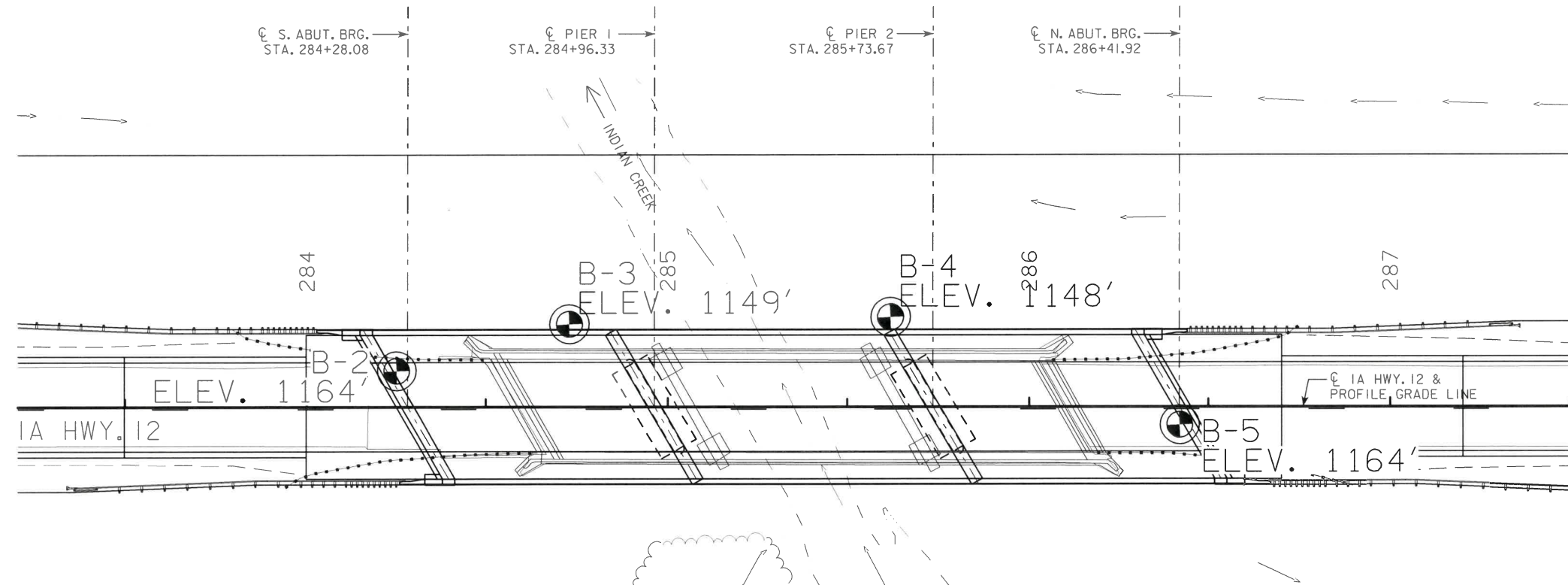
NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

LATEST REVISION DATE	<i>Harmon L. McDaniel</i> APPROVED BY BRIDGE ENGINEER	IOWA DOT Highway Division	
		STANDARD DESIGN - 40' ROADWAY, THREE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES SEPTEMBER, 2014	
		ABUTMENT BACKFILL DETAILS C BEAMS - SKEWED	H40-95-14

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION. DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

NOTE: SOILS MAY VARY BETWEEN BORINGS. SEE STANDARD SPECIFICATION 1104.01



GEOTECHNICAL DESIGN

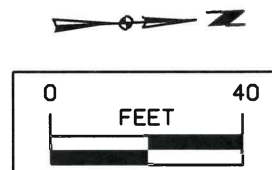


I hereby certify that this engineering document was prepared under my supervision and that engineering decisions with regard to the design were made by me or by other duly licensed Professional Engineers under the laws of the State of Iowa.

Signature: *Zachary A. Bonzer* Date: *9-21-2020*
ZACHARY A. BONZER
Printed or Typed Name

My license renewal date is December 31, 2020

Pages or sheets covered by this seal: SPS.1-SPS.2, CS.1,
& Q.1-Q.2



LOCATION

IA HWY 12
OVER INDIAN CREEK
T-93N R-48W
SECTION 09
PORTLAND TOWNSHIP
PLYMOUTH COUNTY
FHWA NO. 040021
BRIDGE MAINT. NO. 7538.9S012
LATITUDE 42.890556°
LONGITUDE -96.517222°

DESIGN FOR 30° SKEW (R.A.)

213'-10 x 40'-0 PRETENSIONED
PRESTRESSED CONC. BEAM BRIDGE

68'-3 END SPANS

77'-4 INTERIOR SPAN

SOIL PROFILE SHEET

STA. 285+35.00

PLYMOUTH COUNTY

IOWA DEPARTMENT OF TRANSPORTATION - HIGHWAY DIVISION
DESIGN SHEET NO. 1 OF 2 FILE NO. 31633 DESIGN NO. 221

FILE NO. 31633 ENGLISH DESIGN TEAM Iowa DOT/JEO/Terracon

PLYMOUTH COUNTY

PROJECT NUMBER BRF-012-2(32)--38-75

SHEET NUMBER SPS.1

100-0A
10-28-97

100-0A
10-28-97

100-4A
10-29-02

100-4A
10-29-02

FILE NO.	31633	DESIGN TEAM	Iowa DOT\JEO CONSULTING GROUP	PLYMOUTH COUNTY	PROJECT NUMBER	BRF-012-2(32)--38-75	SHEET NUMBER	C.1
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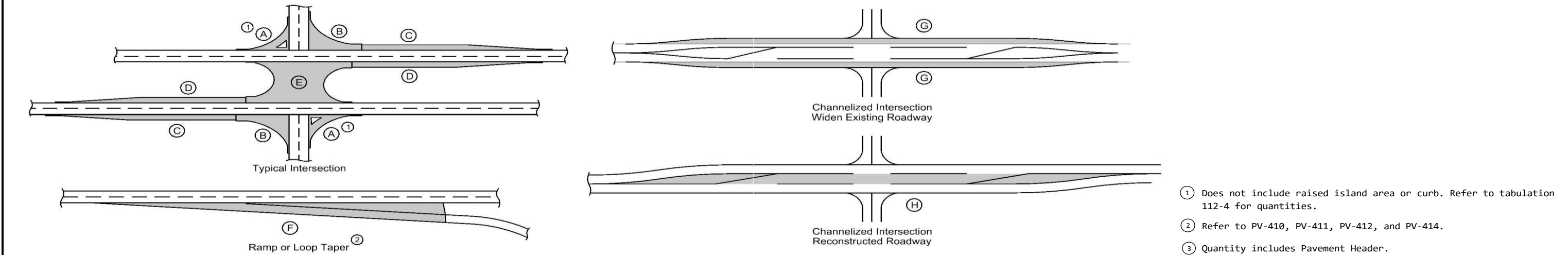
ESTIMATE REFERENCE INFORMATION			100-4A 10-29-02
Item No.	Item Code	Description	
		shall be replaced at the Contractor's expense. Replacement material shall be new. Method of measurement will be for the removal and reinstallation of each sign removed and reinstalled. Basis of payment is full compensation for all work and material needed to remove and reinstall each sign.	
26	2527-9263109	PAINTED PAVEMENT MARKING, WATERBORNE OR SOLVENT-BASED Refer to Tabulation 108-22 for locations and details.	
27	2528-2518000	SAFETY CLOSURE Refer to Tabulation 108-13A for locations and details.	
28	2528-8445110	TRAFFIC CONTROL Refer to J Sheets for Traffic Control details. The Iowa DOT will be responsible for furnishing, installing, maintaining, and removing signage for the designated detour route. Contractor shall place PDMS and safety closure as described in the J Sheets.	
29	2528-8445113	FLAGGERS Refer to J Sheets for Traffic Control details.	
30	2528-9290050	PORTABLE DYNAMIC MESSAGE SIGN (PDMS) Refer to J Sheets for location and message. Message sign to be placed 7 to 10 days prior to road closure.	
31	2529-5070110	PATCHES, FULL-DEPTH FINISH, BY AREA Refer to Tabulation 102-6C for locations and details.	
32	2529-5070120	PATCHES, FULL-DEPTH FINISH, BY COUNT Refer to Tabulation 102-6C for locations and details.	
33	2551-0000120	TEMP CRASH CUSHION, REDIRECTIVE (R) Refer to Tabulation 108-30 for locations and details.	
34	2595-0005130	RAILROAD PROTECTIVE LIABILITY INSURANCE FOR D & I RAILROAD CO. Refer to Special Provision "Work on Railroad Right-of-Way (D+I Railroad)" dated January 20, 2021. Railroad flaggers are considered incidental to this bid item.	
35	2599-9999009	ORANGE SAFETY FENCE Item includes the linear feet of orange safety fence installed along the railroad right-of-way and temporary easement line before construction begins. The fence shall extend to the limits of construction so that no equipment or work shall be on railroad property. Refer to Sheet H.1 for right-of-way information. Contractor shall remove safety fence at the end of the project. Measurement and payment shall be measured by the linear foot of orange safety fence installed. Removal of safety fence is considered incidental to this item and will not be paid separately.	
36	2601-2634100	MULCHING Refer to RC and RR sheets for locations and details. Mulching shall be placed to temporarily stabilize disturbed soil.	
37	2601-2636015	NATIVE GRASS SEEDING Refer to RC and RR Sheets for locations and details. Native grass seeding shall be placed beyond 8' offset of the edge of shoulder.	
38	2601-2636043	SEEDING AND FERTILIZING (RURAL) Refer to RC and RR Sheets for locations and details. Rural seeding and fertilizing shall be placed inside 8 foot offset of the edge of shoulder.	
39	2601-2642100	STABILIZING CROP - SEEDING AND FERTILIZING Refer to RC and RR Sheets for locations and details. Stabilizing crop shall be place to temporarily stabilize disturbed soil areas between construction staging.	
40	2602-0000020	SILT FENCE Refer to Tabulation 100-17 on Sheet RC.1 and RR sheets for locations and details. The tabulation includes estimated locations for placement of Silt Fence to address possible erosion during construction. Verify the specific locations with the Engineer prior to beginning placement. Bid item includes 25% additional quantity for field adjustments and replacements.	
41	2602-0000071	REMOVAL OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS Item is for silt fence and silt fence for ditch check removal required for staging reasons, for replacement (replacement to be paid separately), or for areas that have achieved 70% permanent growth.	
42	2602-0000101	MAINTENANCE OF SILT FENCE OR SILT FENCE FOR DITCH CHECKS Item is for cleanout and repair of the silt fence and silt fence for ditch checks during the project.	
43	2602-0000212	FLOATING SILT CURTAIN (HANGING) Refer to Tabulation 100-10 on Sheet RC.1 and RR Sheets for locations and details. Refer to Developmental Specification DS-15019 "Floating Silt Curtain", Date: 10/20/15 for additional details.	
44	2602-0000240	MAINTENANCE FLOATING SILT CURTAIN (HANGING) Item is for cleanout and repair of the floating silt curtain during the project. Refer to Developmental Specification DS-15019 "Floating Silt Curtain", Date: 10/20/15 for additional details.	
45	2602-0010010	MOBILIZATIONS, EROSION CONTROL Quantity is for installation and maintenance of erosion control within the project limits.	

ESTIMATE REFERENCE INFORMATION			100-4A 10-29-02
Item No.	Item Code	Description	
46	2602-0010020	MOBILIZATIONS, EMERGENCY EROSION CONTROL Quantity is for repair and reinstallation of erosion control due to events requiring emergency measures as determined by the Engineer.	
		ALTERNATE A - OPTION 1	
47	2102-0425070	SPECIAL BACKFILL Refer to Tabulation 112-9 and B Sheets for locations and details. Item is for the construction of subbase under paved shoulders.	
48	2122-5500090	PAVED SHOULDER, HOT MIX ASPHALT MIXTURE, 9 IN. Refer to Shee B.2 and Tabulation 112-9 for locations and details.	
		ALTERNATE A - OPTION 2	
47	2102-0425070	SPECIAL BACKFILL Refer to Tabulation 112-9 and B Sheets for locations and details. Item is for the construction of subbase under paved shoulders.	
48	2122-5190008	PAVED SHOULDER, P.C. CONCRETE, 8 IN. Refer to Shee B.2 and Tabulation 112-9 for locations and details.	

INDEX OF TABULATIONS			111-25 10-18-11
Tabulation	Tabulation Title	Sheet No.	
C Sheets			
100-0A	ESTIMATED ROADWAY QUANTITIES (1 DIVISION PROJECT)	C.1	
100-4A	ESTIMATE REFERENCE INFORMATION	C.1 - C.2	
100-24	PCC PAVEMENT	C.4	
100-28	LONGITUDINAL GROOVING	C.5	
102-5	EXISTING PAVEMENT	C.4	
102-6C	FULL-DEPTH PATCHES	C.5	
104-8A	SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN	C.5	
105-4	STANDARD ROAD PLANS	C.3	
107-22	WING DIKES	C.5	
107-23	GRADING FOR GUARDRAIL INSTALLATIONS	C.6	
108-8A	STEEL BEAM GUARDRAIL AT CONCRETE BARRIER OR BRIDGE RAIL END SECTION	C.5	
108-13A	SAFETY CLOSURES	C.5	
108-22	PAVEMENT MARKING LINE TYPES	C.7	
108-30	CRASH CUSHIONS	C.7	
110-1	REMOVAL OF PAVEMENT	C.5	
110-17	CLEARING AND GRUBBING	C.7	
111-25	INDEX OF TABULATIONS	C.3	
110-7A	REMOVAL OF STEEL BEAM GUARDRAIL	C.6	
112-6	BRIDGE APPROACH SECTION	C.4	
112-9	SHOULDERS	C.6	
190-61	EXISTING SIGNS TO BE REINSTALLED	C.6	

STANDARD ROAD PLANS			105-4 10-18-11
The following Standard Road Plans apply to construction work on this project.			
Number	Date	Title	
BA-200	04-16-19	Steel Beam Guardrail Components	
BA-201	04-18-17	Steel Beam Guardrail Barrier Transition Section (MASH TL-3)	
BA-202	10-20-15	Steel Beam Guardrail Bolted End Anchor	
BA-205	04-19-16	Steel Beam Guardrail Tangent End Terminal (MASH TL-3)	
BA-250	10-18-16	Steel Beam Guardrail Installation at Concrete Barrier or Bridge End Post (MASH TL-3)	
BA-500	04-19-16	Temporary Crash Cushions Sand Barrel	
BR-101	04-21-15	Bridge Approach Section (General Details)	
BR-203	10-17-17	Double Reinforced 12" Approach	
BR-211	10-17-17	Bridge Approach (Abutting PCC or Composite Pavement)	
DR-303	10-17-17	Subdrains (Longitudinal)	
DR-306	10-16-18	Precast Concrete Headwall for Subdrain Outlets	
DR-402	10-15-19	Rock Flume for Bridge End Drain	
EC-201	10-15-19	Silt Fence	
EC-202	10-21-14	Floating Silt Curtain	
EC-204	04-21-20	Perimeter and Slope Sediment Control Devices	
EC-502	04-21-15	Seeding in Rural Areas	
EW-101	10-17-17	Embankment and Rebuilding Embankments	
EW-102	10-20-15	Allowable Placement of Unsuitable Soil in Embankments	
EW-103	10-20-15	Embankment Subgrade Treatment, Moisture Density Control and Special Compaction	
EW-201	04-19-16	Bridge Berm Grading without Recoverable Slope (Barnroof Section)	
EW-210	10-20-15	Standard Wing Dikes	
EW-301	10-20-15	Guardrail Grading	
EW-401	10-20-15	Temporary Stream Crossing, Causeway, or Equipment Pad	
EW-403	04-18-17	Temporary Erosion Control Measures	
PM-110	04-21-20	Line Types	
PM-120	10-21-14	Stop Lines and Islands	
PR-103	04-21-20	Full Depth PCC Patch with Dowels	
PV-3	04-16-19	Safety Edge	
PV-101	04-21-20	Joints	
PV-102	04-21-20	PCC Curb Details	
SI-101	04-19-16	Locations - Type 'A' Signs	
SI-111	04-19-16	Support Structures - Wood Posts	
SI-121	10-16-18	Fabrication - Sign Legend Components	
SI-131	10-18-16	Installation - Type 'A' Signs	
SI-171	04-18-17	Reference Location Sign Posts	
SI-173	04-19-16	Object Markers	
SI-211	10-18-16	Object Marker and Delineator Placement with Guardrail	
SI-881	04-16-19	Special Signs for Workzones	
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)	
TC-202	04-21-15	Work Within 15 ft of Traveled Way	
TC-211	10-15-19	Lane Closure on Low Volume Roadway	
TC-212	04-21-20	Spot Location Lane Closure with Flaggers	
TC-233	10-17-17	Pavement Marking Operations Two-Lane	
TC-252	04-21-20	Routes Closed to Traffic	

PCC PAVEMENT



Location				Mainline			Area (3)								Total Area By Pavement Thickness		Special Backfill	Modified Subbase	Granular Subbase	Remarks
Road Identification	Direction of Travel	Station to Station		Width	Length	Area	<div><div>A</div><div>1</div></div>	<div><div>B</div><div>2</div></div>	<div><div>C</div><div>3</div></div>	<div><div>D</div><div>4</div></div>	<div><div>E</div><div>5</div></div>	<div><div>F</div><div>6</div></div>	<div><div>G</div><div>7</div></div>	<div><div>H</div><div>8</div></div>						
							FT	FT	SY	SY	SY	SY	SY	SY	SY	SY				
		SY															9 IN	0	TONS	
IA Highway 12	Both	282+50.00	283+49.80	28.0	99.8	310.5									310.5			103.5		
IA Highway 12	Both	287+20.20	288+70.00	28.0	149.8	466.0									466.0			155.3		
														Total =	776.5		Total =	258.8	(Refer to 112-9 for Modified Subbase quantity under shoulders.)	

BRIDGE APPROACH SECTION

Refer to the BR Series.

* Not a bid item

Location				Approach Pavement					Standard Road Plans BR Series			Subdrain				*	*	*	*	Remarks
Bridge Station	End	Skew Ahead		<div>T</div> Thickness	Pay Length	Non-Reinf. Pavement Area	Single-Reinf. Pavement Area	Double-Reinf. Pavement Area				Perforated Subdrain 4"	Subdrain Outlet		Porous Backfill					
		Degrees							Approach	Fixed or Movable Abutment	Abutting Pavement		CY							
		LEFT	RIGHT	Inches	FT	SY	SY	SY				LF		STA	Side	CY	TON	SY	TON	
285+35.00	South	--	30	12.0	76.5	93.3	62.2	123.8	BR-203	Movable	BR-211	52.0	283+59.80	Left	1.5	0.2	269.700	297.6		
285+35.00	North	--	30	12.0	76.5	93.3	62.2	123.8	BR-203	Movable	BR-211	52.0	287+10.20	Left	1.5	0.2	269.700	297.6		
						Total =	558.6													

EXISTING PAVEMENT

No.	Location					Year	Type	Project Number	Surface		Base		Subbase		Removal		Coarse Aggregate			Reinforcement	Remarks
	County	Route	Dir. of Travel	Begin Ref. Loc. Sign	End Ref. Loc. Sign				Type	Depth	Type	Depth	Type	Depth	Type	Depth	Source	Type	Durability Class	Type	
1		IA 12	Both	33.52	40.24	1954		P-1056	BSC	6						Chatsworth	Gravel				
2		IA 12	Both	33.52	40.24	1967		FN-12-2(1)--21-75	BAC	1.5	TBB	1.5				Hawarden	Gravel				
3		IA 12	Both	33.52	40.24	1987		MP-12-3(1)34--76-7	BSC												
4		IA 12	Both	33.52	40.24	1997		STPN-12-2(13)--27-75	AAC	1.5	ACC	3									