

DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current <1550	Pass: 1240	Trucks: 310	Total: 1550	
Forecast <2800	Pass: 2240	Trucks: 560	Total: 2800	
Clear Zone Distance: _____		Design Speed: 25		
Minimum Sight Dist. for Stopping: _____		Bridges: _____		
Minimum Sight Dist. for Safe Passing: _____				
Sight Dist. for No Passing Zone: _____				
Pavement Design Life 20 (years)				



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State	PROJECT No.	PCN	Section No.	Page No.
N.D.	CH1107		001	1

CASS COUNTY HIGHWAY DEPARTMENT

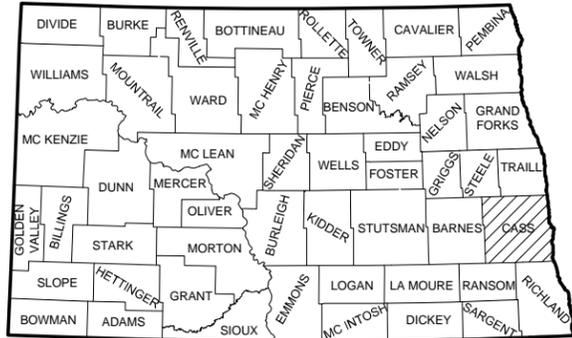
PLANS

FOR THE PROPOSED IMPROVEMENT OF

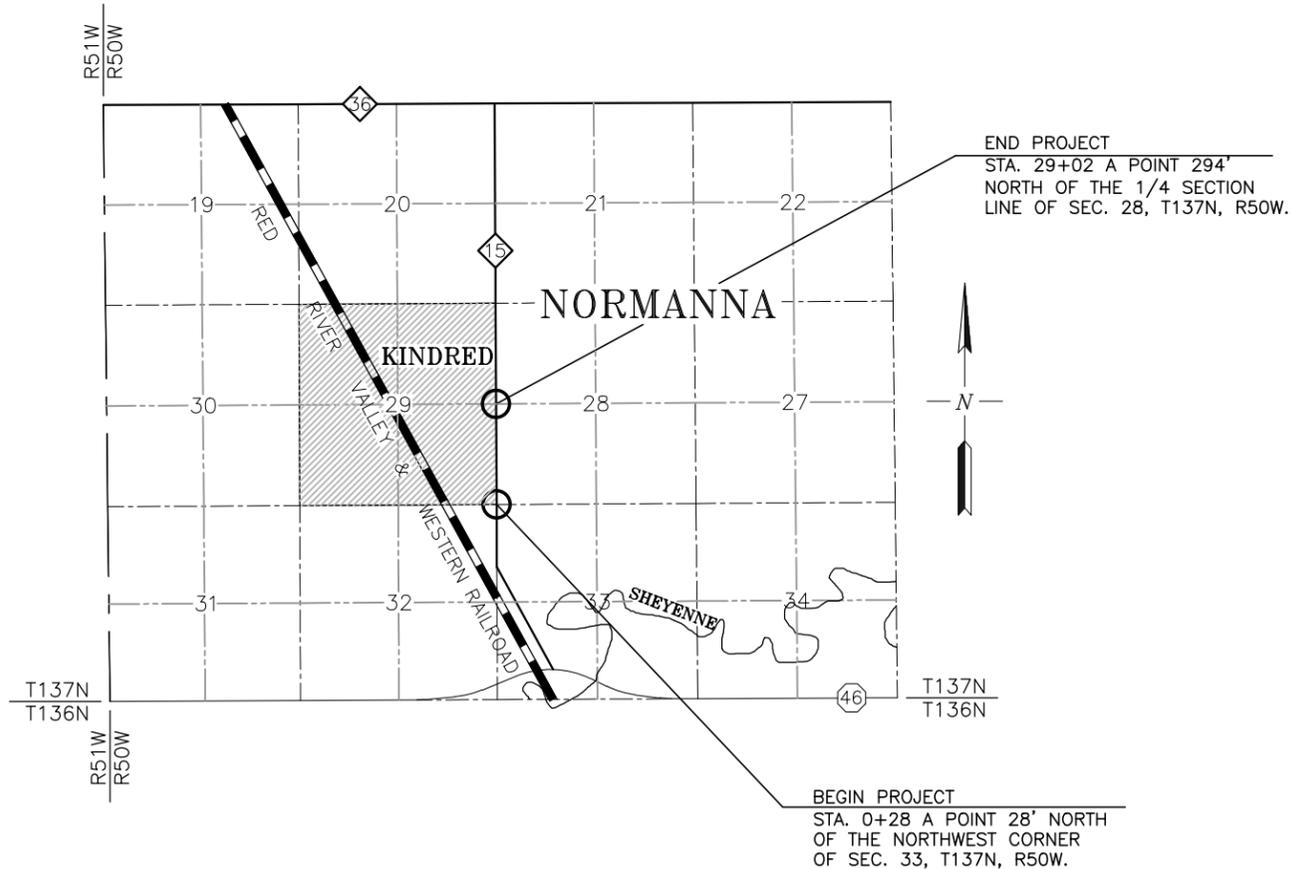
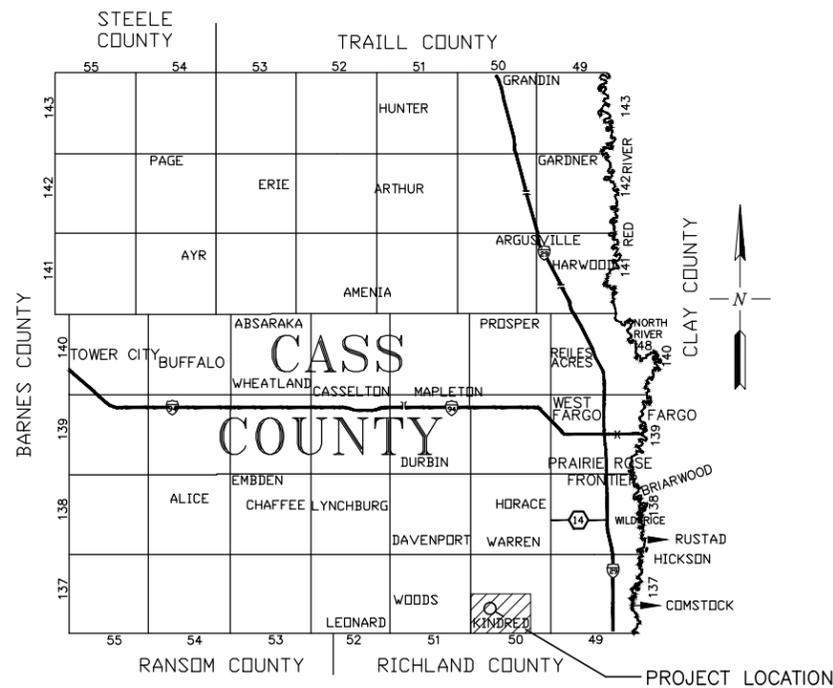
COUNTY HIGHWAY 15

COUNTY PROJECT NO. CH1107

GOVERNING SPECIFICATIONS:
 STANDARD SPECIFICATIONS ADOPTED BY THE
 NORTH DAKOTA DEPARTMENT OF
 TRANSPORTATION, OCTOBER 2008; STANDARD
 DRAWINGS CURRENTLY IN EFFECT; AND OTHER
 CONTRACT PROVISIONS SUBMITTED HEREIN.



SKETCH MAP OF NORTH DAKOTA
 SHOWING COUNTIES



LENGTH OF PROJECT

MILES GROSS	MILES NET
.55	.55

This document was originally issued and sealed by BRANDON OYE, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

DESIGNERS

Brandon Oye, PE

APPROVED BY CASS COUNTY ENGINEER:

JASON BENSON /s/
 JASON BENSON N.D. REG. NO. 7490

DATE: 04/17/13

SECTION	SHEET	DESCRIPTION
1	1	TITLE SHEET
2	1	TABLE OF CONTENTS
2	2	LEGEND
6	1-5	NOTES
8	1	ESTIMATED QUANTITIES
10	1-5	BASIS OF ESTIMATE
11	1	EARTHWORK SUMMARY
11	2	SIGN SUMMARY
20	1-2	GENERAL DETAILS
30	1-7	TYPICAL SECTIONS
40	1-3	REMOVALS
50	1	STORM STRUCTURE SCHEDULE
60	1-9	PLAN AND PROFILE - UNDERGROUND UTILITIES
60	10-17	PLAN AND PROFILE - STREET
70	1-3	EXISTING TOPOGRAPHIC SURVEY
75	1-2	EROSION AND SEDIMENT CONTROL
81	1	SURVEY COORDINATE AND CURVE DATA
100	1	TRAFFIC CONTROL DEVICES LIST
100	2	DETOUR PLAN
100	3-4	WORK ZONE TRAFFIC CONTROL
200	1-6	CROSS SECTIONS

STANDARD DRAWINGS

D-704-4	WORK ZONE BUSINESS SIGN DETAILS
D-704-5	CONSTRUCTION SIGN DETAIL
D-704-7	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS
D-704-8	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS
D-704-9	CONSTRUCTION SIGN DETAILS
D-704-10	CONSTRUCTION SIGN DETAILS
D-704-11	CONSTRUCTION SIGN DETAILS
D-704-12	CONSTRUCTION SIGN DETAILS
D-704-12	CONSTRUCTION SIGN DETAILS
D-704-13	BARRICADE DETAILS AND CHANNELIZING DEVICES
D-704-14	CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS
D-708-5	EROSION AND SILTATION CONTROL BLANKET INSTALLATION
D-708-7	EROSION CONTROL FIBER ROLL STAKING DETAILS
D-714-01	REINFORCED CONCRETE PIPE CULVERT AND END SECTIONS
D-714-04	CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS
D-714-18	EDGEDRAIN DETAILS
D-714-22	CONCRETE PIPE TIES
D-714-26	TRANSVERSE CENTERLINE PIPE BACKFILL FOR PIPES 4 FEET OR LESS BELOW PROPOSED GRADE
D-714-27	PIPE BACKFILL FOR STORM DRAIN UNDER ROADWAYS OF 40 MPH OR LESS AND PIPE NOT UNDER ROADWAY
D-722-1	INLET - TYPE I
D-722-5	MANHOLE DETAILS
D-748-1	VALLEY GUTTER AND CURB & GUTTER
D-750-1A	CONCRETE DRIVEWAY TYPE 2 AND 3 (URBAN)
D-750-2	SIDEWALK
D-750-3	CURB RAMP DETAILS
D-752-2	CHAIN LINK FENCE
D-754-23	ASSEMBLY DETAILS
D-754-25	MOUNTING DETAILS PERFORATED TUBE
D-754-26	SIGN PUNCHING, STRINGING AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS
D-754-27	SIGN PUNCHING, STRINGING AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS
D-762-1	PAVEMENT MARKING MESSAGE DETAILS

LEGEND

	BENCHMARK		NEW LIGHT POLE
	IRON MONUMENT FOUND		NEW SIGN
	EXISTING GAS LINE MARKER OR VALVE		NEW CULVERT W/F.E.S.
	EXISTING SIGN		NEW CURB STOP
	EXISTING CULVERT W/F.E.S.		NEW HYDRANT W/GATE VALVE
	EXISTING CURB STOP		NEW GATE VALVE
	EXISTING HYDRANT W/GATE VALVE		NEW SANITARY SEWER MANHOLE
	EXISTING GATE VALVE		NEW STORM SEWER INLET/MANHOLE/MULTI-MANHOLE
	EXISTING SANITARY SEWER MANHOLE		NEW PLUG
	EXISTING STORM SEWER INLET/MANHOLE/MULTI-MANHOLE		NEW FITTINGS
	EXISTING UTILITY MANHOLE		NEW WATER MAIN
	EXISTING PLUG		NEW SANITARY SEWER
	EXISTING FITTINGS		NEW STORM SEWER
	EXISTING WATER MAIN		NEW FORCEMAIN
	EXISTING SANITARY SEWER		NEW SANITARY CLEANOUT
	EXISTING STORM SEWER		NEW SANITARY SEWER SERVICE
	EXISTING SANITARY FORCEMAIN		NEW WATER SERVICE W/CURB STOP
	EXISTING UNDERGROUND TELEPHONE		INSULATION PER DETAIL
	EXISTING UNDERGROUND TELEVISION		FUTURE BACK OF CURB
	EXISTING UNDERGROUND FIBER		NEW INFLOW CURB AND GUTTER (MOUNTABLE/KNOCKED DOWN)
	EXISTING UNDERGROUND ELECTRIC		NEW INFLOW CURB AND GUTTER (HIGHBACK)
	EXISTING OVERHEAD ELECTRIC		NEW OUTFLOW CURB AND GUTTER (HIGHBACK)
	EXISTING FENCE		NEW ASPHALT PAVEMENT
	EXISTING UTILITY PEDESTAL		NEW CONCRETE PAVEMENT
	EXISTING LIGHT POLE		NEW CONCRETE DRIVEWAY
	EXISTING POWER POLE		NEW CONCRETE SIDEWALK
	EXISTING TREE		NEW DECORATIVE COLORED CONCRETE
	EXISTING ASPHALT PAVEMENT		NEW DETECTABLE WARNING PANEL
	EXISTING CONCRETE PAVEMENT		NEW RIPRAP
	EXISTING CURB AND GUTTER		NEW COMMUNITY BLOCK UNIT
	CURB AND GUTTER REMOVAL & REPLACEMENT		NEW LARGE DECIDUOUS TREE
	EXISTING GRAVEL		NEW SMALL DECIDUOUS TREE
	REMOVE EXISTING PAVEMENT		NEW LARGE EVERGREEN TREE
	EXISTING SIDEWALK/MULTI-USE PATH		NEW SMALL EVERGREEN TREE
	EXISTING WETLANDS		NEW SHRUB

EROSION CONTROL

	DITCHING/REAR YARD GRADING, SEEDING, MULCHING
	SEDIMENTATION CONTROL WATTLE
	SEDIMENTATION CONTROL FENCE
	ROCK CHECK/SEDIMENTATION CONTROL WATTLE
	10' (MIN.) UNDISTURBED GRASS BUFFER
	SEEDED & MULCHED AREAS
	INLET PROTECTION DEVICE
	INLET PROTECTION-SEDIMENTATION CONTROL WATTLE
	DRAINAGE BREAK LINE
	FINISHED DRAINAGE DIRECTION & SLOPE
	EXISTING DRAINAGE DIRECTION
	EXISTING CONTOUR ELEV.
	GRADE ELEVATIONS
<p>ABBREVIATIONS: BOC = BACK OF CURB BOW = BACK OF WALK CL = CENTERLINE ECC = EDGE OF CRUSHED CONCRETE EOC = EDGE OF CONCRETE EOP = EDGE OF PAVEMENT EOW = EDGE OF WALK EX = EXISTING GRADE FG = FINISHED GRADE FL = FLOWLINE HP = HIGH POINT I-# = STORM SEWER INLET LP = LOW POINT MATCH = MATCH EX. GRADE M# = STORM SEWER MANHOLE MT# = STORM SEWER TEE MANHOLE MM# = MULTI-MANHOLE MC = MIDPOINT OF CURVATURE PC = POINT OF CURVATURE PT = POINT OF TANGENCY RIM = RIM OF INLET S# = SANITARY SEWER MANHOLE TOC = TOP OF CONCRETE TOW = TOP OF WALK</p>	



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.
CH1107

Section No. 6
Page No. 1

930-P01 QC/QA TESTING: THE ALLOWANCE PRICE BID SHALL BE USED FOR MATERIAL TESTING AS REQUIRED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING TIMING OF TESTS. THE CONTRACTOR SHALL SUBMIT TO ENGINEER INVOICES FOR THIRD PARTY TESTING SERVICES AND WILL BE REIMBURSED THROUGH PROJECT PAYMENTS. ANY RETESTING FOR FAILING TESTS WILL NOT BE REIMBURSED.

100-P01 GENERAL PROVISIONS:
QUANTITIES ARE ROUNDED TO THE NEAREST WHOLE UNIT FOR BIDDING PURPOSES.

THE COST OF THOSE ITEMS SHOWN ON PLANS BUT NOT LISTED IN THE ESTIMATE OF QUANTITIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OTHER ITEMS.

FOR ALL CONSTRUCTION PAID FOR ON A WEIGHT OR VOLUME BASIS THICKNESS INDICATED ARE APPROXIMATE, AND MAY VARY TO CORRECT FOR UNEVENNESS IN THE FOUNDATION OR OTHER NORMAL UNEVENNESS ENCOUNTERED IN THE PLACEMENT OPERATIONS.

THE ATTENTION OF THE BIDDERS IS DIRECTED TO M.S. 298.75 (AGGREGATE MATERIAL TAX), PURSUANT TO THE REMOVAL OF AGGREGATES FROM ANY DEPOSIT IN CLAY COUNTY MINNESOTA.

100-P02 CULTURAL RESOURCE PRESERVATION AND CLEARANCES OF GRAVEL PITS: IN ACCORDANCE WITH SECTION 107.04B OF THE STANDARD SPECIFICATIONS, THE CONTRACTOR IS REQUIRED TO ENSURE THAT APPLICABLE CULTURAL RESOURCE LAWS AND REGULATIONS HAVE BEEN FOLLOWED FOR ALL MATERIAL SOURCES. TO ENSURE COMPLIANCE THE CONTRACTOR MUST CONTACT THE NDDOT ARCHAEOLOGIST AT (701) 238-4539 AND FOLLOW THEIR RECOMMENDATIONS. ALL MATERIAL SOURCE LOCATIONS, EVEN THOSE OPENED PRIOR TO THE CURRENT PROJECT, MUST HAVE BEEN SUBJECTED TO CLASS III CULTURAL RESOURCES INVENTORY PRIOR TO USE. INVENTORY RESULTS WILL DETERMINE RECOMMENDATIONS REGARDING USE OF A PARTICULAR SOURCE. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 203.02A OF THE STANDARD SPECIFICATIONS FOR THE TREATMENT OF ANY CULTURAL RESOURCES THAT MAY BE UNCOVERED WITHIN THE RIGHT OF WAY.

100-P03 CONSTRUCTION PROGRESS SCHEDULE: PRIOR TO THE PRE-CONSTRUCTION CONFERENCE THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A "BAR GRAPH" OR "LINE OF BALANCE CONSTRUCTION" SCHEDULE AND WRITTEN NARRATIVE ESTABLISHING THE CRITICAL CONSTRUCTION OPERATION. THE SCHEDULE SHALL ILLUSTRATE ALL MAJOR CONSTRUCTION ACTIVITIES INCLUDING, BUT NOT LIMITED TO, ANY SUB-CONTRACTED WORK, MATERIAL INSTALLATION, UTILITY RELOCATION, AND ANY OTHER ACTIVITIES THAT MAY AFFECT THE CRITICAL PATH. THE SCHEDULE SHALL ILLUSTRATE SCHEDULED AND ACTUAL PROGRESS. AN UPDATED SCHEDULE ILLUSTRATING PROGRESS SHALL BE SUBMITTED WEEKLY. THE COST OF THIS ITEM SHALL BE INCIDENTAL TO THE PRICE BID FOR OTHER ITEMS.

100-P04 UTILITIES: UTILITIES THAT THE ENGINEER HAS BEEN MADE AWARE OF ARE SHOWN ON THE PLANS. NOT ALL UTILITIES MAY BE SHOWN. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE COORDINATION OF ALL UTILITY RELOCATION NECESSARY FOR THE CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND NOTIFY ALL UTILITY COMPANIES PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR WILL BE LIABLE FOR ANY COST RESULTING FROM DAMAGE TO UTILITIES, OR CONSTRUCTION DELAYS RELATING TO UTILITY RELOCATION. THE CONTRACTOR WILL NOT BE RESPONSIBLE FOR THE COSTS OF RELOCATING UTILITIES IF NECESSARY.

BELOW IS A LIST OF KNOWN UTILITY COMPANIES THROUGH THE NORTH DAKOTA ONE-CALL SYSTEM:

<u>COMPANY NAME</u>	<u>PHONE NUMBER</u>
BRAATEN CABINETS, INC.	(701) 428-3691
CASS COUNTY ELECTRIC COOP	(701) 356-4471
CASS RURAL WATER USERS, INC.	(701) 428-3139
CITY OF KINDRED	(701) 428-3115
MOORE & LIBERTY TELEPHONE	(701) 437-3300
MVM CONTRACTING, INC.	(701) 205-1330
OTTER TAIL POWER COMPANY	(800) 257-4044
CENTURYLINK	(800) 283-4237

100-P05 WEEKLY PLANNING/REPORTING MEETING: THIS PROJECT SHALL INCLUDE A WEEKLY PLANNING/REPORTING MEETING OR ON AS REQUIRED BY THE ENGINEER.

A. PURPOSE OF WEEKLY MEETING

1. THE CONTRACTOR SHALL ORGANIZE THE WEEKLY MEETING TO COORDINATE THE EFFORTS BETWEEN SUBCONTRACTORS, UTILITIES, LOCAL AUTHORITIES, AND OTHERS.

B. CONTRACTOR'S PROJECT MANAGER/SUPERINTENDENT: PLANNING AND REPORTING.

1. THE CONTRACTOR WILL BE RESPONSIBLE FOR SENDING A KNOWLEDGEABLE REPRESENTATIVE TO CONDUCT A WEEKLY REPORTING/PLANNING MEETING. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PREPARE MINUTES FOR EACH MEETING AND TO MAKE THE APPROPRIATE DISTRIBUTION OF THE MINUTES.

2. THE CONTRACTOR WILL BE REQUIRED TO PROVIDE A WRITTEN SCHEDULE OF THE NEXT WEEK'S WORK AND A TENTATIVE SCHEDULE OF THE FOLLOWING WEEK INCLUDING SINGING, STAGING AND TEMPORARY ACCESS REQUIREMENTS.

3. REPORTING/PLANNING MEETING WILL INCLUDE DISCUSSION OF PROBLEMS ENCOUNTERED DURING THE CURRENT WEEK; INFORMATION OF INTEREST TO LOCAL AUTHORITIES SUBCONTRACTORS, UTILITIES, AND NEXT WEEK'S PROSPECTIVE SCHEDULE.

5. THE CONTRACTOR SHALL ORGANIZE THE WEEKLY MEETING CONTACTING INTERESTED AGENCIES OR BUSINESS OWNERS. THE AGENCIES AND BUSINESS OWNERS MAY INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

- A. CASS COUNTY HIGHWAY DEPARTMENT
- B. CASS COUNTY SHERIFF'S DEPARTMENT
- C. CITY ENGINEER'S REPRESENTATIVE
- D. FIRE DEPARTMENT
- E. AMBULANCE SERVICE
- F. UTILITY COMPANIES

6. THE CONTRACTOR MAY UTILIZE THE KINDRED CITY HALL FOR MEETING SPACE. CONTACT THE CITY AUDITOR FOR SCHEDULING.

100-P06 CONSTRUCTION STAGING AND PHASING: THE CONTRACTOR WILL BE ALLOWED TO CLOSE DOWN HIGHWAY 15 FROM SHEYENNE STREET TO DAKOTA STREET AS SHOWN ON THE DETOUR PLAN. THE CONTRACTOR MUST KEEP THE INTERSECTION OF SPRUCE STREET OPEN TO LOCAL TRAFFIC, INCLUDING THE AIRPORT AND ELEMENTARY SCHOOL. THE CONTRACTOR SHALL PHASE THE TRAFFIC CONTROL IN A MANNER TO ALLOW FOR WORK TO BE COMPLETED AT THE INTERSECTIONS OF DAKOTA STREET AND SPRUCE STREET WITHOUT DISRUPTING ACCESS.

100-P07 CONSTRUCTION ACTIVITIES: THE CONTRACTOR SHALL EXERCISE CARE IN HIS CONSTRUCTION OPERATIONS TO ENSURE THAT TREES, SHRUBS, FENCES, BUILDINGS, GRASSES AND OTHER PROPERTIES WITHIN THE RIGHT-OF-WAY AND CONSTRUCTION EASEMENT NOT DESIGNATED FOR REMOVAL ARE NOT DISTURBED. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
NOTES
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	6	2

100-P08 GEOTECHNICAL ENGINEERING REPORT: A GEOTECHNICAL ENGINEERING REPORT THAT INCLUDES SOIL BORINGS AND PAVEMENT CORINGS IS AVAILABLE FOR INSPECTION BY THE CONTRACTOR. CONTACT THE ENGINEER TO RECEIVE A DIGITAL COPY OF THE REPORT.

100-P09 HAUL ROADS: THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 107.05B OF THE STANDARD SPECIFICATIONS REGARDING USE OF PUBLIC ROADS FOR HAULING MATERIALS TO THE PROJECT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE THE SUITABILITY OF ROUTES WITH THE AGENCY HAVING CONTROL OF THE ROAD PRIOR TO SUBMITTING BID.

100-P10 PAVEMENT PROTECTION: THE CONTRACTOR SHALL PROTECT THE EXISTING PAVEMENT INSIDE AND OUTSIDE THE PROJECT LIMITS DURING THE COURSE OF CONSTRUCTION. THE CONTRACTOR SHALL, AT THE CONTRACTOR'S EXPENSE, MAKE ANY SURFACE REPAIRS WHICH ARE REQUIRED BECAUSE OF THE CONTRACTOR'S OPERATIONS.

100-P11 AIR POLLUTION REQUIREMENTS: THE CONTRACTOR WILL BE REQUIRED TO CONDUCT THE CONSTRUCTION ACTIVITIES IN SUCH A MANNER AS TO COMPLY WITH THE AIR POLLUTION CONTROL REGULATIONS OF THE STATE OF NORTH DAKOTA. WATER SHALL BE USED TO CONTROL DUST ON THE CONSTRUCTION SITE.

105-P01 CONSTRUCTION SURVEYING: CASS COUNTY WILL PROVIDE THE INITIAL CUT AND FILL STAKES AT THE RIGHT OF WAY LINE, BENCH MARKS, INLETS, CULVERTS, CURB, AND SUBGRADE AND TOP OF GRAVEL BASE BLUETOPS ONLY. ALL OTHER SURVEY WORK NECESSARY TO CONSTRUCT THE PROJECT TO THE LINES, GRADE, AND TYPICAL SECTIONS SHOWN ON THE PLANS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

202-P01 DISPOSAL OF CONCRETE AND ASPHALT: ANY CONCRETE OR ASPHALT TO BE DISPOSED OF SHALL BE HAULED TO A DISPOSAL SITE APPROVED BY THE COUNTY OR THE NORTH DAKOTA DEPARTMENT OF HEALTH.

202-P02 REMOVAL OF EXISTING CULVERTS: ALL EXISTING CULVERTS AND STORM SEWER PIPE REMOVED ON THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR. DISPOSAL SHALL BE AT A LOCATION OFF THE PROJECT DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. ALL COSTS ASSOCIATED WITH REMOVAL, INCLUDING EXCAVATION, SHALL BE INCLUDED IN THE PRICE BID FOR "REMOVAL OF CULVERTS-ALL TYPES & SIZES".

202-P03 ABUTTING PAVEMENT: WHERE THE NEW PAVEMENT WILL ABUT EXISTING PAVEMENT, A FULL-DEPTH VERTICAL SAW CUT SHALL BE MADE ALONG THE ENTIRE LENGTH OF THE BUTT JOINT. THE MATERIAL TO BE REMOVED SHALL THEN BE REMOVED WITHOUT DISTURBING THE MATERIAL THAT IS DESIGNATED TO REMAIN. THE NEW PAVEMENT SHALL BE PLACED SO AS TO MATCH THE EXISTING PAVEMENT AND SO AS TO PROVIDE A SATISFACTORY SURFACE PROFILE..

202-P04 REMOVAL OF EXISTING WOOD RETAINING WALLS: THIS WORK SHALL INCLUDE THE REMOVAL OF EXISTING WOOD RETAINING WALLS AT STA. 18+75 TO STA. 19+45 AND STA. 25+35 TO STA. 26+15. THE VOIDS SHALL BE ADEQUATELY FILLED AND COMPACTED WITH SUITABLE MATERIAL. THE WOOD SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

203-P01 EARTHWORK: ZERO PERCENT (0%) ADDITIONAL VOLUME IN YARDAGE COMPUTED BY THE AVERAGE END AREA METHOD IS ASSUMED FOR SHRINKAGE IN THE EARTH EMBANKMENT. NO ADDITIONAL PAYMENT WILL BE MADE FOR SHINKAGE VALUES THAT VARY IN THE FIELD.

FOLLOWING EXCAVATION OF THE EXISTING ROADBED TO THE LINES AND GRADES SHOWN IN THE PLANS, THE ROADBED SHALL BE SCARIFIED AND RECOMPACTED TO A MINIMUM OF 98 PERCENT OF MAXIMUM DENSITY AS DETERMINED BY STANDARD PROCTOR ASTM D698. THE MOISTURE CONTENT AT THE TIME OF COMPACTION MAY RANGE FROM 0 TO 4 PERCENT BELOW OPTIMUM. THE CONTRACTOR SHALL SCHEDULE PROCTOR TESTS AS NEEDED TO DETERMINE THE MAXIMUM DENSITY AND OPTIMUM MOISTURE OF THE SUBGRADE MATERIAL. ADDITIONAL PROCTOR TESTS MAY BE REQUIRED FOR DIFFERING SOIL CONDITIONS. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING THE DENSITY TESTS WITH A 3RD PARTY TESTING FIRM WHEN THE SUBGRADE IS PREPARED. THE SUBGRADE SHALL BE TESTED A MINIMUM OF EVERY 500' OF ROADWAY.

SALVAGING/REMOVING EXISTING GRANULAR MATERIAL ON DRIVEWAYS AND UNDERCUTTING THE DITCH BOTTOM TO A DEPTH OF 0.33 FEET BELOW FINISHED GRADE TO ALLOW FOR TOPSOIL PLACEMENT SHALL BE INCLUDED IN THE PRICE BID FOR "COMMON EXCAVATION-TYPE A".

THE CONTRACTOR SHALL PLACE EMBANKMENT AS NECESSARY TO BRING THE ROAD TO THE PROPOSED CROSS SECTION AND GRADE DUE TO WIDENING OF THE ROADWAY. THE CONTRACTOR SHALL HAUL ALL EXCESS EXCAVATION MATERIAL NOT USED AS EMBANKMENT TO A SITE DETERMINED BY THE CONTRACTOR. ALL WORK NECESSARY FOR THE PLACEMENT, HAULING AND DISPOSAL OF EMBANKMENT SHALL BE INCLUDED IN THE PRICE BID FOR "COMMON EXCAVATION - TYPE A"

203-P02 SCARIFYING AND RECOMPACTION OF EMBANKMENT AREAS: UNDER ALL EMBANKMENT AREAS, AN ADDITIONAL 12" (BEYOND TOPSOIL STRIPPING IF REQUIRED) SHALL BE SCARIFIED AND RECOMPACTED. THIS WORK SHALL BE INCLUDED IN THE BID ITEM FOR "SUBGRADE PREPARATION - TYPE C-12 IN". ALL AREAS UNDER THE ROADWAY SHALL BE COMPACTED AND TEST ROLLED BEFORE PLACEMENT OF AGGREGATE BASE AND BITUMINOUS SURFACING. EMBANKMENT AREAS INCLUDE THE TOTAL ROADBED IN AREAS TO RECEIVE NEW FULL DEPTH PAVEMENT AND WIDENING FOR NEW LANES AND SHOULDERS.

203-P03 COMMON EXCAVATION - SUBCUT: IN AREAS THAT ARE TOO WET OR UNSTABLE FOR SCARIFICATION AND COMPACTION AS IDENTIFIED BY THE ENGINEER, THE SUBGRADE SHALL BE CUT TO A DEPTH OF 12" BELOW FINISHED EARTH GRADE AND THE EXCAVATED MATERIAL HAULED OFF SITE AS APPROVED BY THE ENGINEER. PLACE GEOTEXTILE FABRIC - TYPE R1 AT THE BOTTOM OF THE SUBCUT AND BACKFILL WITH AGGREGATE FOR SUBGRADE REINFORCEMENT TO ALLOW FOR THE DESIGNED BASE AND PAVEMENT. A 20:1 TRANSITION MUST BE UTILIZED AT THE BEGINNING AND END OF THE SUBCUT.

209-P01 TOPSOIL: ALL DISTURBED EMBANKMENT AREAS SHALL REQUIRE REMOVAL AND REPLACEMENT OF EXISTING TOPSOIL. REMOVED TOPSOIL SHALL BE STOCKPILED AND CARE SHALL BE TAKEN TO KEEP BLACK DIRT SEGREGATED FROM OTHER MATERIALS. TOPSOIL SHALL THEN BE RESPREAD PRIOR TO SEEDING OPERATIONS.

216-P01 WATER SOURCE: IF CONTRACTOR CHOOSES TO UTILIZE CITY WATER, THE CONTRACTOR MUST METER TOTAL WATER USAGE FOR THE PROJECT AND PAY THE CITY OF KINDRED \$4.00/1000 GALLONS. THIS IS THE RAW COST THAT THE CITY PAYS TO THEIR BULK PROVIDER. THE CITY WILL PROVIDE THE METER. THE AMOUNT OF GALLONS USED MUST BE SUBMITTED MONTHLY TO THE CITY AUDITOR AT CITY HALL. THE CITY WILL BILL THE CONTRACTOR FOR THE WATER USAGE.

216-P02 WATER FOR COMPACTION: THE COST OF WATER USED FOR COMPACTION OF EMBANKMENT AND AGGREGATE BASE SHALL BE INCLUDED IN THE PRICE BID FOR THE RESPECTIVE EARTHWORK ITEMS.

302-P01 AGGREGATE BASE COURSE: THE CONTRACTOR SHALL UTILIZE THE BLENDED BASE COURSE FOR PLACEMENT AS THE AGGREGATE BASE COURSE AS STATED IN NOTE 306-P01. ADDITIONAL CLASS 5 AGGREGATE SHALL BE INSTALLED AS NEEDED TO PROVIDE THE FULL AGGREGATE BASE COURSE SECTIONS SHOWN IN THE TYPICAL SECTIONS.

302-P02 SURFACE TOLERANCE: SURFACE TOLERANCE TYPE A (MAX. VARIANCE OF 0.08') SHALL APPLY TO THE SUBGRADE AND AGGREGATE BASE MATERIAL UNDER ASPHALT PAVEMENT AND SHOULDERS.

306-P01 REMOVE AND RELAY BLENDED BASE COURSE: THIS WORK ITEM SHALL INCLUDE REMOVING AND RELAYING THE EXISTING AGGREGATE AND BITUMINOUS MATERIAL FROM THE RECONSTRUCTION AREA AS SHOWN IN THE PLANS. THE CONTRACTOR SHALL ATTEMPT TO REMOVE AS MUCH BITUMINOUS MATERIAL AS POSSIBLE TO RELAY AS BLENDED BASE COURSE. THE MATERIAL SHALL BE HAULED AND STOCKPILED AS NECESSARY FOR THE CONTRACTOR'S OPERATIONS. THE BLENDED BASE SHALL BE INSTALLED AS THE FIRST 6" LIFT OF AGGREGATE BASE COURSE UNTIL ALL MATERIAL IS USED. ALL COST FOR LABOR, MATERIAL, AND EQUIPMENT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "REMOVE AND RELAY BLENDED BASE COURSE." ADDITIONAL "MAKE-UP" GRAVEL AS NEEDED TO BLEND THE MATERIAL PER SECTION 306.04C OF THE STANDARD SPECIFICATIONS WILL BE PAID AS "AGGREGATE CL 5" PER TON SUPPLIED AND PLACED ON THE ROADWAY.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
NOTES
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State
 N.D.

PROJECT No.
 CH1107

Section No. 6
 Page No. 3

405-P01 STOCKPILE SITE: THE CONTRACTOR SHALL FURNISH A STOCKPILE SITE AND PROVIDE A RELEASE FOR THE STOCKPILE SITE. ALL SITES SHALL BE APPROVED BY THE ENGINEER.

THE STOCKPILE SITE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 405.02A OF THE STANDARD SPECIFICATIONS AND SHALL BE USED TO STOCKPILE MATERIALS THAT ARE SALVAGED.

THE LUMP SUM BID FOR "PREPARE STOCKPILE SITE" SHALL BE FULL PAYMENT FOR ONE SITE ONLY. IF THE CONTRACTOR USES ADDITIONAL SITES FOR HIS OPERATION, THEN THESE ITEMS OF WORK SHALL BE AT HIS OWN EXPENSE. THE LUMP SUM BID FOR "PREPARE STOCKPILE SITE" SHALL INCLUDE ALL COSTS TO PREPARE AND RESTORE, SHAPE THE SUBGRADE, DISPOSE OF THE EXCESS MATERIAL, REPLACE THE TOPSOIL, SEEDING, AND ALL INCIDENTAL ITEMS.

AFTER COMPLETION OF THE PROJECT, ALL EXCESS STOCKPILED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. NO PAYMENT SHALL BE MADE FOR SALVAGED MATERIAL WHICH IS STOCKPILED AND NOT INCORPORATED INTO THE PROJECT. NO ADDITIONAL PAYMENT WILL BE MADE TO LOAD, HAUL, AND STOCKPILE THE EXCESS MATERIAL OFF-SITE.

408-P01 MAINTENANCE OF TRAVELED ROADWAY: THE CONTRACTOR WILL BE FULLY RESPONSIBLE FOR MONITORING AND MAINTAINING THE TRAVELED ROADWAY AND SHOULDERS SEVEN DAYS A WEEK, INCLUDING PRIVATE DRIVES AND CROSSROADS WITHIN THE LIMITS OF THE PROJECT.

408-P02 HOT BITUMINOUS PAVEMENT: THE CONTRATOR SHALL SUBMIT A MIX DESIGN FOR THE CLASS 27 HOT BITUMINOUS PAVEMENT TO THE ENGINEER FOR APPROVAL 7 DAYS BEFORE THE MATERIAL IS USED. THE MIX DESIGN SHALL MEET THE PROPERTIES SPECIFIED IN SECTION 409.04B OF THE STANDARD SPECIFICATIONS. THE COST FOR THE MIX DESIGN WORK SHALL BE INCLUDED IN THE PRICE BID FOR "HOT BITUMINOUS PAVEMENT CL 27".

THE COSTS FOR ASPHALT CEMENT (PG 58-28) AND TACK COAT (CSS-1H) INCLUDING MATERIALS, EQUIPMENT, AND LABOR, WILL NOT BE MEASURED SEPARATELY BUT SHALL BE INCLUDED IN THE PRICE BID FOR "HOT BITUMINOUS PAVEMENT CL 27".

THE HOT BITUMINOUS PAVEMENT SHALL BE LAID IN APPROXIMATELY EQUAL DEPTH LIFTS WITH THE MAXIMUM DEPTH OF LIFT NOT TO EXCEED 3 INCHES. THE FINAL DEPTH LIFT SHALL NOT EXCEED 2 INCHES. THE HOT BITUMINOUS PAVEMENT SHALL BE COMPACTED TO ORDINARY COMPACTION IN ACCORDANCE WITH SECTION 408.04.I.2 OF THE STANDARD SPECIFICATIONS.

704-P01 TRAFFIC CONTROL: THE LUMP SUM PRICE BID FOR "TRAFFIC CONTROL" SHALL BE CONSIDERED FULL PAYMENT TO SUPPLY, PLACE, MAINTAIN, ADJUST/RELOCATE (AS NEEDED FOR PHASING OF WORK) AND REMOVE ALL TRAFFIC CONTROL DEVICES SHOWN IN THE WORK ZONE TRAFFIC CONTROL PLAN AND DETOUR PLAN.

THE WORK ZONE TRAFFIC CONTROL PLAN AND DETOUR PLAN REPRESENT THE MINIMUM TRAFFIC CONTROL DEVICES REQUIRED FOR THE PROJECT. ANY ADDITIONAL TRAFFIC CONTROL DEVICES REQUIRED BY THE CONTRACTOR'S OPERATIONS SHALL BE AT THE CONTRACTOR'S EXPENSE. ANY PROPOSED CHANGES OR ADDITIONS TO THE WORK ZONE TRAFFIC CONTROL PLAN OR DETOUR PLAN MUST CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD-LATEST EDITION) AND BE APPROVED BY THE ENGINEER.

A FLAGGER MAY BE REQUIRED BY THE ENGINEER IF THE CONTRACTOR'S OPERATIONS CREATE A HAZARD TO THE TRAVELING PUBLIC. AN ESTIMATED AMOUNT OF FLAGGER HOURS IS PROVIDED IN THE PROJECT TO BE USED AS REQUIRED.

THE CONTRACTOR SHALL MAINTAIN THE ROADS USED AS DETOURS (ROADS DESIGNATED ON THE PLANS) AND REPAIR AREAS DAMAGED BY THE DETOURED TRAFFIC. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL RESTORE THE ROADS TO CONDITION AT LEAST EQUAL TO THAT WHICH EXISTED AT THE TIME TRAFFIC WAS ROUTED OVER THEM. WORK SHALL BE AS DEEMED NECESSARY BY THE ENGINEER. THE REPAIR AND MAINTENANCE OF THE DETOURS WILL BE PAID FOR IN ACCORDANCE WITH SECTION 107.05B OF THE STANDARD SPECIFICATIONS - HAUL ROADS.

THE CONTRACTOR SHALL LEAVE THE WORK AREA FREE OF ALL HAZARDS DURING NON-WORKING HOURS. IF A HAZARD EXISTS AFTER WORKING HOURS, THE CONTRACTOR SHALL PROVIDE ADDITIONAL SIGNING OR TRAFFIC CONTROL AT THEIR OWN EXPENSE UNTIL THE HAZARD HAS BEEN ELIMINATED.

704-P03 MAINTAINING ACCESS: FINAL DETAILS ON LOCATION OF ACCESS POINTS FOR RESIDENTS, BUSINESSES AND THE ELEMENTARY SCHOOL SHALL BE WORKED OUT WITH THE ENGINEER IN THE FIELD PRIOR TO THE START OF THE PROJECT. THE INTENT FOR ACCESS TO THE ELEMENTARY SCHOOL IS TO UTILIZE THE SPRUCE STREET CROSSING WHEN FEASIBLE THROUGHOUT CONSTRUCTION. THIS SHALL INCLUDE ANY CLASS 5 AGGREGATE AS NEEDED TO MAINTAIN THE CROSSING FOR USE BY TRAFFIC.

708-P01 STORM WATER MANAGEMENT: THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING ALL STORM WATER CONSTRUCTION PERMITS AND DOCUMENTS IN ACCORDANCE WITH THE NDPDES CONSTRUCTION GENERAL PERMIT NDR10-000 (GENERAL PERMIT) WHICH IS ADMINISTERED BY THE NORTH DAKOTA DEPARTMENT OF HEALTH (NDDOH). THIS SHALL GENERALLY INCLUDE THE FOLLOWING:

1. CONTRACTOR SHALL PREPARE A STORM WATER POLLUTION AND PREVENTION (SWPP) PLAN
 - 1.1. SUBMIT TO ENGINEER FOR REVIEW
2. CONTRACTOR SHALL PREPARE AN APPLICATION (NOTICE OF INTENT) TO OBTAIN COVERAGE
 - 2.1. SUBMIT TO THE ENGINEER FOR REVIEW A MINIMUM OF 14 DAYS PRIOR TO CONSTRUCTION. THIS DOCUMENT IS REFERRED AS THE NOI.
 - 2.1. THE ENGINEER WILL SUBMIT THE REVIEWED NOI APPLICATION TO THE NDDOH.
 - 2.2. THE CONTRACTOR MAY BEGIN CONSTRUCTION 7 DAYS AFTER THE SUBMISSION OF THE NOI. THE NDDOH WILL SEND THE COUNTY ENGINEER A NOTICE OF COVERAGE LETTER. A COPY OF THIS LETTER WILL BE SUBMITTED TO THE CONTRACTOR.
3. THE CONTRACTOR SHALL IMPLEMENT THE PHASES OF THE SWPP PLAN PRIOR TO CONSTRUCTION AND MAKE REVISIONS/ADJUSTMENTS AS REQUIRED BY THE CONTRACTOR'S OPERATIONS.
4. DURING CONSTRUCTION, EROSION AND SEDIMENT CONTROL INSPECTIONS SHALL BE PERFORMED BY THE CONTRACTOR A MINIMUM OF EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.50 INCHES OF RAIN PER 24 HOUR PERIOD DURING ACTIVE CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE OPTION OF MAINTAINING A RAIN GAUGE AT THEIR SITE OR UTILIZING A NATIONAL WEATHER SERVICE PRECIPITATION GAUGE LOCATED WITHIN 5 MILES OF THE CONSTRUCTION AREA.

ALL INSPECTIONS AND MAINTENANCE CONDUCTED DURING CONSTRUCTION MUST BE RECORDED IN WRITING AND RETAINED FOR THREE YEARS, OR LONGER IF REQUESTED BY THE NDDOH OR THE EPA. RECORDS OF EACH INSPECTION AND MAINTENANCE ACTIVITY MUST INCLUDE THE INFORMATION REQUIRED IN THE GENERAL PERMIT.
5. THE CONTRACTOR SHALL KEEP A COPY OF THE FOLLOWING DOCUMENTS IN A MAILBOX ON THE CONSTRUCTION SITE AVAILABLE FOR INSPECTION AT ANY TIME:
 - 5.1. SWPP PLAN
 - 5.2. NOTICE OF COVERAGE LETTER
 - 5.3. ALL INSPECTION REPORTS
6. THE ENGINEER WILL SUBMIT THE NOTICE OF TERMINATION (NOT) APPLICATION AFTER THE PROJECT HAS BEEN STABILIZED TO 70% OF PRE-EXISTING CONDITIONS.

A FULL LIST OF THE REQUIREMENTS FOR THE GENERAL PERMIT AND ALL ABOVE DOCUMENTS/FORMS ARE LOCATED ON THE NDDOH WEBSITE UNDER THE DIVISION OF WATER QUALITY. ALL COSTS ASSOCIATED WITH STORM WATER MANAGEMENT SHALL BE INCLUDED IN THE PRICE BID FOR "COMMON EXCAVATION - TYPE B".

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
NOTES
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State
 N.D.

PROJECT No.
 CH1107

Section No. 6
 Page No. 4

708-P02 SEEDING: ALL DISTURBED AREAS SHALL BE SEEDED AND HYDROMULCHED WITHIN TWO WEEKS OF COMPLETION OF CONSTRUCTION AS DIRECTED BY THE ENGINEER. SEEDING LIMITS ARE SHOWN ON THE TYPICAL SECTIONS.

THE CLASS OF SEED AND THE MINIMUM AMOUNT OF SEED PER ACRE SHALL BE AS FOLLOWS:

TYPE B - CLASS V

SPECIES	LB PURE LIVE SEED/ACRE
PERENNIAL RYE GRASS	20
KENTUCKY BLUEGRASS	50
DURAL-HARD FESCUE	30
ANNUAL RYE GRASS	50
	150

708-P03 HYDROMULCH: THE HYDROMULCH MATERIAL SHALL BE IN ACCORDANCE WITH 708.02 B.3.a OF THE STANDARD SPECIFICATIONS. THE HYDROMULCH SHALL BE APPLIED AFTER THE SEED IS DRILLED INTO THE TOPSOIL. FERTILIZER SHALL BE A MIXTURE OF 5-10-5 APPLIED AT A RATE OF 100 POUNDS PER ACRE.

708-P04 WATER FOR TURF ESTABLISHMENT: THE CONTRACTOR SHALL BE RESPONSIBLE FOR WATERING THE SEED DURING THE FOUR-WEEK MAINTENANCE PERIOD IN ACCORDANCE WITH 708.02 C.2.f OF THE STANDARD SPECIFICATIONS TO PROVIDE SUFFICIENT MOISTURE FOR GROWTH. THE COST OF WATER SHALL BE INCLUDED IN THE PRICE BID FOR THE RESPECTIVE SEEDING ITEMS.

709-P01 GEOTEXTILE FABRIC - TYPE R1: PAYMENT FOR GEOTEXTILE FABRIC - TYPE R1 WILL BE MADE ON THE BASIS OF THE MEASUREMENT OF ACTUAL SURFACE AREA COVERED, WITH NO ALLOWANCES FOR LONGITUDINAL AND TRANSVERSE OVERLAPS AS REQUIRED BY THE STANDARD SPECIFICATIONS. THE FIRST SENTENCE OF PARAGRAPH 2 OF THE STANDARD SPECIFICATION 709.03B SHALL BE REVISED TO READ "THE FIRST LIFT ABOVE THE SEPARATION FABRIC SHALL HAVE A MINIMUM DEPTH OF 6 INCHES BEFORE COMPACTION."

714-P01 PIPE CONDUIT: THE ALLOWABLE MATERIALS FOR PIPE CONDUIT ARE THE FOLLOWING:

- A. REINFORCED CONCRETE STORM DRAIN - CLASS III
- B. SPIRAL RIB STEEL PIPE ALUMINIZED TYPE 2
 - B.A. MANUFACTURED BY TRUE NORTH STEEL OR APPROVED EQUAL
 - B.B. ALL PIPE EXCEPT CENTERLINE PIPES SHALL HAVE AASHTO CLASS I PERFORATIONS WITH SOCK
- C. CORRUGATED POLYETHYLENE STORM DRAIN
 - C.A. ADS N-12 WT IB PIPE (PER ASTM F2648) MANUFACTURED BY ADS OR APPROVED EQUAL
 - C.C. ALL PIPE EXCEPT CENTERLINE PIPES SHALL HAVE AASHTO CLASS I PERFORATIONS WITH SOCK

THE CONTRACTOR SHALL PROVIDE THE ENGINEER A POST INSTALLATION VIDEO INSPECTION REPORT ON CENTERLINE STORM PIPES. ADDITIONAL TESTING MAY BE REQUIRED BY THE ENGINEER BASED ON RESULTS OF THE VIDEO REPORT. THIS SHALL BE INCLUDED IN THE PRICE BID FOR THE PIPE CONDUIT ITEMS.

714-P02 ROAD MAINTENANCE AND CENTERLINE PIPE INSTALLATION: THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE ROADWAY AND DRIVEWAYS SO THAT THEY REMAIN ACCESSIBLE TO LOCAL RESIDENTS, BUSINESSES AND EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A MEANS OF MAINTAINING LOCAL RESIDENTIAL TRAFFIC DURING THE INSTALLATION OF THE CENTERLINE PIPE. INSTALLATION AND BACKFILLING TO A HEIGHT OF SAFE PASSAGE OF TRAFFIC MUST BE COMPLETED PRIOR TO SUNDOWN ON THE SAME DAY AS THE INSTALLATION WAS STARTED.

714-P03 DRAINAGE: IF THE EXISTING DRAINAGE FACILITIES BECOME INOPERABLE BEFORE THE NEW DRAINAGE SYSTEM IS FUNCTIONING, THE CONTRACTOR SHALL PROVIDE SUFFICIENT TEMPORARY PUMPING AND DRAINAGE FACILITIES TO KEEP THE ROADWAY AND ADJACENT PROPERTIES DRAINED TO THE SATISFACTION OF THE ENGINEER. THE COST OF PROVIDING SUFFICIENT TEMPORARY PUMPING AND DRAINAGE SHALL NOT BE BID SEPARATELY BUT SHALL BE INCLUDED IN THE PRICE BID FOR OTHER ITEMS.

714-P04 CONCRETE OPENINGS FOR EDGEDRAINS: CONCRETE DRAINAGE STRUCTURES SHALL HAVE A CORED OPENING (PIPE O.D. PLUS 2 INCHES) AND RUBBER BOOT CONNECTION WITH STAINLESS STEEL STRAPS FOR ALL EDGEDRAIN CONNECTIONS. SAND COLLARS WILL NOT BE ALLOWED.

722-P01 MANHOLES, CATCH BASINS AND INLETS: THE ALLOWABLE MATERIALS FOR MANHOLES, CATCH BASINS AND INLETS ARE THE FOLLOWING:

- A. PRECAST REINFORCED CONCRETE
- B. DUAL WALL ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE WITH CONCRETE
 - B.A. MANUFACTURED BY TRUE NORTH STEEL OR APPROVED EQUAL
- C. PVC PIPE
 - C.A. MANUFACTURED BY NYLOPLAST (ADS) OR APPROVED EQUAL

ALL STRUCTURED LOCATED IN STREETS SHALL HAVE A WATER TIGHT SEAL BETWEEN THE RISER AND THE CASTING BY MEANS OF A CHIMNEY SEAL OR OTHER APPROVED METHOD. STRUCTURES OUTSIDE OF STREETS IN GREEN SPACES SHALL HAVE A SOIL TIGHT CONNECTION.

ALL CASTINGS SHALL BE MANUFACTURED BY NEENAH FOUNDRY OR APPROVED EQUAL AS SHOWN ON THE STRUCTURE SCHEDULE.

ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK (INCLUDING FINAL ADJUSTMENT) SHALL BE INCLUDED IN THE PRICE BID FOR THE MANHOLE, CATCH BASIN AND INLET ITEMS.

722-P02 RESIDENTIAL YARD DRAINAGE: PRIOR TO FINAL INSTALLATION OF CATCH BASINS WITHIN RESIDENTIAL YARDS ALONG STATION 18+70 TO 26+25, CONTRACTOR SHALL VERIFY ALL DRAINAGE FROM YARDS WILL BE INTERCEPTED BY THE SWALES CONSTRUCTED. NOTIFY ENGINEER OF ANY CATCH BASIN OR SWALES THAT NEED TO BE ADJUSTED TO PROVIDE POSITIVE DRAINAGE FOR ALL RESIDENTIAL YARDS.

724-P01 WATER MAIN PIPE: ALL WATER MAIN PIPE SHALL BE CLASS 150, DR18 IN ACCORDANCE TO AWWA STANDARD C-900.

724-P02 WATER MAIN FITTINGS: FITTINGS SHALL BE DUCTILE IRON IN ACCORDANCE WITH AWWA SPECIFICATIONS C-153. ALL BOLTS USED IN FITTINGS SHALL BE 304 STAINLESS STEEL. ALL FITTINGS SHALL BE WRAPPED IN 8 MIL PLASTIC. THE SEAMS SHALL BE TAPED WITH 2" WIDE 10 OR 12 MIL TAPE. THE WRAPPING SHALL BE DONE IN ACCORDANCE WITH THE AWWA SPECIFICATIONS ON ENCASEMENT.

724-P03 GATE VALVES AND BOXES: GATE VALVES SHALL BE DUCTILE IRON RESILIENT WEDGE VALVES IN ACCORDANCE WITH AWWA C515. ALL VALVES SHALL BE EPOXY COATED INSIDE AND OUT. ALL VALVES SHALL OPEN WHEN THE OPERATING STEM IS ROTATED COUNTER CLOCKWISE. THE VALVE SHALL BE EQUIPPED WITH A 2" OPERATING NUT WITH THE DIRECTION OF OPENING CAST IN THE NUT. ALL EXTERIOR BOLTS AND NUTS SHALL BE 304 STAINLESS STEEL. ACCEPTABLE MANUFACTURERS ARE: AMERICAN FLOW CONTROL, WATEROUS, MUELLER AND CLOW. VALVE BOXES SHALL BE TWO PIECE TYLER 6850 SERIES WITH A SEPARATE BASE ADJUSTABLE TO THE DEPTH OF COVER AS SHOWN ON THE PLANS PLUS 6". THE VALVE BOX LID SHALL BE LABELED "WATER" UPON COMPLETION OF ALL WORK THE CONTRACTOR SHALL ADJUST ALL VALVE BOXES TO FINISHED GRADE.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
NOTES
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State
 N.D.

PROJECT No.
 CH1107

Section No. 6
 Page No. 5

724-P04 FIRE HYDRANTS: FIRE HYDRANTS SHALL BE TRUE COMPRESSION, TRAFFIC MODEL, NONJACKETED STYLE WITH 5 1/4" VALVE OPENING AND SUITABLE FOR 7 1/2' COVER 8' TRENCH. ALL BURIED BOLTS SHALL BE 304 STAINLESS STEEL. ALL FIRE HYDRANT EXTENSION BOLTS AND NUTS SHALL BE 304 STAINLESS STEEL. TYPICALLY ALL HYDRANTS SHALL HAVE TWO (2) 2 1/2" NATIONAL STANDARD THREAD 7532 HOSE NOZZLES AND ONE (1) 4 1/2" NATIONAL STANDARD THREAD 40524 PUMPER NOZZLE BUT SHALL BE VERIFIED BY THE CONTRACTOR WITH THE OWNER BEFORE ORDERING. ALL HYDRANTS SHALL HAVE BRONZE TO BRONZE SEATING AND HAVE A 6" INLET. HYDRANT SHALL BE AMERICAN B-62-B, WATEROUS WB-67, OR APPROVED EQUAL. ALL HYDRANTS SHALL CONFORM TO THE FOLLOWING:

- A. LATEST ISSUE OF AWWA SPECIFICATION C-502, "STANDARD FOR FIRE HYDRANTS".
- B. VALVE SEAT, AND ALL OPERATING PARTS, SHALL BE REMOVABLE AS A SINGLE UNIT THROUGH THE BARREL, WITHOUT DIGGING.
- C. MAIN VALVE SHALL CLOSE WITH THE WATER PRESSURE, LEAVING NO PRESSURE ON LOWER JOINT AND FLANGE WHEN SHUT OFF.
- D. NOZZLE THREADS SHALL BE NATIONAL STANDARD OR CONFORM WITH CITY STANDARDS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY STANDARDS WITH OWNER.
- E. STUFFING BOX SHALL BE OF CONVENTIONAL "O" RING TYPE, SHOULD BE FULLY ACCESSIBLE AND SEALED FROM WATER, MOISTURE AND FOREIGN MATTER.
- F. VALVE ROD OR OPERATING NUT, WHERE SAME PASSES THROUGH PACKING, SHOULD BE BRASS OR BRASS BUSHED.
- G. THE DRAIN SHOULD BE POSITIVELY ACTUATED BY THE VALVE ROD WHEN OPENING OR CLOSING. DRAIN SHOULD NOT DEPEND UPON GRAVITY WHEN OPENING AND CLOSING.
- H. SHALL ALLOW FOR INSTALLATION OF A TOP EXTENSION.
- I. SHALL BE OF THE BREAK-OFF TYPE.
- J. INTERNAL ADJUSTMENTS SHOULD BE FIXED AND NOT LEFT UP TO THE OPERATOR.
- K. CONTRACTOR SHALL FURNISH AND TOUCH UP THE PAINT ON ALL HYDRANTS AFTER INSTALLATION.

724-P05 WATER MAIN SHUTDOWNS: THE CONTRACTOR SHALL NOTIFY ALL PROPERTIES AFFECTED BY THE SHUTDOWN AND THE CITY OF KINDRED PUBLIC WORKS SUPERINTENDENT A MINIMUM OF 24 HOURS PRIOR TO SHUTDOWN. NOTIFICATION SHALL BE IN WRITING. NOTIFICATION SHALL INDICATE TIME OF SHUTDOWN AND ESTIMATED DURATION. IF ACTUAL SHUTDOWN TIME VARIES FROM STATED TIME IN EXCESS OF ONE HOUR, A SECOND VERBAL NOTIFICATION WILL BE REQUIRED.

748-P01 CURB & GUTTER: THE CURB AND GUTTER WITH SIDEWALK OR DECORATIVE MEDIAN ADJACENT SHALL HAVE A 2" LEDGE AS SHOWN IN THE STANDARD DRAWING D-748-1.

748-P02 DRIVEWAYS: ALL DRIVEWAYS SHALL HAVE #4 DEFORMED REINFORCING BARS PLACED 24" O.C. BOTH WAYS. THE BAR SHALL BE SIX (6) INCHES SHORTER THAN THE WIDTH OF THE SLAB AND PLACED ACCURATELY AT 1/2 THE DEPTH OF THE SLAB. PLASTIC CHAIRS SHALL BE USED. 2" AGGREGATE BASE COURSE SHALL BE PLACED BELOW ALL DRIVEWAYS.

THE DRIVEWAYS INSTALLED ALONG THE SIDEWALK FROM STA. 18+50 TO STA. 26+50 SHALL BE TYPE 3 AS SHOWN IN THE STANDARD DRAWING D-750-1A.

750-P01 CLASS OF CONCRETE: THE CLASS OF CONCRETE USED FOR CURB AND GUTTER AND CONCRETE FLATWORK SHALL BE AE WITH THE OPTION FOR THE CONTRACTOR TO USE COARSE AGGREGATE SIZES NO. 3, 4, OR 5 AS DEFINED IN SECTION 816.02 OF THE NDDOT STANDARD SPECIFICATIONS.

750-P02 SIDEWALK: AT DRIVEWAY CROSSING AREAS, SIDEWALK SHALL BE THICKENED TO 6", INCLUDED IN "SIDEWALK CONCRETE 6IN REINFORCED." CONTRACTION JOINTS SHALL BE CONSTRUCTED EVERY AT A DIMENSION MATCHING SIDEWALK WIDTH. 1/2" EXPANSION JOINTS SHALL BE PLACED AT INTERVALS NOT TO EXCEED 150 FEET AT CHANGES IN ALIGNMENT AND AT THE TOP OF ADA RAMPS. ALL SIDEWALK SHALL HAVE #4 DEFORMED REINFORCING BARS PLACED 24" O.C. BOTH WAYS. THE BAR SHALL BE SIX (6) INCHES SHORTER THAN THE WIDTH OF THE SLAB AND PLACED ACCURATELY AT 1/2 THE DEPTH OF THE SLAB. PLASTIC CHAIRS SHALL BE USED. 2" AGGREGATE BASE COURSE SHALL BE PLACED BELOW ALL SIDEWALKS. ALL LONGITUDINAL AND TRANSVERSE JOINTS MAY BE SAWED OR TOOLED. ALL ITEMS LISTED SHALL BE PART OF THE RESPECTIVE ITEM. NEW SIDEWALK ELEVATIONS SHALL MATCH EXISTING SIDEWALK ELEVATIONS, EXCEPT AT LOCATIONS NOTED IN FIELD BY ENGINEER. THE COST OF REBAR, DOWELS, EXPANSION JOINTS, CURING COMPOUND, ETC. SHALL BE INCLUDED IN THE RESPECTIVE SIDEWALK ITEM.

750-P03 DETECTABLE WARNING PANELS: ALL SIDEWALK ADA RAMPS SHALL HAVE DETECTABLE WARNING PANELS INSTALLED AS SHOWN IN STANDARD DRAWING D-750-3. THE SIDEWALK RAMP CONCRETE SHALL BE THICKENED TO 6". FOLLOWING IS AN APPROVED SUPPLIER LIST FOR DETECTABLE WARNING PANELS USED FOR NEWLY CONSTRUCTED CURB RAMPS.

- ADA ARCIS TACTILE (503-647-5042)
[HTTP://ARCIS-CORP.COM/#/TACTILE/](http://ARCIS-CORP.COM/#/TACTILE/)
- ARMOR-TILE TACTILE SYSTEMS BY ENGINEERED PLASTICS, INCORPORATED (800-682-2525)
[HTTP://WWW.ARMOR-TILE.COM/](http://WWW.ARMOR-TILE.COM/)
- DETECTABLE WARNING PAVER BY HANOVER ARCHITECTURAL PRODUCTS (800-426-4242)
[HTTP://WWW.HANOVERPAVERS.COM/HTML/DETECTABLE.HTML](http://WWW.HANOVERPAVERS.COM/HTML/DETECTABLE.HTML)
- COMPOSITE PAVER INLINE DOME TILE BY ADA TACTILE SYSTEMS (800-372-0519)
[HTTP://WWW.ADATILE.COM/](http://WWW.ADATILE.COM/)
- ACCESS TILE BY ACCESS PRODUCTS INC. (888-679-4022)
[HTTP://WWW.ACCESTILE.COM/](http://WWW.ACCESTILE.COM/)

750-P04 DECORATIVE PAVED BOULEVARD: THE PATTERN SHALL BE COBBLESTONE RANDOM INTERLOCKING PATTERN BY SCOFIELD SYSTEMS OR APPROVED EQUAL. THE COLOR SHALL BE MARIGOLD BY SOLOMON COLORS OR APPROVED EQUAL. CURING SHALL BE DONE WITH A CLEAR (NON-PIGMENTED) PRODUCT WITHIN 24 HOURS. SEALANT SHALL BE USED AFTER 14 DAYS WITH A MAXIMUM OF 30 DAYS.

752-P01 FENCE REMOVE & RESET: THIS WORK INCLUDES THE REMOVAL AND RESETTING OF EXISTING FENCES AT STA. 20+05 AND STA. 21+10.

752-P02 CHAIN LINK FENCE AND GATES: THIS WORK INCLUDES REMOVING AND REPLACING THE CHAIN LINK FENCE AND VEHICLE AND PEDESTRIAN GATES AS NECESSARY FOR THE REGRADING OF THE ELEMENTARY SCHOOL SPORTS FIELD APPROACH AND EXISTING ASPHALT SHARED USE PATH AT STA. 5+05 RT. THE NEW VEHICLE GATE SHALL BE 16' WIDE.

754-P01 SIGNS: THE CONTRACTOR SHALL REMOVE OR SALVAGE ALL EXISTING SIGNS PRIOR TO CONSTRUCTION AS NOTED IN THE SIGN SUMMARY. ALL SIGNS NOTED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ALL SIGNS IDENTIFIED TO BE SALVAGED AND REINSTALLED SHALL BE STORED AT A SAFE LOCATION ON SITE. ANY SIGNS NOTED TO BE SALVAGED THAT APPEAR TO BE DAMAGED PRIOR TO CONSTRUCTION SHALL BE IDENTIFIED WITH THE ENGINEER PRIOR TO REMOVING. ANY SALVAGED SIGNS FOUND TO BE DAMAGED PRIOR TO REINSTALLING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

762-P01 STRIPING: STRIPING SHALL BE PAVEMENT MARKING PAINT AND GLASS BEADS PER SECTIONS 880.01 AND 880.02 AND INSTALLED PER SECTION 762.04.D.1 OF THE STANDARD SPECIFICATIONS.

762-P02 PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED): PAVEMENT MESSAGES SHALL BE 3M SERIES 380I ES EXTENDED SEASON MARKING FILM OR APPROVED EQUAL. THE PAVEMENT MESSAGES SHALL BE DIMENSIONED PER THE NDDOT STANDARD DRAWING "D-762-1 PAVEMENT MARKING MESSAGE DETAILS". THIS SHALL INCLUDE THE ARROWS AND STOP BARS.

766-P01 MAILBOXES: INCLUDE REMOVAL OF MAILBOXES IN THE "MAILBOX" ITEM. CONTRACTOR SHALL FURNISH A POSTMASTER APPROVED MAILBOX WITH UNIFORM BOX STYLE AND METHOD OF ADDRESS IDENTIFICATION. THE CONTRACTOR SHALL TEMPORARILY SET THE NEW MAILBOXES NEAR THE CONSTRUCTION SITE AT A LOCATION APPROVED BY THE ENGINEER TO PROVIDE TEMPORARY ACCESS TO THE USPS AND OWNERS. THE BOXES SHALL THEN BE INSTALLED PERMANENTLY AS SHOWN ON THE PLANS.

772-P01 RELOCATE FLASHING BEACON: THIS WORK SHALL INCLUDE SALVAGING THE FLASHING BEACON, TEMPORARILY DISCONNECTING THE EXISTING ELECTRIC LINE AND RECONNECTING AFTER RELOCATION OF THE FLASHING BEACON, SIGN AND POST. IT SHALL INCLUDE ANY TRENCHING TO ADJUST THE LOCATION OF THE ELECTRIC LINE AS REQUIRED FOR THE WIDENING OF THE ROADWAY.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
NOTES
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	8	1

SPEC	CODE	DESCRIPTION	UNIT	QUANTITY
103	100	CONTRACT BOND	L SUM	1
202	112	REMOVAL OF CONCRETE	SY	1,073
202	119	SAW CONCRETE	LF	272
202	130	REMOVAL OF CURB & GUTTER	LF	954
202	132	REMOVAL OF BITUMINOUS SURFACING	SY	125
202	153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	1,000
202	174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	1,058
202	210	REMOVAL OF MANHOLES	EA	4
202	230	REMOVAL OF INLETS	EA	4
202	235	REMOVAL OF CATCH BASIN	EA	1
202	292	REMOVAL OF EXISTING WOOD RETAINING WALLS	L SUM	1
203	101	COMMON EXCAVATION-TYPE A	CY	8,862
203	109	TOPSOIL	CY	1,692
203	138	COMMON EXCAVATION-SUBCUT	CY	500
230	320	SUBGRADE PREPARATION-TYPE C-6IN	SY	2,625
230	320	SUBGRADE PREPARATION-TYPE C-12IN	SY	15,465
302	108	AGGREGATE FOR SUBGRADE REINFORCEMENT	CY	500
302	120	AGGREGATE BASE COURSE CL 5	TON	4,987
306	101	AGGREGATE CL 5	TON	3,338
306	350	REMOVE AND RELAY BLENDED BASE COURSE	SY	10,681
405	100	PREPARE STOCKPILE SITE	L SUM	1
408	176	HOT BITUMINOUS PAVEMENT CL 27	TON	4,955
702	100	MOBILIZATION	L SUM	1
704	100	FLAGGING	MHR	540
704	1100	TRAFFIC CONTROL	L SUM	1
708	1410	FIBER ROLLS 6IN	LF	400
708	1540	INLET PROTECTION-SPECIAL	EA	19
708	2280	SEEDING-TYPE B-CL V	ACRE	3.12
708	2950	HYDRO MULCH	ACRE	3.12
708	5651	ECB TYPE 2	SY	500
708	8500	STABILIZED CONSTRUCTION ACCESS	EA	2
709	701	GEOTEXTILE FABRIC-TYPE R1	SY	13,450
714	3150	HEADWALL-PRECAST CONCRETE 4IN	EA	1
714	4090	PIPE CONDUIT 12IN	LF	379
714	4095	PIPE CONDUIT 15IN	LF	319
714	4100	PIPE CONDUIT 18IN	LF	1,490
714	4105	PIPE CONDUIT 24IN	LF	702
714	4108	PIPE CONDUIT 27IN	LF	25
714	4115	PIPE CONDUIT 36IN	LF	125
714	9720	UNDERDRAIN PIPE PVC PERFORATED 4IN	LF	1,717
722	91	MANHOLE	EA	21
722	3510	INLET-TYPE 2	EA	7
722	3560	INLET SHALLOW CATCH BASIN BEEHIVE	EA	13
722	6140	ADJUST GATE VALVE BOX	EA	9
724	300	GATE VALVE & BOX 6IN	EA	5
724	400	HYDRANT-INSTALL 6IN	EA	5
724	420	HYDRANT-RELOCATE	EA	2
724	430	REMOVE HYDRANT	EA	2
724	800	WATERMAIN 6IN	LF	50
724	944	CONNECTION TO EXISTING MAIN	EA	5
724	941	ADJUST CURB STOP & BOX	EA	5
748	190	CURB & GUTTER-TYPE I 30IN	LF	2,128
748	1020	VALLEY GUTTER	SY	60
750	111	DECORATIVE PAVED BOULEVARD	SY	571
750	115	SIDEWALK CONCRETE 4IN REINFORCED	SY	676
750	140	SIDEWALK CONCRETE 6IN REINFORCED	SY	89
750	1016	DRIVEWAY CONCRETE 6IN REINFORCED	SY	533
750	2115	DETECTABLE WARNING PANELS	SF	160
752	641	CHAIN LINK FENCE	L SUM	1
752	922	FENCE REMOVE & RESET	LF	25
754	206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	609
754	532	PANEL FOR SIGNS-TYPE 3A REFLECTIVE SHEETING	SF	118
754	592	RESET SIGN PANEL	EA	39
762	122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED	SF	110
762	1104	PVMT MK PAINTED 4IN LINE	LF	8,920
762	1108	PVMT MK PAINTED 8IN LINE	LF	885
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	224
766	100	MAILBOX-ALL TYPES	EA	7
772	3072	RELOCATE FLASHING BEACON	EA	4
930	010	QC/QA TESTING	ALLOWANCE	1

MATERIAL	BASIS OF ESTIMATE
AGGREGATE BASE	1.875 TON/CY
SHRINKAGE FOR EARTHWORK	0.0%

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
ESTIMATED QUANTITIES
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	10	1

REMOVAL OF CONCRETE				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
5+11	5+51	LT	SIDEWALK	22
5+90	7+82	LT	EXPRESS LANE CONCRETE, SIDEWALK, CURBING	574
10+79	11+14	LT	LINDEN STREET SIDEWALK RAMPS	6
12+61	13+16	RT	MEDIAN	24
13+73	14+43	RT	MEDIAN	32
14+32	14+37	LT	SIDEWALK	11
15+00	18+19	RT	MEDIAN	169
17+14	17+64	LT	DRIVEWAY	144
18+14	18+34	LT	SIDEWALK	23
24+86	25+05	LT	DRIVEWAY	65
26+78	26+83	LT	SPLASH PAD	3
TOTAL				1,073

SAW CONCRETE				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
5+11	5+13	LT	SIDEWALK	5
5+90	7+36	LT	EXPRESS LANE CONCRETE, SIDEWALK, CURBING	160
7+82	7+82	LT	SIDEWALK	5
10+80	10+80	LT	SIDEWALK	5
11+14	11+14	LT	SIDEWALK	6
14+32	14+37	LT	SIDEWALK	5
17+14	17+64	LT	DRIVEWAY	56
18+15	18+20	LT	SIDEWALK	12
24+87	25+5	LT	DRIVEWAY	18
TOTAL				272

REMOVAL & CURB AND GUTTER				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
12+57	13+20	RT	MEDIAN	126
13+69	14+45	RT	MEDIAN	157
14+96	18+22	RT	MEDIAN	671
TOTAL				954

REMOVAL OF BITUMINOUS SURFACING				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
0+13	0+44	RT	SHARED USE PATH	30
4+55	5+55	RT	SHARED USE PATH	95
TOTAL				125

SAW BITUMINOUS SURFACING-FULL DEPTH				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
0+13	0+13	RT	SHARED USE PATH	9
0+28	0+28	CL	COUNTY 15	45
0+44	0+44	RT	SHARED USE PATH	9
4+55	4+55	RT	SHARED USE PATH	9
5+55	5+55	RT	SHARED USE PATH	8
10+85	11+10	LT	LINDEN STREET	25
12+28	18+58	RT	ELEMENTARY SCHOOL PARKING LOT	672
14+51	14+97	LT	ELM STREET	46
18+35	18+59	LT	SPRUCE STREET	24
18+93	19+04	LT	DRIVEWAY	11
19+81	19+96	LT	DRIVEWAY	15
21+87	22+09	RT	AIRPORT/BUS BARN ROAD	22
22+59	22+72	LT	DRIVEWAY	13
23+45	23+56	RT	CEMETERY ROAD	11
23+58	23+68	LT	DRIVEWAY	10
25+23	25+34	RT	CEMETERY ROAD	11
26+40	26+64	LT	DAKOTA STREET	24
29+02	29+02	CL	COUNTY 15	36
TOTAL				1,000

REMOVAL OF PIPE ALL TYPES AND SIZES			
STATION	OFFSET	DESCRIPTION	QUANTITY (LF)
0+30	LT	24" CSP	25
0+34	RT	24" CSP	42
0+37	RT	24" CSP	16
0+38	CL	24" CSP	68
0+46	LT	24" CSP	13
5+03	RT	18" CSP	41
5+17	LT	18" HDPE	42
5+68	LT	18" RCP	58
6+43	LT	18" RCP	91
6+89	LT	12" CSP	25
7+15	LT	18" RCP	55
7+42	LT	12" CSP	21
7+61	LT	18" HDPE	36
11+01	LT	18" RCP	42
17+13	LT	18" RCP	116
18+33	RT	18" CSP	47
18+40	LT	18" RCP	63
18+96	LT	18" RCP	24
19+77	LT	18" RCP	43
20+95	LT	18" RCP	20
22+65	LT	18" RCP	18
23+51	RT	18" RCP (BURIED PIPE, EXACT LOCATION UNKNOWN)	20
23+63	LT	18" RCP	20
24+97	LT	18" CSP	23
25+27	LT	18" RCP	20
25+28	RT	18" RCP (BURIED PIPE, EXACT LOCATION UNKNOWN)	20
26+54	LT	24" CSP	49
TOTAL			1058

REMOVAL OF MANHOLES			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
0+36	RT	EX-M6	1
0+38	RT	EX-M5	1
0+38	LT	EX-M4	1
7+42	LT	EX-M16	1
TOTAL			4

REMOVAL OF INLETS			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
5+97	LT	EX-M14	1
6+88	LT	EX-M15	1
7+42	LT	EX-M17	1
18+09	RT	EX-M21	1
TOTAL			4

REMOVAL OF CATCH BASIN			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
5+39	LT	EX-M13	1
TOTAL			1

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
BASIS OF ESTIMATE
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

TOPSOIL				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (CY)
0+12	5+54	LT	4" DEPTH	244
0+14	4+99	RT	4" DEPTH	231
4+66	5+26	RT	4" DEPTH	55
5+11	12+58	RT	4" DEPTH	274
7+43	10+85	LT	4" DEPTH	90
11+09	14+51	LT	4" DEPTH	87
14+97	16+58	LT	4" DEPTH	43
17+59	18+34	LT	4" DEPTH	18
18+52	21+87	RT	4" DEPTH	110
18+60	18+93	LT	4" DEPTH	16
19+04	19+81	LT	4" DEPTH	29
19+95	20+91	LT	4" DEPTH	26
21+01	22+59	LT	4" DEPTH	59
22+09	23+45	RT	4" DEPTH	22
22+72	23+58	LT	4" DEPTH	32
23+57	25+22	RT	4" DEPTH	26
23+68	24+87	LT	4" DEPTH	45
25+05	25+22	LT	4" DEPTH	8
25+31	26+40	LT	4" DEPTH	47
25+34	29+05	RT	4" DEPTH	124
26+65	29+02	LT	4" DEPTH	36
26+91	27+18	LT	12" DEPTH (SIDEWALK TO SCHOOL)	70
TOTAL				1,692

REMOVE AND RELAY BLENDED BASE COURSE					
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)	QUANTITY (CY)
0+28	29+02	CL	HIGHWAY 15 AND SIDE STREETS	9,401	2,611
12+28	18+58	RT	ELEMENTARY SCHOOL PARKING LOT	1,280	249
TOTAL				10,681	2,860

HOT BITUMINOUS PAVEMENT CL 27					
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (TON)	QUANTITY (SY)
0+28	29+02	CL	HIGHWAY 15 - 3IN LIFT	1,800	10,669
0+28	29+02	CL	HIGHWAY 15 - 4IN LIFT	2,783	12,370
			SCHOOL, AIRPORT, CEMETERY - 5IN LIFT	371	1,319
TOTAL				4,955	24,358

AGGREGATE BASE COURSE CL 5					
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (TON)	QUANTITY (CY)
0+28	29+02	CL	12" THICK FOR COUNTY 15	9,058	4,831
0+29	29+03	CL	3" THICK FOR COUNTY 15 SHOULDERS	304	162
4+55	5+55	RT	4" THICK FOR APPROACH AND SHARED USE PATH	26	14
5+12	5+54	LT	2" THICK FOR SIDEWALK	4	2
5+53	7+05	LT	6" THICK FOR EXPRESS LANE APPROACH & PARKING LOT	116	62
7+05	7+40	LT	12" THICK FOR MAPLE STREET	103	55
7+40	7+83	LT	6" THICK FOR RDO LOT & 2" THICK FOR SIDEWALK	38	20
10+80	11+14	LT	6" THICK FOR LINDEN STREET & 2" THICK FOR SIDEWALK	38	20
12+28	18+60	RT	6" THICK FOR ELEMENTARY SCHOOL PARKING LOT	497	265
14+48	14+98	LT	6" THICK FOR ELM STREET	6	3
16+55	16+73	LT	2" THICK FOR ALLEY DRIVEWAY	4	2
16+92	17+62	LT	2" THICK FOR DRIVEWAY	13	7
18+14	18+34	LT	2" THICK FOR SIDEWALK	4	2
18+60	26+39	LT	2" THICK FOR SIDEWALK	56	30
18+87	19+10	LT	2" THICK FOR DRIVEWAY	4	2
19+75	20+02	LT	2" THICK FOR DRIVEWAY	4	2
20+85	21+08	LT	2" THICK FOR DRIVEWAY & 6" THICK FOR TIE-IN	6	3
21+87	22+10	RT	6" THICK FOR AIRPORT/BUS BARN ROAD	17	9
22+53	22+78	LT	2" THICK FOR DRIVEWAY	4	2
23+42	23+60	RT	4" THICK FOR CEMETERY ROAD	11	6
23+52	23+74	LT	2" THICK FOR DRIVEWAY	4	2
24+81	25+11	LT	2" THICK FOR DRIVEWAY	8	4
25+15	25+36	LT	2" THICK FOR DRIVEWAY & 6" THICK FOR TIE-IN	11	6
25+16	25+38	RT	4" THICK FOR CEMETERY ROAD	6	3
26+73	27+12	LT	2" THICK FOR SIDEWALK	11	6
SUBTOTAL				10,350	5,520
LESS ESTIMATED BLENDED BASE				5,363	2,860
TOTAL				4,987	2,660

SEEDING-TYPE B-CL V AND HYDROMULCH				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (AC)
0+12	5+54	LT	SEED AND HYDROMULCH	0.26
0+14	4+99	RT	SEED AND HYDROMULCH	0.47
4+66	5+26	RT	SEED AND HYDROMULCH	0.10
5+11	12+58	RT	SEED AND HYDROMULCH	0.46
7+43	10+85	LT	SEED AND HYDROMULCH	0.14
11+09	14+51	LT	SEED AND HYDROMULCH	0.13
14+97	18+34	LT	SEED AND HYDROMULCH	0.09
18+52	21+87	RT	SEED AND HYDROMULCH	0.28
18+60	18+93	LT	SEED AND HYDROMULCH	0.02
19+04	19+81	LT	SEED AND HYDROMULCH	0.04
19+95	20+91	LT	SEED AND HYDROMULCH	0.05
21+01	22+59	LT	SEED AND HYDROMULCH	0.09
22+09	23+45	RT	SEED AND HYDROMULCH	0.11
22+72	23+58	LT	SEED AND HYDROMULCH	0.05
23+57	25+22	RT	SEED AND HYDROMULCH	0.10
23+68	25+22	LT	SEED AND HYDROMULCH	0.08
25+31	26+40	LT	SEED AND HYDROMULCH	0.07
25+34	29+05	RT	SEED AND HYDROMULCH	0.31
26+65	29+02	LT	SEED AND HYDROMULCH	0.27
TOTAL				3.12

AGGREGATE CL 5 (MAKE UP GRAVEL FOR BLENDED BASE)					
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (TON)	QUANTITY (SY)
0+28	29+02	CL	HIGHWAY 15 AND SIDE STREETS	2,938	9,401
12+28	18+58	RT	ELEMENTARY SCHOOL PARKING LOT	400	1,280
TOTAL				3,338	10,681

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
BASIS OF ESTIMATE
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	10	3

PIPE CONDUIT							12IN (LF)	15IN (LF)	18IN (LF)	24IN (LF)	27IN (LF)	36IN (LF)
STATION START	STATION STOP	OFFSET	DESCRIPTION									
0+32	0+36	RT	PIPE CONDUIT 36IN									42
0+36	0+38	CL	PIPE CONDUIT 36IN									83
0+36	0+54	RT	PIPE CONDUIT 18IN					18				
0+20	0+38	LT	PIPE CONDUIT 27IN								25	
0+38	2+51	LT	PIPE CONDUIT 24IN						213			
2+51	2+51	LT	PIPE CONDUIT 12IN		10							
2+51	3+38	LT	PIPE CONDUIT 24IN						87			
3+28	3+38	LT	PIPE CONDUIT 18IN					11				
3+38	4+13	LT	PIPE CONDUIT 18IN					75				
4+13	4+13	LT	PIPE CONDUIT 12IN		10							
4+13	5+39	LT	PIPE CONDUIT 18IN					126				
4+82	5+28	RT	PIPE CONDUIT 18IN					46				
5+39	6+86	LT	PIPE CONDUIT 18IN					147				
6+86	6+91	LT	PIPE CONDUIT 12IN		25							
6+86	7+46	LT	PIPE CONDUIT 18IN					60				
7+46	7+42	LT	PIPE CONDUIT 12IN		26							
7+46	7+69	LT	PIPE CONDUIT 15IN					23				
7+69	7+78	LT	PIPE CONDUIT 15IN					9				
10+65	11+27	LT	PIPE CONDUIT 15IN					62				
16+48	17+87	LT	PIPE CONDUIT 12IN		139							
17+57	17+97	LT	PIPE CONDUIT 12IN		48							
17+97	18+78	LT	PIPE CONDUIT 15IN					82				
17+87	18+74	LT	PIPE CONDUIT 15IN					87				
18+74	18+74	LT	PIPE CONDUIT 12IN		22							
18+74	19+43	LT	PIPE CONDUIT 18IN					69				
19+43	19+43	LT	PIPE CONDUIT 12IN		12							
19+43	20+25	LT	PIPE CONDUIT 18IN					82				
20+25	20+25	LT	PIPE CONDUIT 12IN		5							
20+25	20+25	LT	PIPE CONDUIT 12IN		11							
20+25	21+17	LT	PIPE CONDUIT 18IN					92				
21+17	21+17	LT	PIPE CONDUIT 12IN		10							
21+17	21+78	LT	PIPE CONDUIT 18IN					61				
21+70	21+78	RT	PIPE CONDUIT 18IN					8				
21+78	21+78	RT	PIPE CONDUIT 18IN					8				
21+78	21+78	CL	PIPE CONDUIT 18IN					55				
21+78	23+18	LT	PIPE CONDUIT 18IN					140				
21+78	22+78	RT	PIPE CONDUIT 18IN					100				
22+78	22+78	RT	PIPE CONDUIT 18IN		8							
22+78	24+37	RT	PIPE CONDUIT 18IN					159				
23+18	23+18	LT	PIPE CONDUIT 12IN		15							
23+18	23+78	LT	PIPE CONDUIT 24IN					60				
23+78	23+78	LT	PIPE CONDUIT 12IN		5							
23+78	24+80	LT	PIPE CONDUIT 24IN					103				
24+37	25+94	RT	PIPE CONDUIT 18IN					159				
24+80	24+80	LT	PIPE CONDUIT 12IN		16							
24+80	25+13	LT	PIPE CONDUIT 24IN					32				
25+13	25+13	LT	PIPE CONDUIT 12IN		17							
25+13	26+22	LT	PIPE CONDUIT 24IN					110				
25+94	26+50	RT	PIPE CONDUIT 18IN					56				
26+22	26+22	LT	PIPE CONDUIT 15IN					34				
26+22	26+33	LT	PIPE CONDUIT 24IN					11				
26+33	26+98	LT	PIPE CONDUIT 24IN					68				
26+50	26+63	RT	PIPE CONDUIT 18IN					18				
26+89	26+98	LT	PIPE CONDUIT 15IN					22				
26+98	27+16	LT	PIPE CONDUIT 24IN					18				
			TOTAL		379	319	1,490	702	25		125	

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
BASIS OF ESTIMATE
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.
CH1107

Section No. 10
Page No. 4

UNDERDRAIN PIPE PVC PERFORATED 4IN				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
5+85	7+02	LT	UNDER CURB & GUTTER	278
12+48	18+13	RT	UNDER MEDIAN	568
17+72	18+21	RT	UNDER MEDIAN	55
18+59	26+40	LT	UNDER CURB & GUTTER	816
TOTAL				1,717

MANHOLE			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
0+36	RT	M-1	1
0+38	LT	M-2	1
2+51	LT	M-3	1
3+38	LT	M-4	1
4+13	LT	M-5	1
7+46	LT	M-6	1
7+69	LT	M-7	1
18+74	LT	M-18	1
19+43	LT	M-17	1
20+25	LT	M-16	1
21+17	LT	M-15	1
21+78	LT	M-14	1
21+78	RT	M-21	1
22+78	RT	M-20	1
23+18	LT	M-13	1
23+78	LT	M-12	1
24+80	LT	M-11	1
25+13	LT	M-10	1
26+22	LT	M-9	1
26+50	RT	M-19	1
26+98	LT	M-8	1
TOTAL			21

INLET-TYPE 2			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
6+86	LT	I-1	1
7+42	LT	I-2	1
17+57	RT	I-7	1
17+97	RT	I-6	1
20+25	LT	I-5	1
23+78	LT	I-4	1
26+33	LT	I-3	1
TOTAL			7

INLET SHALLOW CATCH BASIN BEEHIVE			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
2+51	LT	CB-1	1
4+13	LT	CB-2	1
5+39	LT	CB-3	1
16+48	LT	CB-9	1
17+87	LT	CB-8	1
19+43	LT	CB-7	1
22+78	RT	CB-12	1
23+18	LT	CB-6	1
24+37	RT	CB-11	1
24+80	LT	CB-5	1
25+13	LT	CB-4	1
25+94	RT	CB-10	2
TOTAL			13

ADJUST GATE VALVE BOX			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
10+71	LT	LOWER	1
11+30	LT	LOWER	1
14+32	LT	LOWER	1
15+09	LT	LOWER	1
15+12	LT	LOWER	1
18+06	LT	LOWER	1
18+09	LT	LOWER	1
18+66	LT	LOWER	1
26+03	LT	RAISE	1
TOTAL			9

GATE VALVE & BOX 6IN			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
7+01	LT	ON HYDRANT LEAD	1
18+85	LT	ON HYDRANT LEAD	1
22+45	LT	ON WATER MAIN	1
22+50	LT	ON HYDRANT LEAD	1
26+24	LT	ON HYDRANT LEAD	1
TOTAL			5

HYDRANT-INSTALL 6IN			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
6+97	LT	IN MEDIAN	1
10+62	LT	ADJACENT TO SIDEWALK	1
18+85	LT	ADJACENT TO SIDEWALK	1
22+50	LT	ADJACENT TO SIDEWALK	1
26+28	LT	ADJACENT TO SIDEWALK	1
TOTAL			5

REMOVE HYDRANT			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
21+19	LT	HYDRANT AND VALVE	1
25+13	LT	HYDRANT AND VALVE	1
TOTAL			2

WATERMAIN 6IN				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
6+97	7+06	LT	HYDRANT LEAD	10
10+62	10+62	LT	HYDRANT LEAD	10
18+87	18+87	LT	HYDRANT LEAD	6
22+45	22+55	LT	WATER MAIN	10
22+50	22+50	LT	HYDRANT LEAD	4
26+18	26+28	LT	HYDRANT LEAD	10
TOTAL				50

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS

BASIS OF ESTIMATE

PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	10	5

ADJUST CURB STOP & BOX			
STATION	OFFSET	DESCRIPTION	QUANTITY (EA)
19+52	LT	LOWER	1
21+44	LT	LOWER	1
23+80	LT	RAISE	1
24+80	LT	RAISE	1
25+17	LT	RAISE	1
TOTAL			5

CURB & GUTTER-TYPE I 30IN				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (LF)
5+83	7+05	LT	EXPRESS LANE MEDIAN	278
12+65	13+14	RT	SCHOOL MEDIAN	102
13+76	18+34	RT	SCHOOL MEDIAN	932
18+57	26+42	LT	ADJACENT TO SIDEWALK	816
TOTAL				2,128

VALLEY GUTTER				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
13+16	13+76	RT	SCHOOL ENTRANCE THROUGH MEDIAN	60
TOTAL				60

DECORATIVE PAVED BOULEVARD				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
5+86	7+02	LT	EXPRESS LANE MEDIAN	122
12+65	13+16	RT	SCHOOL MEDIAN	23
13+76	14+31	RT	SCHOOL MEDIAN	25
14+40	18+30	RT	SCHOOL MEDIAN	247
18+61	26+36	LT	ADJACENT TO SIDEWALK	154
TOTAL				571

SIDEWALK CONCRETE 4IN REINFORCED				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
5+11	5+47	LT	SOUT OF SOUTH ENTRANCE TO EXPRESS LANE	21
5+96	6+89	LT	EXPRESS LANE MEDIAN	52
7+43	7+82	LT	NORTH OF MAPLE STREET	23
14+32	14+38	LT	SOUTH OF ELM STREET	7
14+31	14+40	RT	SCHOOL MEDIAN	4
17+89	18+21	RT	SCHOOL MEDIAN	20
18+16	18+29	LT	SOUTH OF SPRUCE STREET	17
18+62	26+37	LT	BETWEEN SPRUCE AND DAKOTA STREET	469
26+81	27+11	LT	NORTH OF DAKOTA STREET TO SCHOOL PARKING LOT	63
TOTAL				676

SIDEWALK CONCRETE 6IN REINFORCED				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
5+47	5+55	LT	SIDEWALK RAMP	3
5+86	5+96	LT	SIDEWALK RAMP	8
6+89	7+02	LT	SIDEWALK RAMP	10
7+37	7+43	LT	SIDEWALK RAMP	4
10+79	10+84	LT	SIDEWALK RAMP	3
11+09	11+14	LT	SIDEWALK RAMP	3
14+33	14+38	LT	SIDEWALK RAMP	3
17+14	17+59	LT	DRIVEWAY CROSSING PLATE	29
17+84	17+93	RT	SIDEWALK RAMP	4
18+14	18+22	RT	SIDEWALK RAMP	4
18+16	18+21	LT	SIDEWALK RAMP	3
18+59	18+67	LT	SIDEWALK RAMP	5
26+30	26+39	LT	SIDEWALK RAMP	6
26+74	26+82	LT	SIDEWALK RAMP	4
TOTAL				89

DRIVEWAY CONCRETE 6IN REINFORCED				
STATION START	STATION STOP	OFFSET	DESCRIPTION	QUANTITY (SY)
5+90	7+05	LT	EXPRESS LANE PARKING LOT	143
16+53	16+75	LT	ALLEY DRIVEWAY	35
16+90	17+64	LT	AMBULANCE DRIVEWAY	132
18+87	19+10	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	24
19+75	20+02	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	30
20+85	21+08	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	25
22+53	22+78	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	36
23+52	23+74	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	23
24+81	25+11	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	63
25+15	25+36	LT	RESIDENTIAL DRIVEWAY/SIDEWALK	22
TOTAL				533

DETECTABLE WARNING PANELS			
STATION	OFFSET	DESCRIPTION	QUANTITY (SF)
5+52	LT	SIDEWALK RAMP	10
5+88	LT	SIDEWALK RAMP	10
6+99	LT	SIDEWALK RAMP	10
7+39	LT	SIDEWALK RAMP	10
10+83	LT	SIDEWALK RAMP	10
11+10	LT	SIDEWALK RAMP	10
14+35	LT	SIDEWALK RAMP	10
14+35	RT	SIDEWALK RAMP	20
17+89	RT	SIDEWALK RAMP	10
18+18	LT	SIDEWALK RAMP	10
18+18	RT	SIDEWALK RAMP	10
18+61	LT	SIDEWALK RAMP	10
26+37	LT	SIDEWALK RAMP	10
26+77	LT	SIDEWALK RAMP	10
27+08	LT	SIDEWALK RAMP	10
TOTAL			160

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
BASIS OF ESTIMATE
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	11	1

STATION	CUT AREA (SF)	CUT VOLUME (CY)	CUM. CUT VOLUME (CY)	EMB. AREA (SF)	EMB. VOLUME (CY)	CUM. EMB. VOLUME (CY)	EXCESS EMB. (CY)
28	55.0	0	0	0.0	0	0	0
36	50.6	16	16	0.0	0	0	16
100	42.3	110	126	74.7	89	89	37
150	44.6	80	206	78.6	142	230	-24
200	47.1	85	291	64.5	133	363	-72
251	51.2	93	384	59.2	117	480	-96
300	58.5	100	484	50.5	100	579	-96
338	64.1	86	570	50.8	71	651	-81
413	76.9	196	766	51.8	143	793	-28
450	87.1	112	878	24.0	52	845	33
506	86.7	180	1,058	0.0	25	870	188
570	114.2	238	1,296	0.0	0	870	426
650	142.6	380	1,677	0.0	0	870	807
686	151.7	196	1,873	0.0	0	870	1,003
718	209.7	214	2,087	0.0	0	870	1,217
750	120.5	196	2,283	0.0	0	870	1,413
800	120.0	223	2,505	0.0	0	870	1,636
850	118.5	221	2,726	2.4	2	872	1,854
900	113.7	215	2,941	4.5	6	879	2,063
950	107.5	205	3,146	5.4	9	888	2,258
1000	105.3	197	3,343	0.6	6	893	2,450
1050	103.8	194	3,537	0.7	1	894	2,642
1096	95.0	169	3,706	2.7	3	897	2,809
1150	97.5	193	3,899	0.0	3	900	2,999
1200	94.2	178	4,076	2.0	2	902	3,174
1260	99.3	215	4,291	0.0	2	904	3,387
1300	114.4	158	4,449	0.0	0	904	3,545
1350	81.0	181	4,630	0.0	0	904	3,726
1400	86.2	155	4,785	0.0	0	904	3,881
1471	59.3	191	4,976	0.0	0	904	4,072
1550	67.9	186	5,163	0.0	0	904	4,258
1600	67.5	125	5,288	2.2	2	906	4,382
1648	75.7	127	5,415	1.3	3	909	4,506
1664	93.6	50	5,465	0.0	0	910	4,556
1700	96.3	127	5,592	0.0	0	910	4,682
1750	99.2	181	5,773	0.0	0	910	4,863
1787	90.2	130	5,903	0.0	0	910	4,993
1817	107.0	110	6,012	0.0	0	910	5,103
1848	125.1	133	6,146	0.0	0	910	5,236
1900	81.7	199	6,345	3.3	3	913	5,432
1943	78.4	127	6,472	27.7	25	938	5,535
1990	86.2	143	6,615	27.0	48	985	5,630
2025	84.3	111	6,726	27.3	35	1,020	5,706
2096	71.2	204	6,930	30.0	75	1,096	5,835
2117	64.2	53	6,983	33.8	25	1,121	5,863
2178	63.2	144	7,127	29.8	72	1,192	5,935
2200	72.5	55	7,182	27.5	23	1,216	5,967
2265	66.8	168	7,350	28.0	67	1,283	6,067
2318	72.4	137	7,487	29.8	57	1,339	6,147
2351	76.6	91	7,578	28.3	36	1,375	6,203
2364	78.0	37	7,615	27.0	13	1,388	6,227
2400	80.0	105	7,720	27.5	36	1,424	6,296
2450	69.4	138	7,859	47.9	70	1,494	6,364
2480	66.0	75	7,934	35.2	46	1,540	6,393
2500	57.1	46	7,979	35.5	26	1,567	6,413
2513	62.3	29	8,008	36.9	17	1,584	6,424
2526	59.2	29	8,037	35.0	17	1,601	6,436
2550	56.7	52	8,089	43.4	35	1,636	6,453
2600	54.1	103	8,191	47.6	84	1,720	6,471
2622	49.0	42	8,233	80.0	52	1,772	6,461
2652	100.0	83	8,316	0.0	44	1,817	6,499
2700	80.0	160	8,476	144.7	129	1,945	6,531
2750	51.2	121	8,598	28.0	160	2,105	6,492
2800	49.2	93	8,691	13.8	39	2,144	6,547
2850	45.2	87	8,778	0.0	13	2,157	6,621
2900	45.7	84	8,862	0.0	0	2,157	6,705

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
EARTHWORK SUMMARY
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



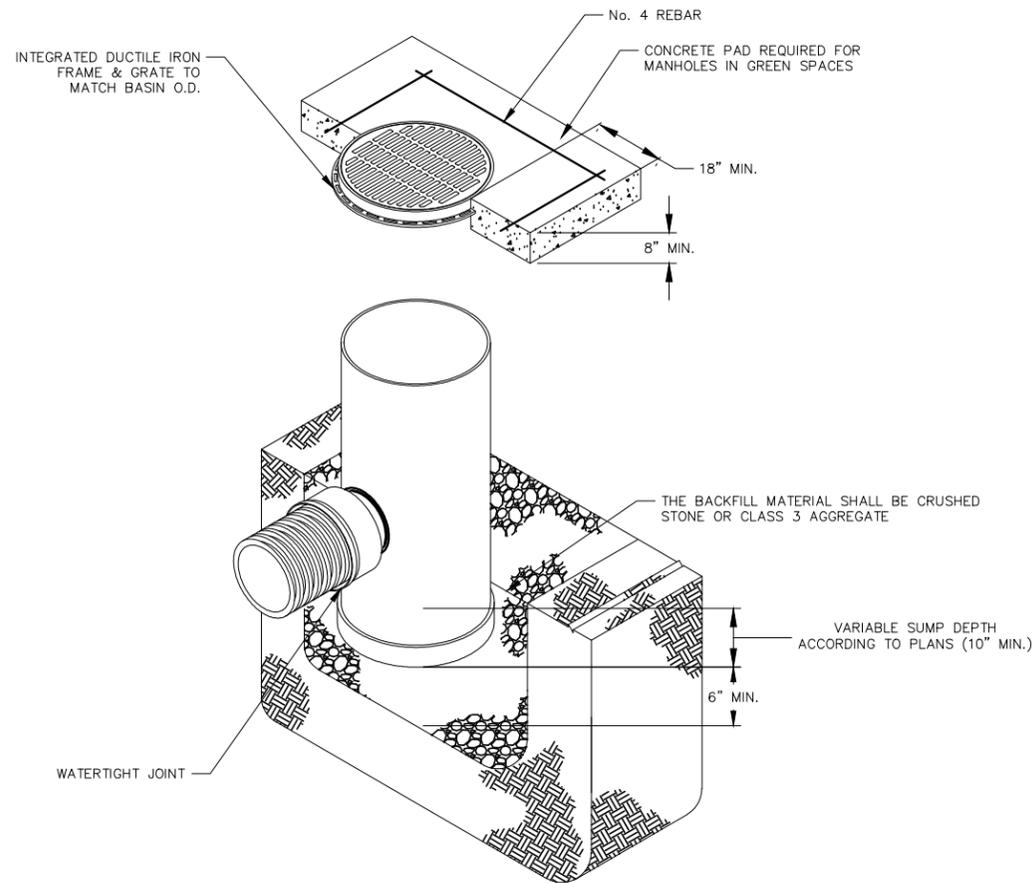
PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	11	2

STATION	NO.	LENGTH (IN)	HEIGHT (IN)	SIGN TYPE / DESCRIPTION	MUTCD CODE	SALVAGED SIGN (EA)	NEW SIGN AREA (SQ FT)	POST LENGTHS			ANCHOR UNIT				ACTION
								TYPE 3A	LF	SIZE	WT/FT	LENGTH	SIZE	NO	
1+10.00 RT	1	48	18	KINDRED CITY SIGN		1									SALVAGE & REINSTALL
1+10.00 RT	1	18	24	NO PARKING ON CITY STREETS	R7-1-1	1		13.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
4+58.17 RT	1	18	24	NO PARKING ANY TIME	R6-2	1									SALVAGE & REINSTALL
4+58.17 RT	1	24	30	BUILDING PERMITS SIGN			5	14.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
9+44.85 RT	1	36	36	SCHOOL	S1-1	1									SALVAGE & REINSTALL
9+44.85 RT	1	24	12	AHEAD	W16-9p	1									SALVAGE & REINSTALL
9+44.85 RT	1	18	24	NO PARKING ANY TIME	R6-2	1		15.5	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
11+62.78 RT	1	24	48	SCHOOL/SPEED LIMIT 20/WHEN FLASHING	S5-1	1		13.5	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
13+73.77 RT	1	30	30	STOP SIGN	R1-1	1									SALVAGE & REINSTALL
13+73.77 RT	1	18	24	BUCKLE UP/IT'S THE LAW		1									SALVAGE & REINSTALL
13+73.77 RT	1	18	24	NO SMOKING		1		14.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
14+23.50 RT	1	36	36	SCHOOL	S1-1		9								REMOVE & INSTALL NEW
14+23.50 RT	1	24	12	ARROW	W16-7pL	1									SALVAGE & REINSTALL
14+23.50 RT	1	18	24	STOP FOR PEDESTRIANS	LR9-16		3	15.5	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
15+02.08 RT	1	30	30	STOP SIGN	R1-1	1									SALVAGE & REINSTALL
15+02.08 RT	1	18	24	NO SMOKING		1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
17+55.00 RT	1	12	18	STOP FOR PEDESTRIANS	LR9-16	1		11.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
17+84.26 RT	1	36	36	SCHOOL	S1-1	1									SALVAGE & REINSTALL
17+84.26 RT	1	24	12	ARROW	W16-7pL		2	13.5	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
18+09.94 RT	2	12	36	STATE LAW - STOP FOR CROSSWALK	R1-6a	1									SALVAGE & REINSTALL
18+56.49 RT	1	30	30	STOP SIGN	R1-1		5.2								REMOVE & INSTALL NEW
18+56.49 RT	1	18	24	BUCKLE UP/IT'S THE LAW		1									SALVAGE & REINSTALL
18+56.49 RT	1	18	24	NO SMOKING		1		14.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
19+02.35 RT	1	24	30	SPEED LIMIT 25	R2-1		5	12.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
22+18.61 RT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
24+36.61 RT	1			KINDRED CEMETARY SIGN											OWNER TO RESET
27+24.29 RT	1	15	24	CASS CO. 15 SIGN	M1-6a	1									SALVAGE & REINSTALL
27+24.29 RT	1	30	24	AXLE WEIGHT LIMIT 8 TONS	R12-2	1		13.5	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
0+31.22 LT	2	24	9	STREET SIGN / FIRST AVE.	SNS-8		3								REMOVE & INSTALL NEW
0+31.22 LT	2	36	9	STREET SIGN / SHEYENNE ST.	SNS-8		4.5	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
6+98.28 LT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
7+56.04 LT	4	30	9	STREET SIGN / 1ST AV. / MAPLE ST.	SNS-8		7.6	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
10+75.29 LT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
11+26.15 LT	2	24	9	STREET SIGN / FIRST AV.	SNS-8		3								REMOVE & INSTALL NEW
11+26.15 LT	2	30	9	STREET SIGN / LINDEN ST.	SNS-8		3.8	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
13+79.91 LT	1	30	24	KINDRED BUSINESS DISTRICT	D1-X1L		5	11.5	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
14+41.33 LT	1	30	30	SCHOOL	S1-1	1									SALVAGE & REINSTALL
14+41.33 LT	1	24	12	ARROW	W16-7pL	1		13.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
14+47.83 LT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
15+04.99 LT	4	24	9	STREET SIGN / FIRST AV. / ELM ST.	SNS-8		6	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
15+04.99 LT	2	24	24	NO TRUCKS	R5-2		8								REMOVE & INSTALL NEW
15+04.99 LT	2	21	15	ARROW	M6-1		4.4	12.8	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
15+38.25 LT	1	12	28	STOP FOR PEDESTRIANS	LR9-16	1		11.8	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
16+21.87 LT	1	30	24	KINDRED BUSINESS DISTRICT	D1-X1R		5	11.5	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
18+21.03 LT	1	36	36	SCHOOL	S1-1	1									SALVAGE & REINSTALL
18+21.03 LT	1	24	12	ARROW	W16-7pL	1		13.5							SALVAGE & REINSTALL
18+21.03 LT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
18+69.93 LT	2	24	24	NO TRUCKS	R5-2		8								REMOVE & INSTALL NEW
18+69.93 LT	2	21	15	ARROW	M6-1		4.4	12.8	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
18+69.93 LT	2	24	9	STREET SIGN / FIRST AV.	SNS-8		3								REMOVE & INSTALL NEW
18+69.93 LT	2	30	9	STREET SIGN / SPRUCE ST.	SNS-8		3.8	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
19+12.00 LT	1	18	24	STOP FOR PEDESTRIANS	LR9-16		3	11.5	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
19+69.57 LT	1	36	36	SCHOOL	S1-1	1									SALVAGE & REINSTALL
19+69.57 LT	1	24	12	ARROW	W16-7pL	1		13.5	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
21+38.49 LT	1	24	48	SCHOOL/SPEED LIMIT 20/WHEN FLASHING	S5-1	1		13.5	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
22+98.16 LT	1	30	30	SCHOOL	S1-1	1									SALVAGE & REINSTALL
22+98.16 LT	1	24	8	"SCHOOL"	S4-3	1		12.7	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
26+12.51 LT	1	24	30	BUILDING PERMITS SIGN			5								REMOVE & INSTALL NEW
26+12.51 LT	1	18	24	"DOLLARS FOR SCHOLARS COMMUNITY"			3	14.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
26+15.51 LT	4	30	9	STREET SIGN / FIRST AVE. / DAKOTA ST.	SNS-8		7.6	11.0	2	2.416	4	2.25	2.773		REMOVE & INSTALL NEW
26+30.96 LT	1	30	30	STOP SIGN	R1-1	1		12.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
27+38.60 LT	1	48	18	KINDRED CITY SIGN		1									SALVAGE & REINSTALL
27+38.60 LT	1	18	24	NO PARKING ON CITY STREETS	R7-1-1	1		13.0	2	2.416	4	2.25	2.773		SALVAGE & REINSTALL
27+38.60 LT	2	98	49	WELCOME TO KINDRED		1									SALVAGE & REINSTALL
TOTALS						39	117.3	464.6				144			

MINIMUM HEIGHT (BOTTOM OF SIGN TO TOP OF CURB) FOR AN URBAN STREET: 7 FEET
 MINIMUM HEIGHT FOR A RURAL STREET: 9 FEET
 SIGN SUPPORT POST OVERLAP WITH ANCHOR SUPPORT (BELOW GROUND): 6 INCH

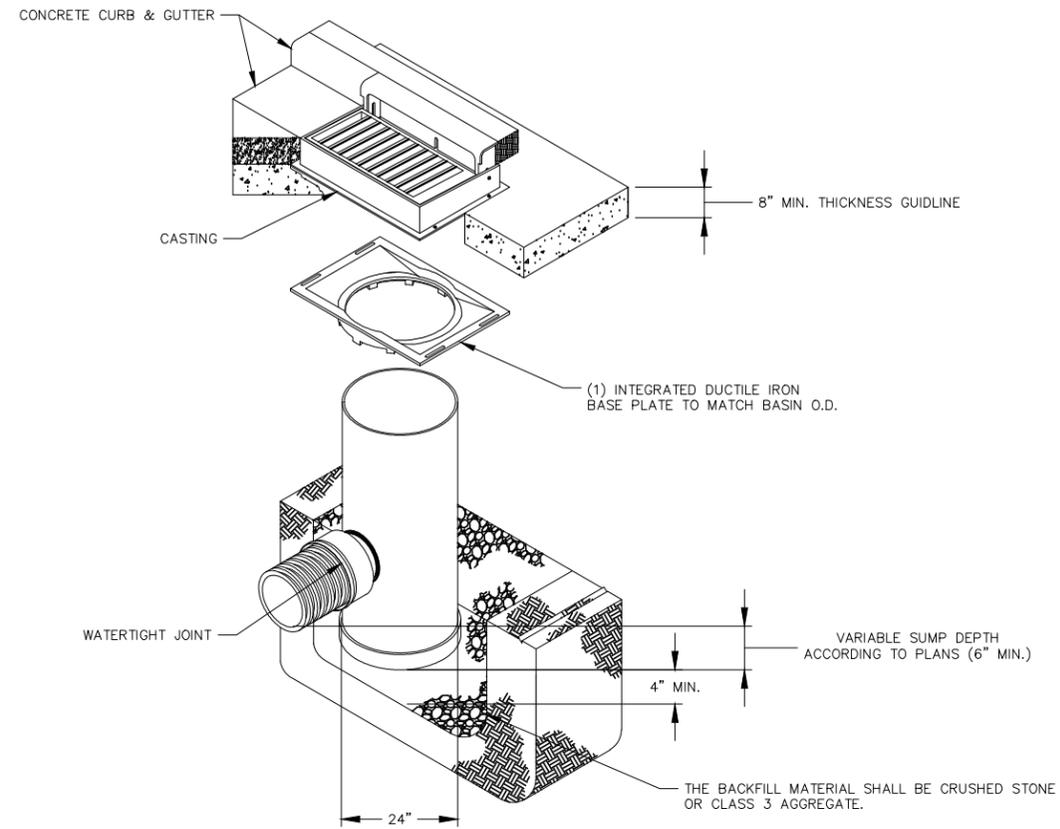
CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
SIGN SUMMARY
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



- NOTES:**
1. GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
 2. FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
 3. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE

PVC MANHOLE AND CATCH BASIN

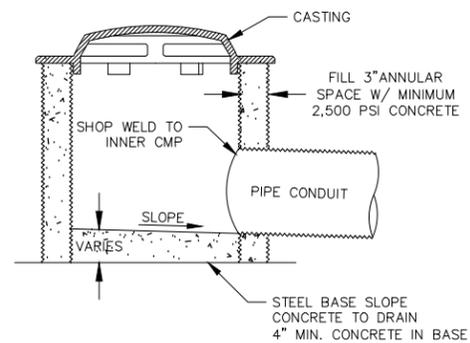
NO SCALE



- NOTES:**
1. BASE PLATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
 2. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE.

PVC 2FT X 3FT CURB INLET STRUCTURE

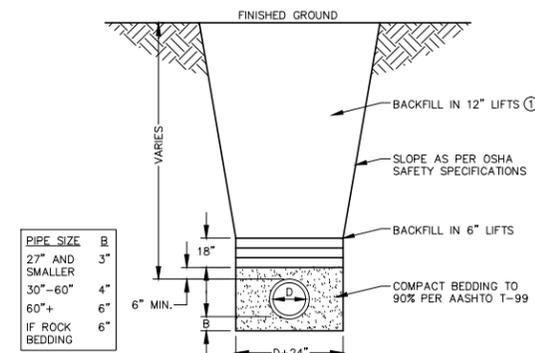
NO SCALE



- NOTES:**
1. ANY COATING DAMAGED DURING WELDING OR CONSTRUCTION SHALL BE REPAIRED.
 2. TRANSITION PLATES SHALL BE PROVIDED AS NEEDED TO MATCH REQUIRED CASTING PER THE STRUCTURE SCHEDULE.

CSP STRUCTURE DETAIL

NO SCALE

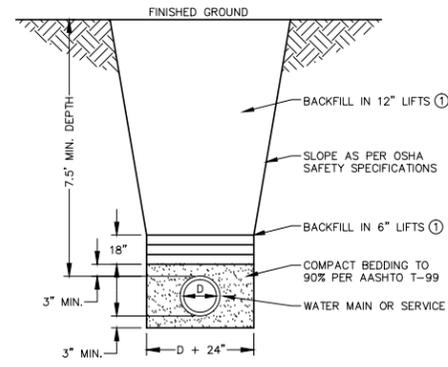


- ① COMPACT TO 95% MINIMUM STANDARD PROCTOR DENSITY. TOP 1 FEET BELOW ROADWAY SECTION SHALL BE COMPACTED TO 98% MINIMUM STANDARD PROCTOR DENSITY.

FLEXIBLE PIPE STORM SEWER TRENCH

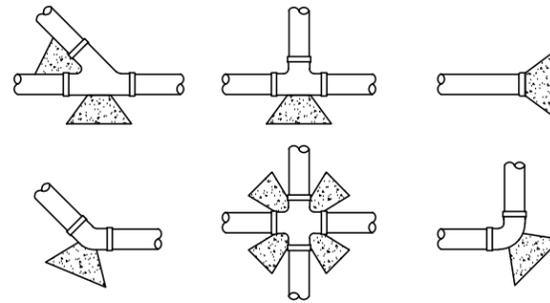
NO SCALE

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
GENERAL DETAILS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



① COMPACT TO 95% MINIMUM STANDARD PROCTOR DENSITY. TOP 1 FEET BELOW ROADWAY SECTION SHALL BE COMPACTED TO 98% MINIMUM STANDARD PROCTOR DENSITY.

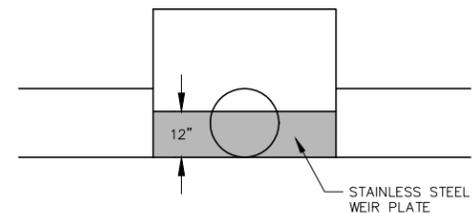
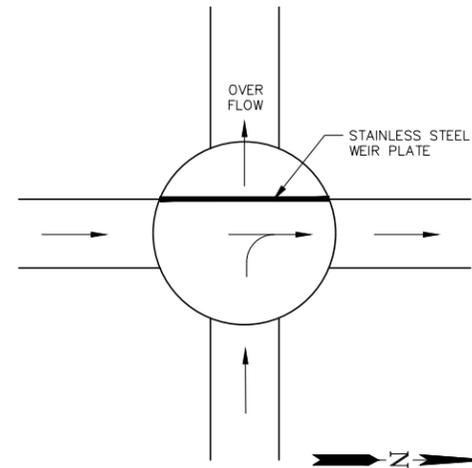
WATER MAIN OR SERVICE TRENCH
NO SCALE



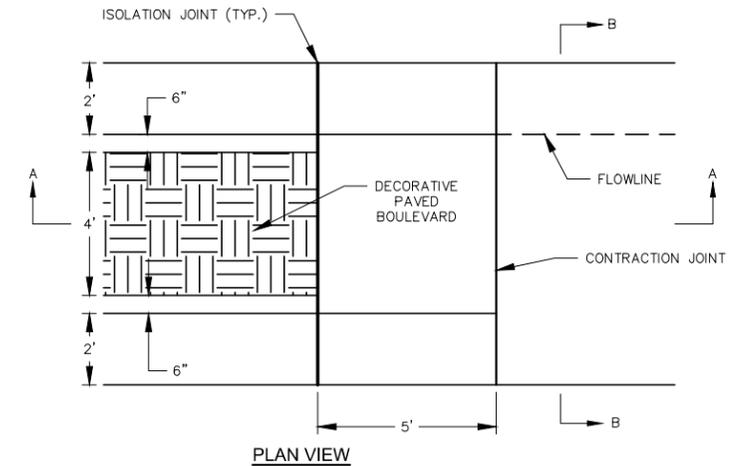
PIPE DIAMETER	MINIMUM THRUST BLOCK SIZES									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
CROSS, DEAD END OR TEE	2	4	7	11	16	21	28	36	44	63
90 BEND	3	6	10	16	22	30	39	50	62	88
45 BEND	2	3	6	9	12	17	21	27	34	48
22 1/2 BEND	1	2	3	5	7	9	14	17	17	25

NOTE: ALL THRUST BLOCKS A MINIMUM OF 12" THICK AND MUST BEAR AGAINST UNDISTURBED SOIL.

THRUST BLOCKS
NO SCALE



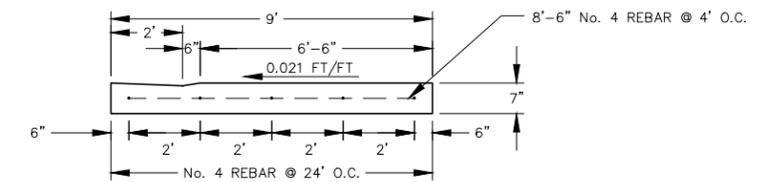
WEIR STRUCTURE M-21
NO SCALE



PLAN VIEW



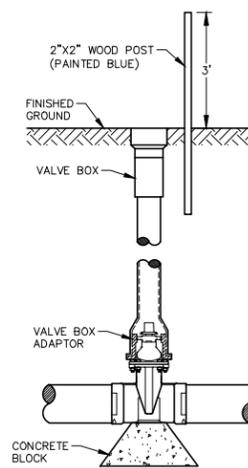
SECTION A-A



SECTION B-B

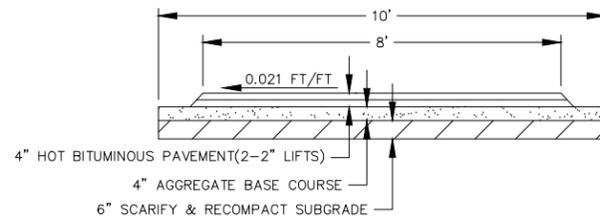
NOTES:
1. CONCRETE MEDIAN NOSE TO BE PAID FOR AS VALLEY GUTTER.

CONCRETE MEDIAN NOSE AND VALLEY GUTTER
NO SCALE

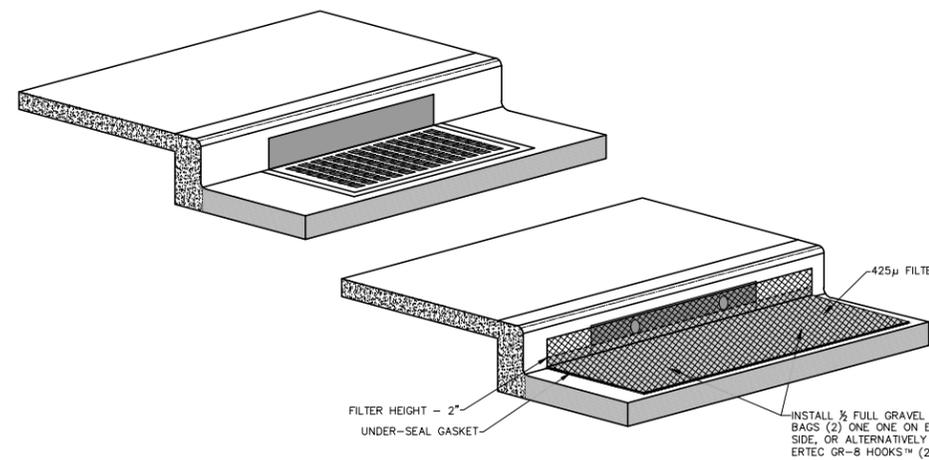


NOTES:
1. WRAP ALL UNDERGROUND METAL ITEMS WITH 8 MIL POLYETHYLENE PLASTIC.
2. VALVE AND BOX SHALL BE BACKFILLED WITH GRANULAR MATERIAL TO TOP COMPACTED TO 95% DENSITY.
3. PROVIDE RISER FOR NUT ON ANY VALVE OVER 7-1/2" DEEP.
4. TOP OF VALVE BOX SHALL BE SET TO PROVIDE 12" OF UPWARD ADJUSTMENT.

VALVE AND BOX
NO SCALE



ASPHALT SHARED USE PATH SECTION
NO SCALE

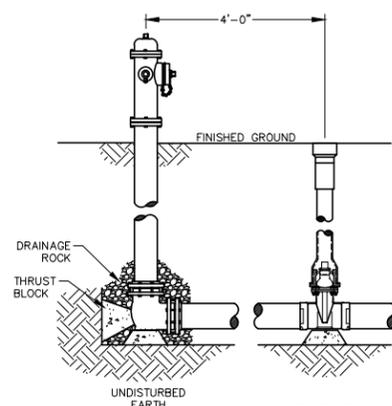


INLET PROTECTION - SPECIAL
NO SCALE

NOTES:
1. INLET PROTECTION SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE OWNER.
2. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE MINNESOTA DEPARTMENT OF TRANSPORTATION'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.
3. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

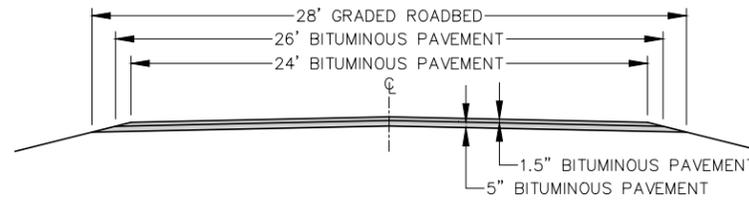
INSTALLATION NOTES:

1. PLACE DEVICE TIGHTLY AGAINST DRAIN OPENING AND COVER ENTIRE GRATE. THE DEVICE SHOULD EXTEND AT LEAST 2 INCHES PAST GRATE TOWARD STREET.
2. OVERLAP THE SEGMENTS AT LONGER OPENINGS.
3. ANCHOR THE DEVICE SO THAT WATER CANNOT FLOW BEHIND IT.

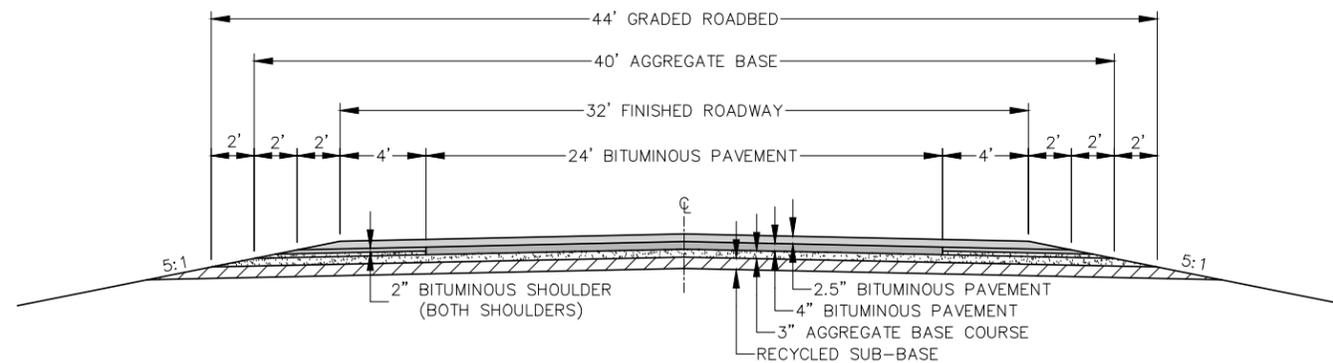


NOTES:
1. DO NOT BLOCK WEEP HOLE ON HYDRANT.
2. DO NOT COVER ANY JOINT WITH CONCRETE.
3. ALL UNDERGROUND METAL ITEMS TO BE WRAPPED WITH 8" MIL POLYETHYLENE PLASTIC.
4. NOZZLE HEIGHT SHALL BE MINIMUM 24" FROM FINISHED GROUND OR AS SHOWN ON PLANS.

HYDRANT
NO SCALE

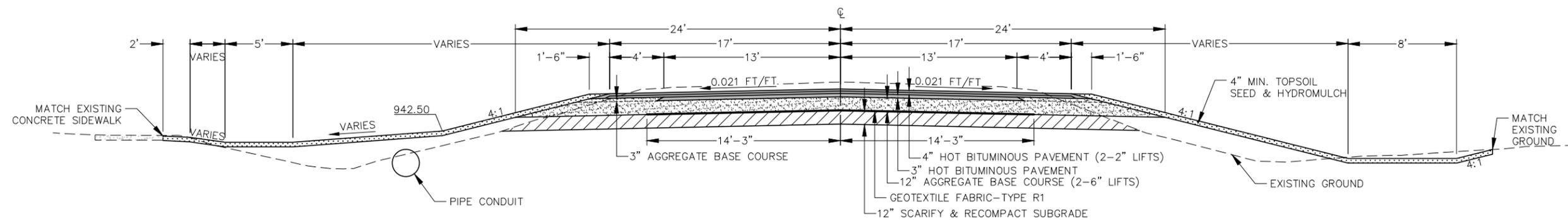


TYPICAL EXISTING SECTION
NO SCALE STA 0+00 TO STA 26+65

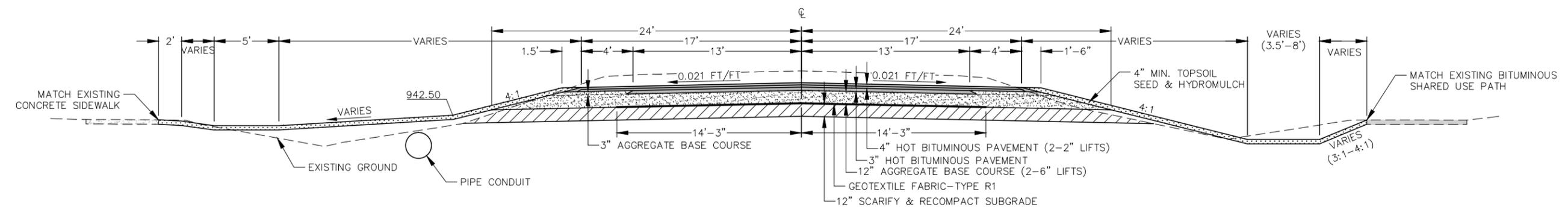


TYPICAL EXISTING SECTION
NO SCALE STA 26+65 TO END

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

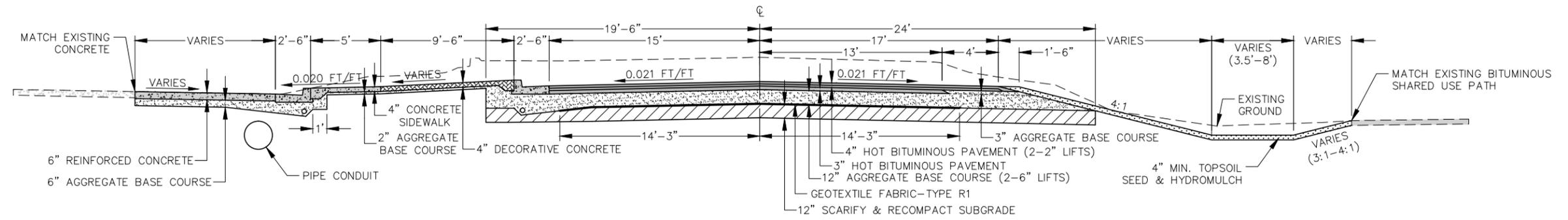


TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 0+28 TO STA 3+25

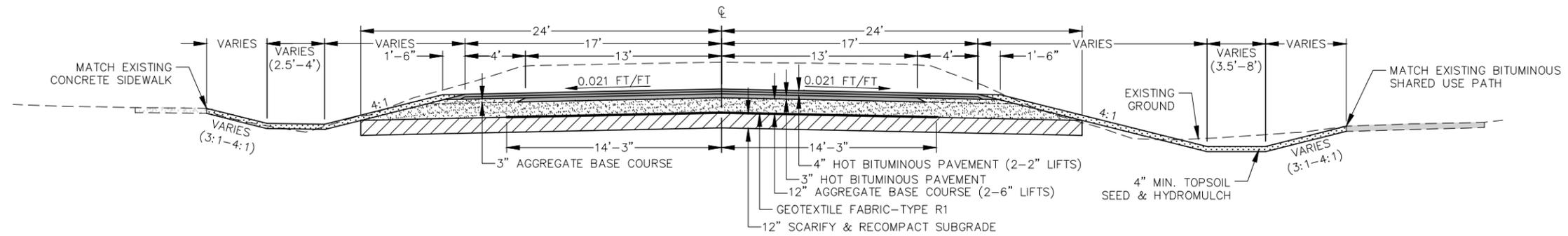


TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 3+25 TO STA 5+70

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

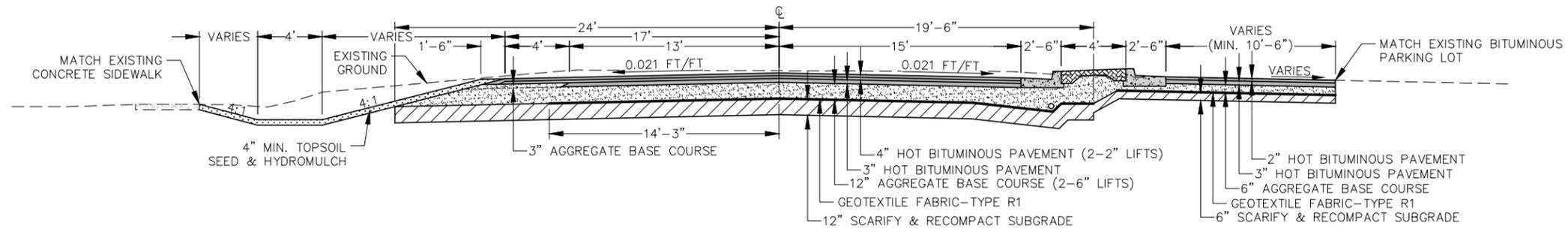


TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 5+70 TO STA 7+18



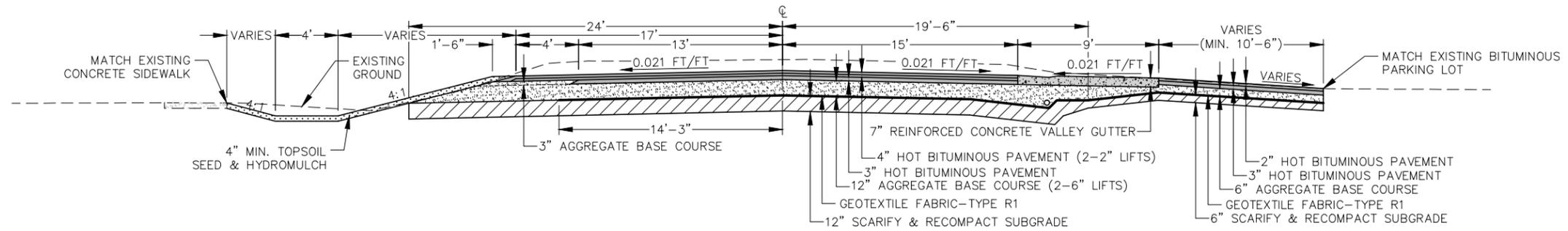
TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 7+18 TO STA 12+60

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



TYPICAL PAVEMENT & GRADING SECTION

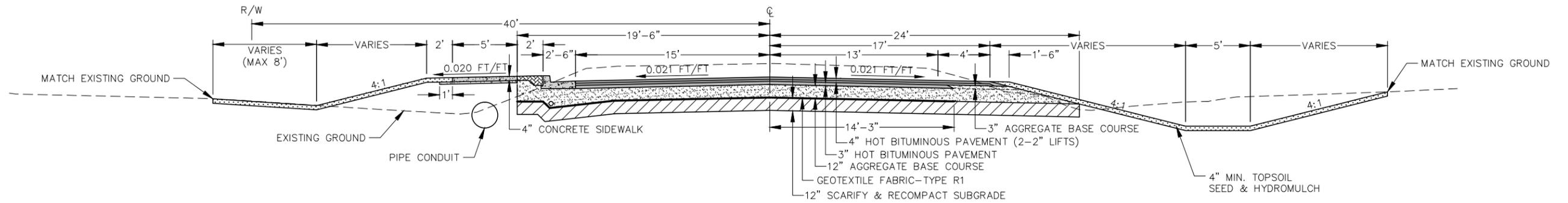
NO SCALE STA 12+60 TO STA 13+20.6
STA 13+70.6 TO STA 18+46.5



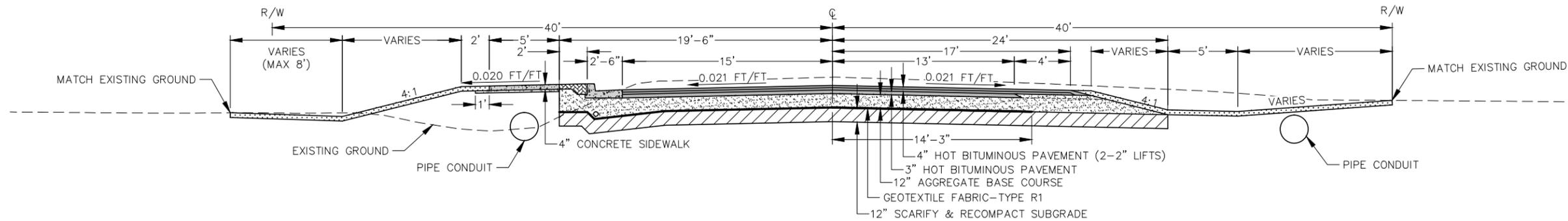
TYPICAL PAVEMENT & GRADING SECTION

NO SCALE STA 13+20.6 TO STA 13+70.6

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

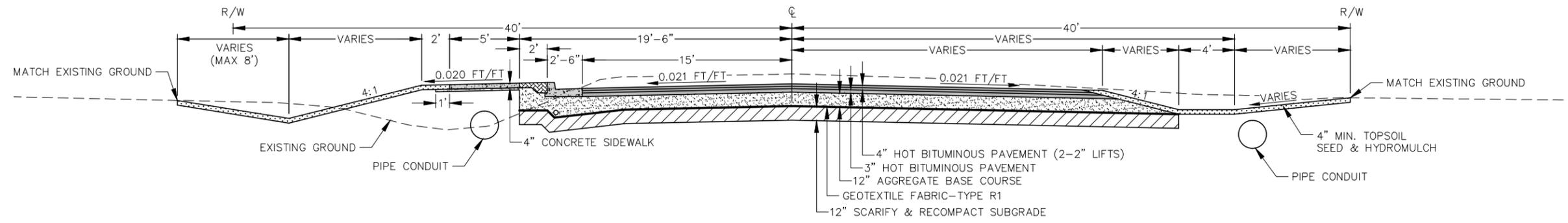


TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 18+46 TO STA 21+99

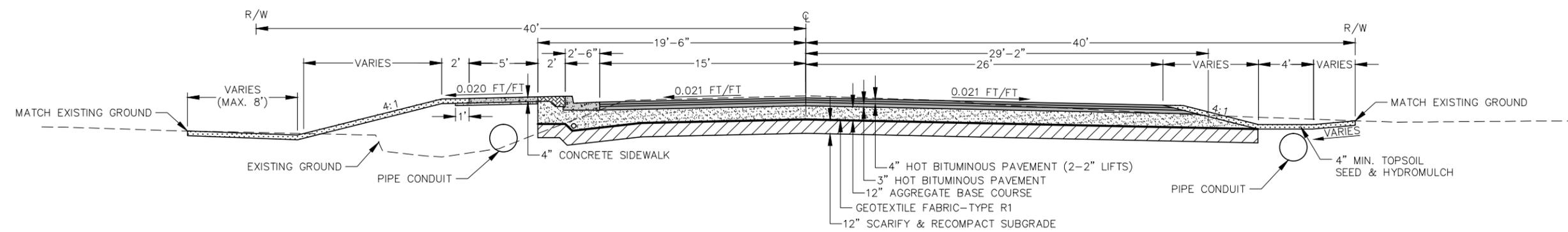


TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 21+99 TO STA 23+52.6

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



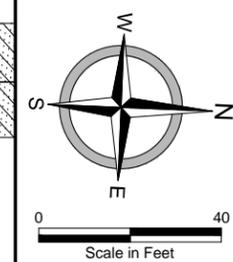
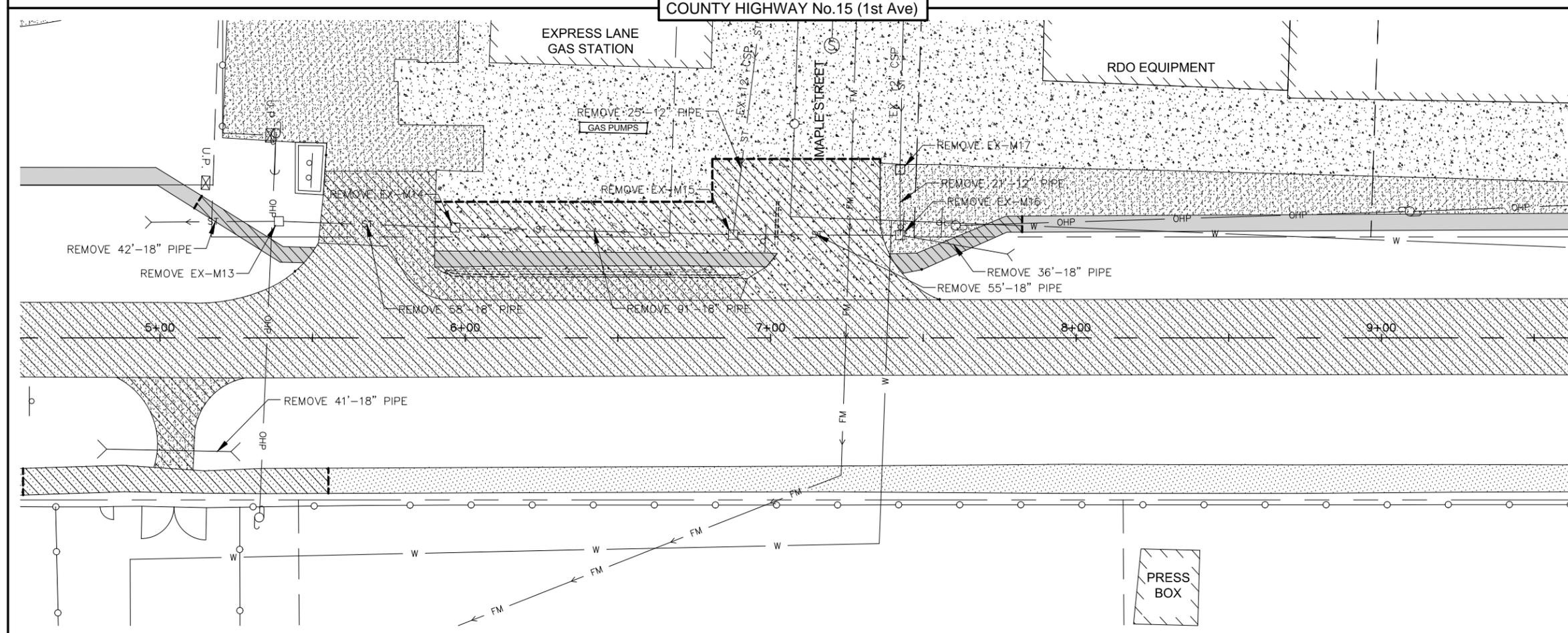
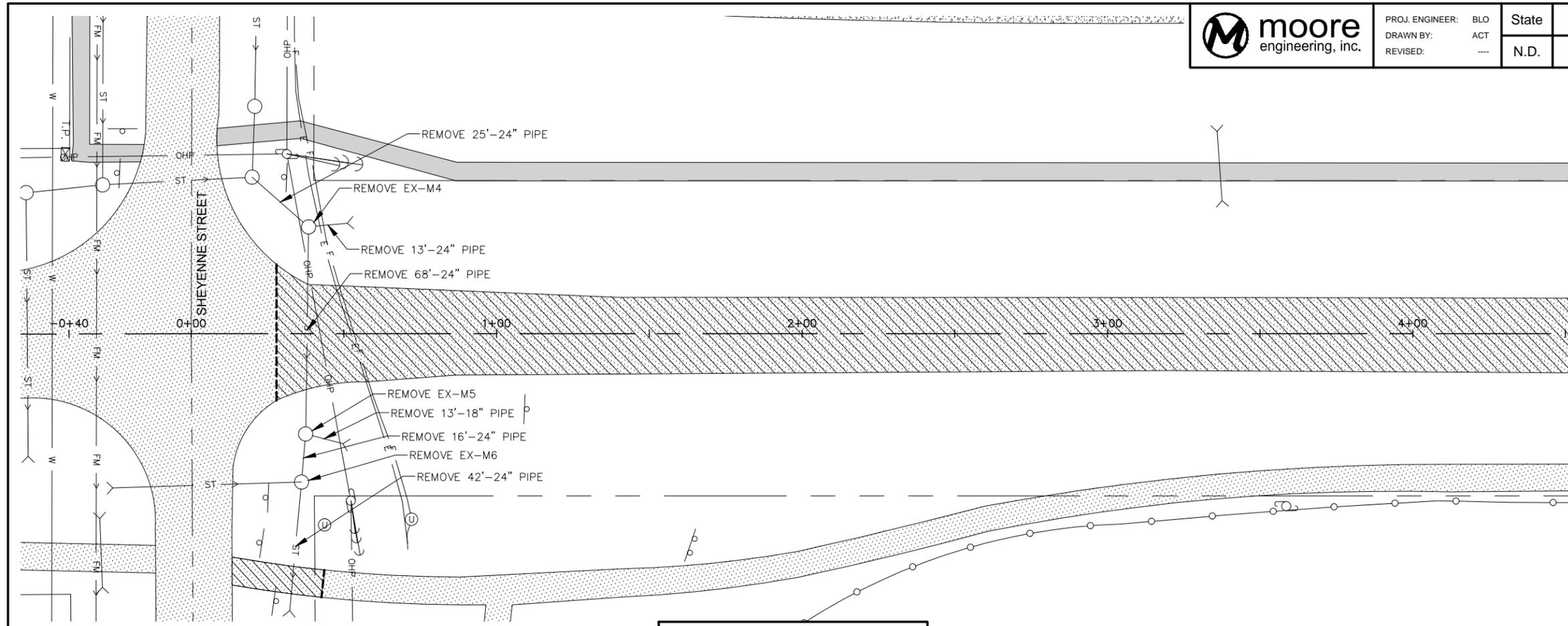
TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 23+52.6 TO STA 24+64.5



TYPICAL PAVEMENT & GRADING SECTION
NO SCALE STA 24+64.5 TO STA 27+14.4

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TYPICAL SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

NOTES:
1. SEE SIGN SUMMARY FOR SIGNS TO BE REMOVED OR SALVAGED.



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
REMOVALS PLAN
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



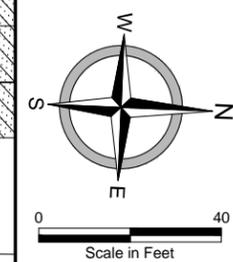
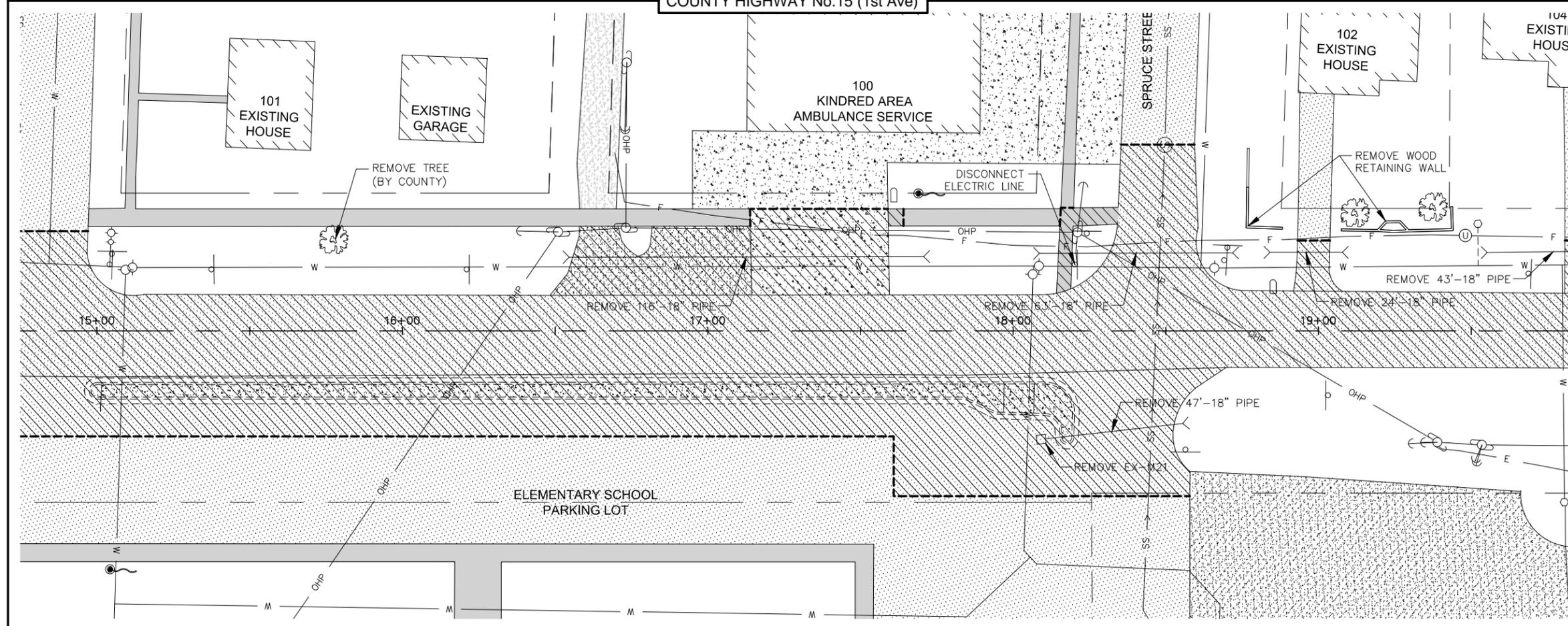
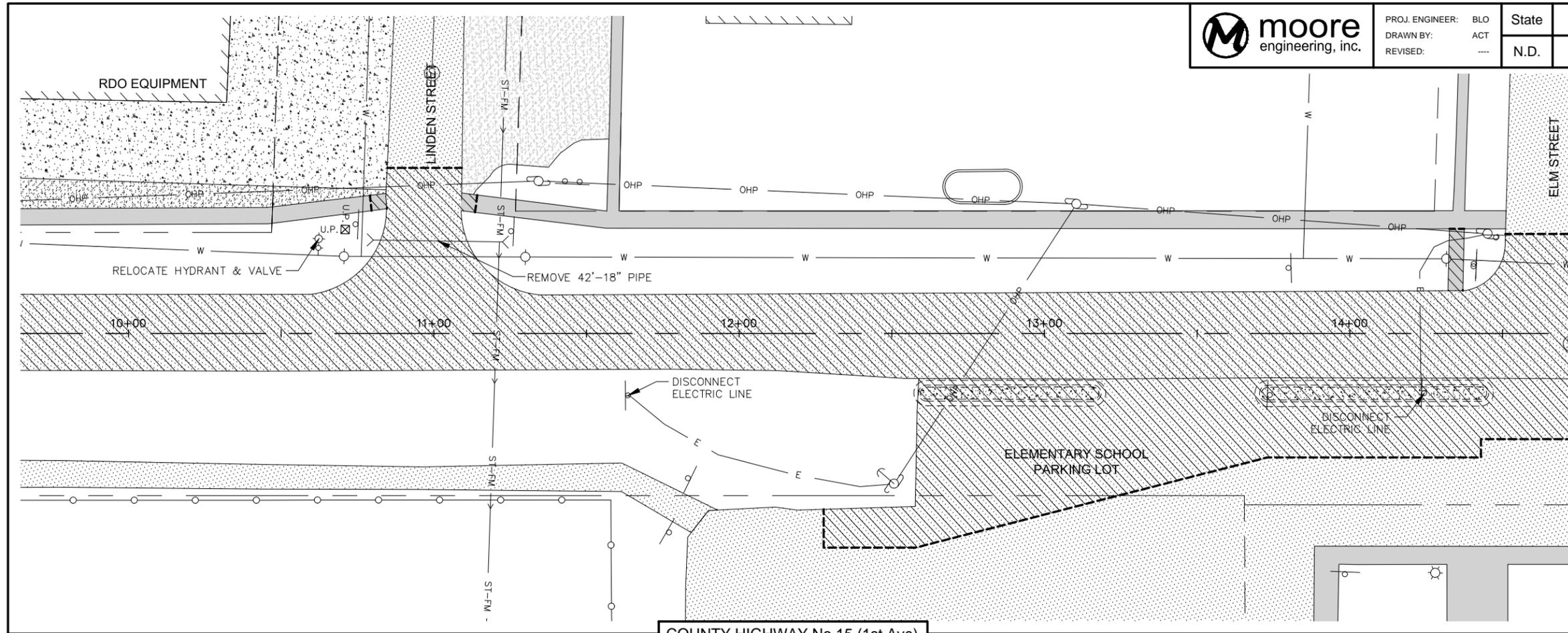
PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State
 N.D.

PROJECT No.
 CH1107

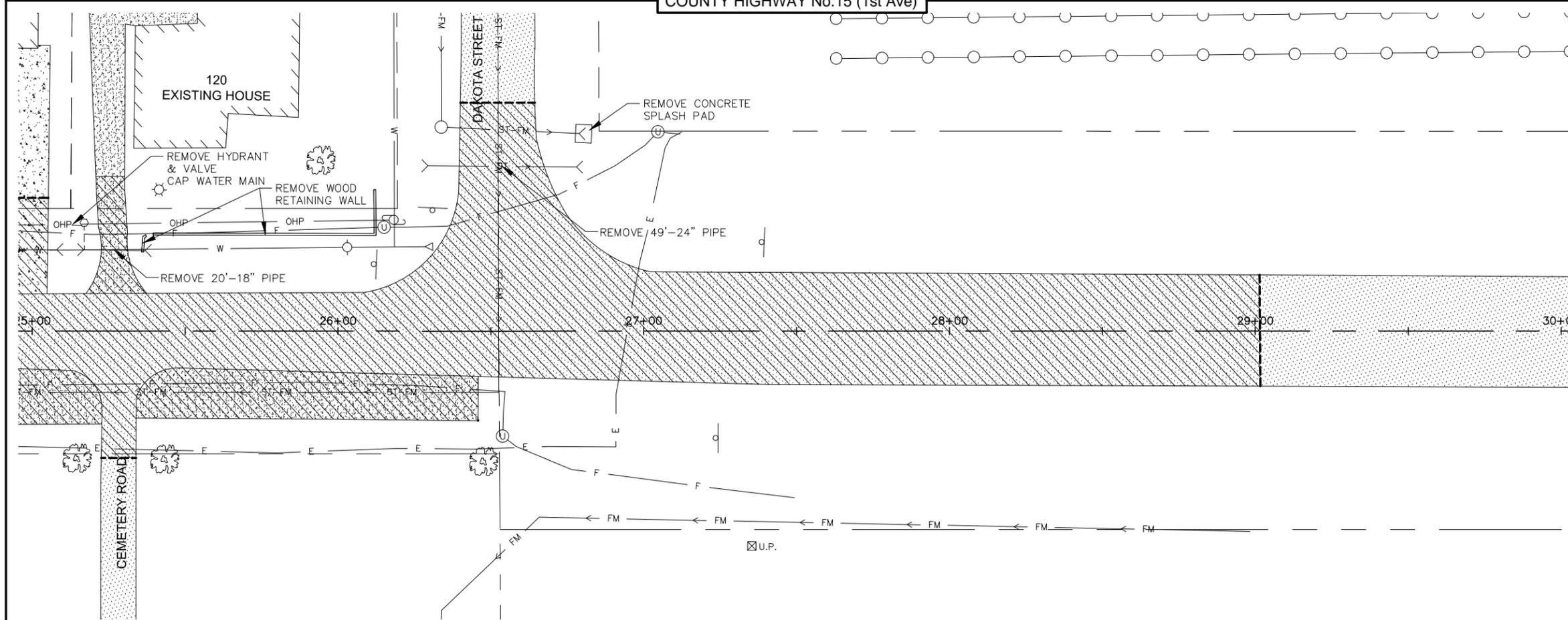
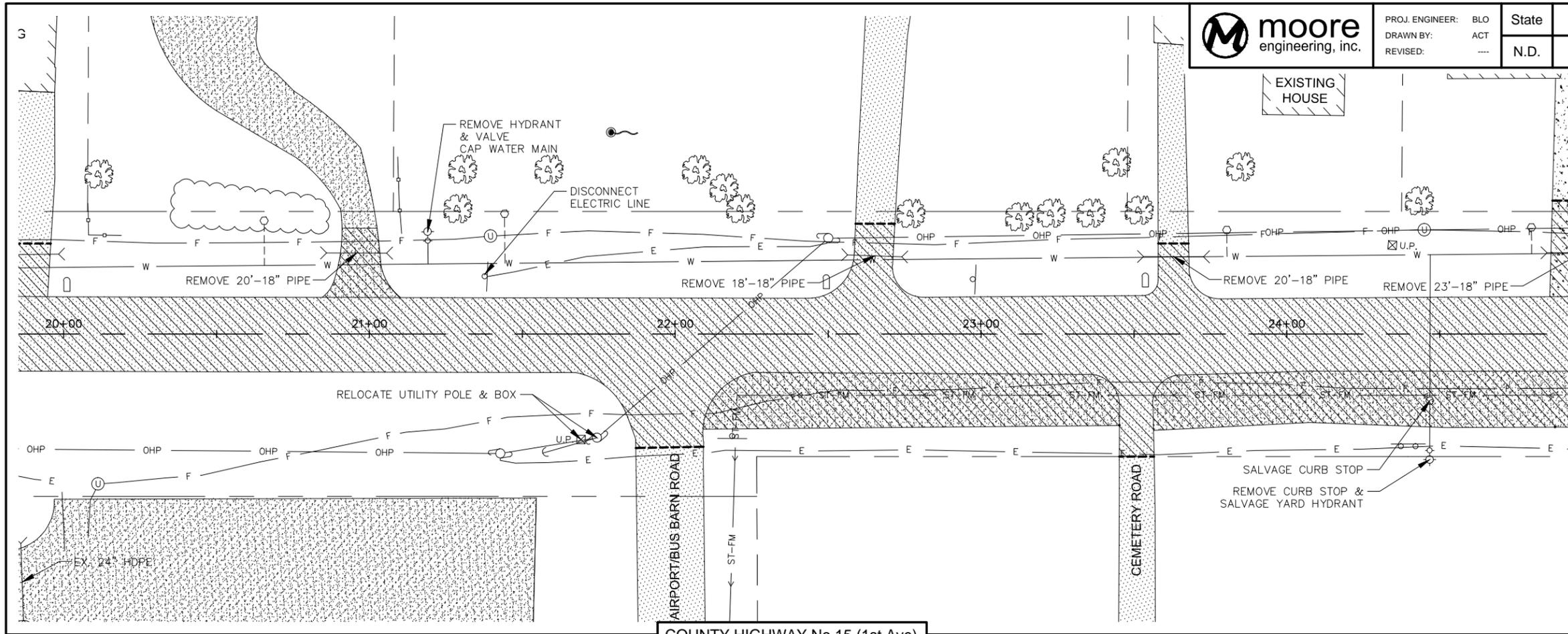
Section No. 40
 Page No. 2

NOTES:
 1. SEE SIGN SUMMARY FOR SIGNS TO BE REMOVED OR SALVAGED.

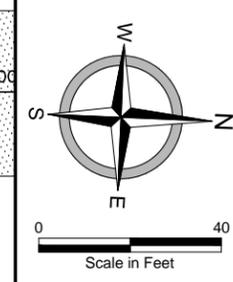


This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
REMOVALS PLAN
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



NOTES:
1. SEE SIGN SUMMARY FOR SIGNS TO BE REMOVED OR SALVAGED.



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
REMOVALS PLAN
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.
CH1107

Section No. 50
Page No. 1

STORM STRUCTURE SCHEDULE				
STRUCTURE	LOCATION	CASTING	RIM	INV. ELEV.
CB-1	STA: 2+51 42.0L N 376326.4387 E 2844837.9583	R-2561-A	941.43	E INV. 939.43
CB-2	STA: 4+13 42.0L N 376488.2921 E 2844831.0687	R-2561-A	941.47	E INV. 939.97
CB-3	STA: 5+39 38.0L N 376614.3483 E 2844829.7065	R-2561-A	942.12	S INV. 939.70 N INV. 939.70
CB-4	STA: 25+12.70 39.0L N 378586.2200 E 2844744.7687	R-2561-A	941.86	E INV. 940.48
CB-5	STA: 24+80.30 38.0L N 378553.8919 E 2844747.1457	R-2561-A	941.92	E INV. 940.50
CB-6	STA: 23+17.70 37.0L N 378391.4815 E 2844755.0600	R-2561-A	942.20	E INV. 940.62
CB-7	STA: 19+43 34.0L N 378017.2481 E 2844773.9927	R-2561-A	942.50	E INV. 940.89
CB-8	STA: 17+87 25.0L N 377861.7720 E 2844789.6190	R-2561-A	942.65	S INV. 940.90 N INV. 940.90
CB-9	STA: 16+48 26.0L N 377722.8552 E 2844794.5314	R-2561-A	942.45	N INV. 941.01
CB-10	STA: 25+94 36.4R N 378670.6531 E 2844816.6429	R-2668	942.60	S INV. 940.29 N INV. 940.29
CB-11	STA: 24+37 33.0R N 378513.6506 E 2844819.9230	R-2668	942.50	S INV. 940.48 N INV. 940.48
CB-12	STA: 22+78 25.0R N 378354.4542 E 2844818.6922	R-2668	942.38	E INV. 940.75
I-1	STA: 6+86.36 33.0L N 376761.7876 E 2844828.4349	R-3067-VB	942.62	W INV. 940.02 N INV. 940.02 S INV. 940.02
I-2	STA: 7+42.40 55.1L N 376816.8361 E 2844803.9935	R-2668	942.50	E INV. 940.79
I-3	STA: 26+33.01 31.0L N 378706.7638 E 2844747.5949	R-3067-VB	944.12	S INV. 940.21 N INV. 940.21
I-4	STA: 23+77.50 16.5L N 378452.0993 E 2844772.9961	R-3067-VB	943.61	W INV. 940.61
I-5	STA: 20+25 16.5L N 378099.9182 E 2844787.9874	R-3067-VB	943.20	W INV. 940.76
I-6	STA: 17+96.97 42.5R N 377874.6000 E 2844856.6341	R-3067-VB	943.11	SW INV. 941.26 N INV. 941.26
I-7	STA: 17+57 16.5R N 377833.5641 E 2844832.3573	R-3067-VB	943.55	NE INV. 941.32
M-1	STA: 0+36.11 48.5R N 376115.5933 E 2844937.4981	R-1733	944.70	W INV. 938.46 E INV. 938.46 N INV. 940.16

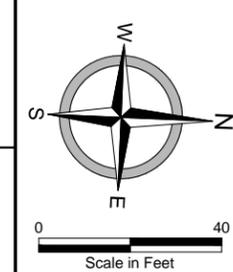
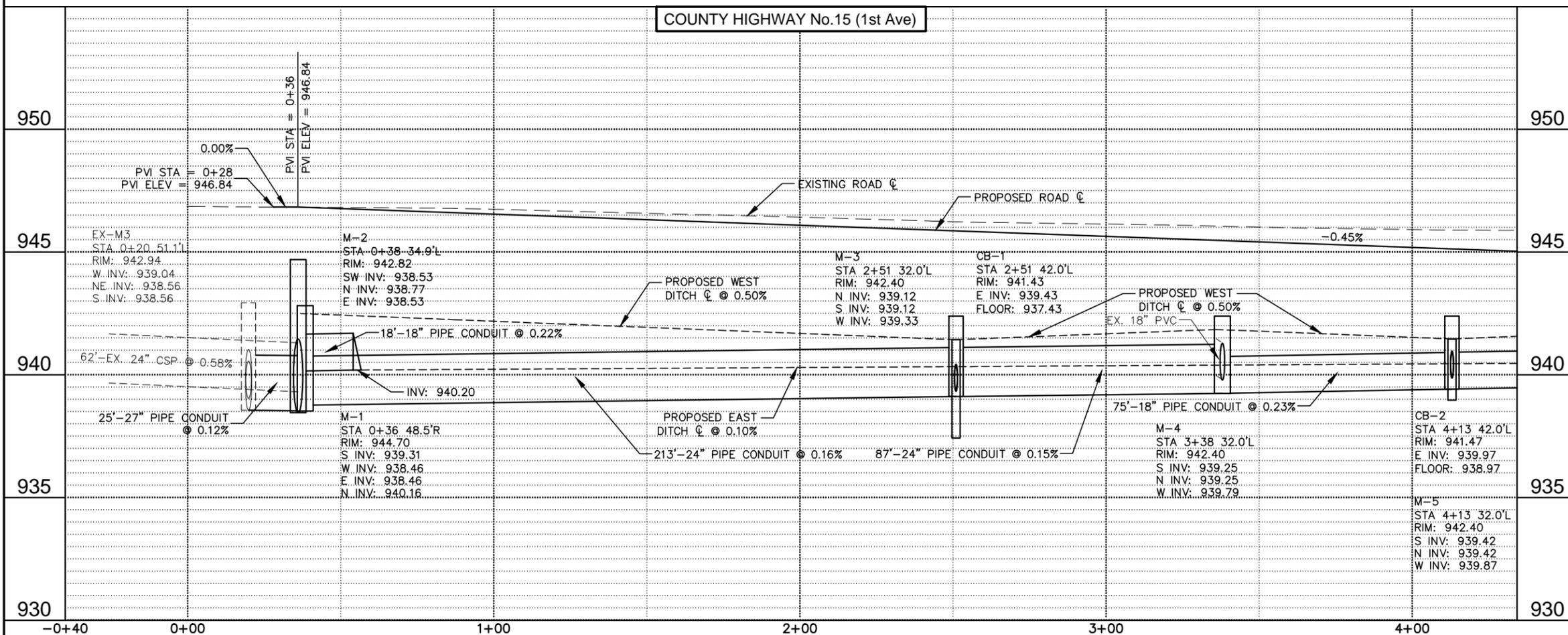
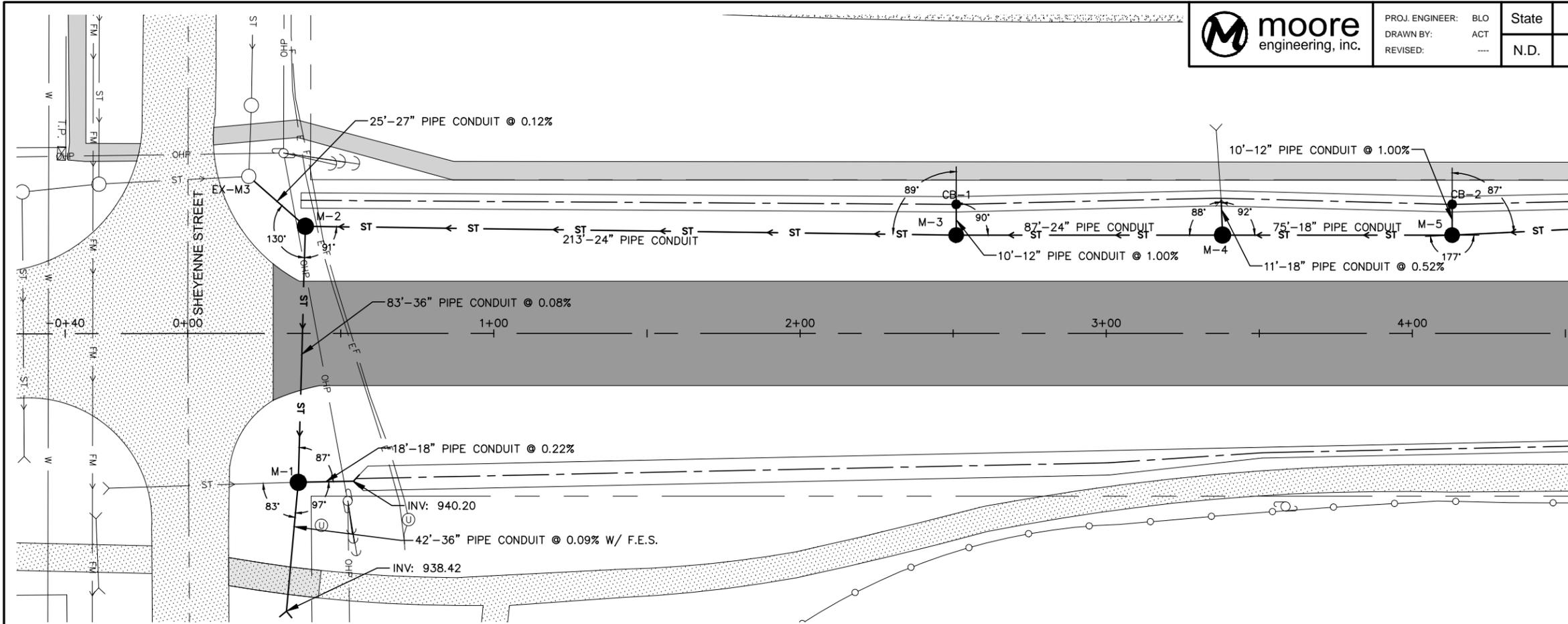
STORM STRUCTURE SCHEDULE				
STRUCTURE	LOCATION	CASTING	RIM	INV. ELEV.
M-2	STA: 0+38.41 34.9L N 376114.3498 E 2844854.1401	R-1733	942.82	SW INV. 938.53 N INV. 938.77 E INV. 938.53
M-3	STA: 2+51 32.0L N 376326.8640 E 2844847.9493	R-1733	942.40	N INV. 939.12 S INV. 939.12 W INV. 939.33
M-4	STA: 3+38 32.0L N 376413.7853 E 2844844.2493	R-1733	942.40	S INV. 939.25 N INV. 939.25 W INV. 939.79
M-5	STA: 4+13 32.0L N 376488.7174 E 2844841.0596	R-1733	942.40	S INV. 939.42 N INV. 939.42 W INV. 939.87
M-6	STA: 7+46 29.0L N 376821.5437 E 2844829.8949	R-1733	943.00	S INV. 940.14 N INV. 940.14 W INV. 940.54
M-7	STA: 7+68.90 28.2L N 376844.4570 E 2844829.7203	R-1733	942.70	S INV. 940.22 N INV. 940.70
M-8	STA: 26+97.80 53.0L N 378770.5515 E 2844722.9049	R-1733	943.75	S INV. 940.16 SW INV. 940.16 N INV. 940.16
M-9	STA: 26+22.29 27.4L N 378696.1988 E 2844751.6843	R-1733	943.28	S INV. 940.22 N INV. 940.22 W INV. 940.22
M-10	STA: 25+12.70 22.0L N 378586.9430 E 2844761.7533	R-1733	944.56	S INV. 940.31 N INV. 940.31 W INV. 940.31
M-11	STA: 24+80.30 22.0L N 378554.5723 E 2844763.1312	R-1733	944.43	S INV. 940.34 N INV. 940.34 W INV. 940.34
M-12	STA: 23+77.50 22.0L N 378451.8654 E 2844767.5032	R-1733	944.02	S INV. 940.42 N INV. 940.42 E INV. 940.57
M-13	STA: 23+17.70 22.0L N 378392.1194 E 2844770.0464	R-1733	944.26	S INV. 940.47 N INV. 940.47 W INV. 940.47
M-14	STA: 21+77.80 22.0L N 378252.3460 E 2844775.9961	R-1733	944.22	S INV. 940.58 N INV. 940.58 E INV. 940.58
M-15	STA: 21+17 22.0L N 378191.6010 E 2844778.5819	R-1733	943.98	S INV. 940.63 N INV. 940.63 W INV. 941.30
M-16	STA: 20+25 22.0L N 378099.6843 E 2844782.4945	R-1733	943.61	S INV. 940.70 N INV. 940.70 W INV. 940.70 E INV. 940.70
M-17	STA: 19+43 22.0L N 378017.7584 E 2844785.9818	R-1733	943.94	S INV. 940.77 N INV. 940.77 W INV. 940.77
M-18	STA: 18+74 25.0L N 377948.6933 E 2844785.9190	R-1733	944.06	S INV. 940.83 N INV. 940.83 W INV. 940.83
M-19	STA: 26+50 36.4R N 378726.6025 E 2844814.2613	R-1733	942.96	S INV. 940.23 NE INV. 940.23
M-20	STA: 22+78 33.0R N 378354.7944 E 2844826.6850	R-1733	943.00	S INV. 940.67 N INV. 940.67 W INV. 940.67
M-21	STA: 21+77.80 33.0R N 378254.6851 E 2844830.9464	R-1733	943.00	W INV. 940.80 N INV. 940.80 E INV. 940.80 S INV. 940.80

(3)

NOTES:

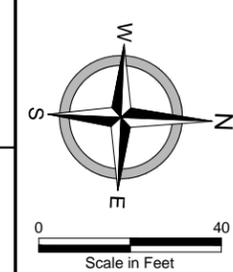
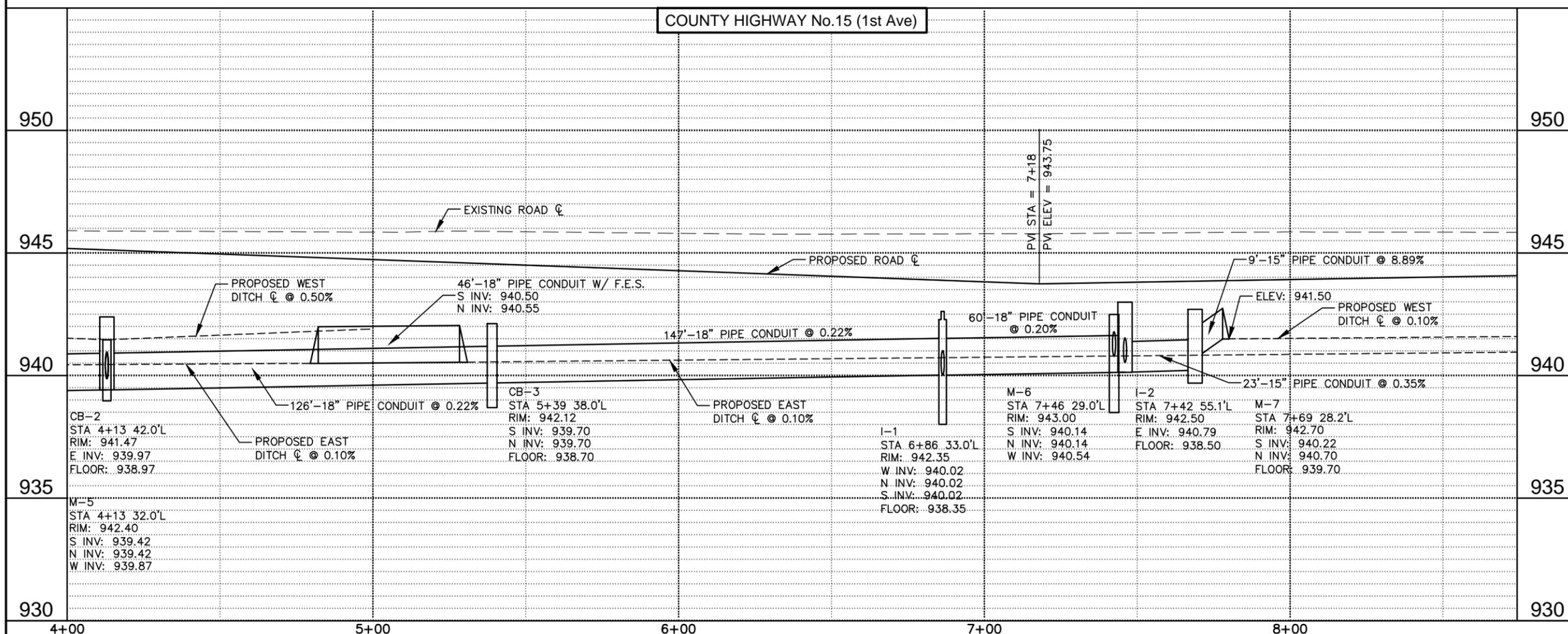
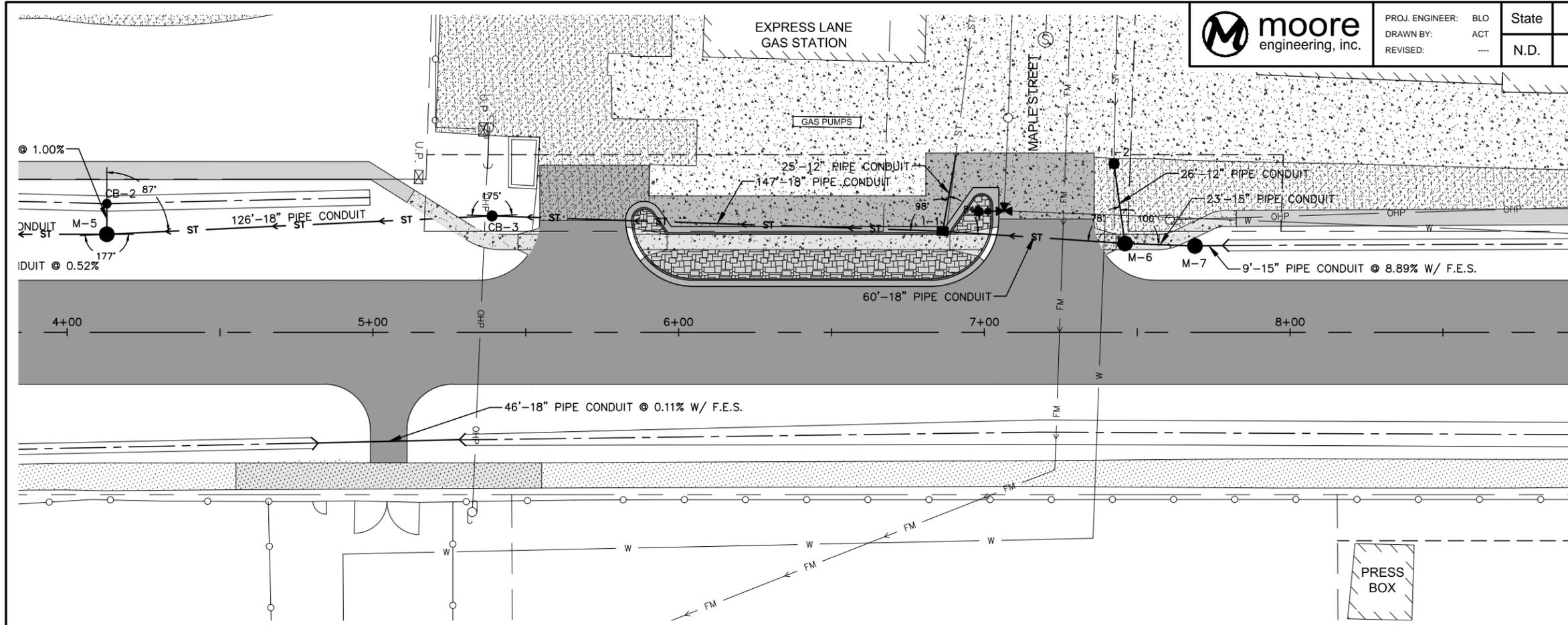
1. CONTRACTOR SHALL DETERMINE SIZE OF STRUCTURE REQUIRED BASED ON PIPE AND STRUCTURE MATERIAL USED.
2. CASTINGS SUPPLIED FOR PROJECT CAN BE DIFFERENT THAN LISTED IF APPROVED PRIOR TO BID OPENING.
3. SEE WEIR STRUCTURE DETAIL IN GENERAL DETAILS.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
STORM STRUCTURE SCHEDULE
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



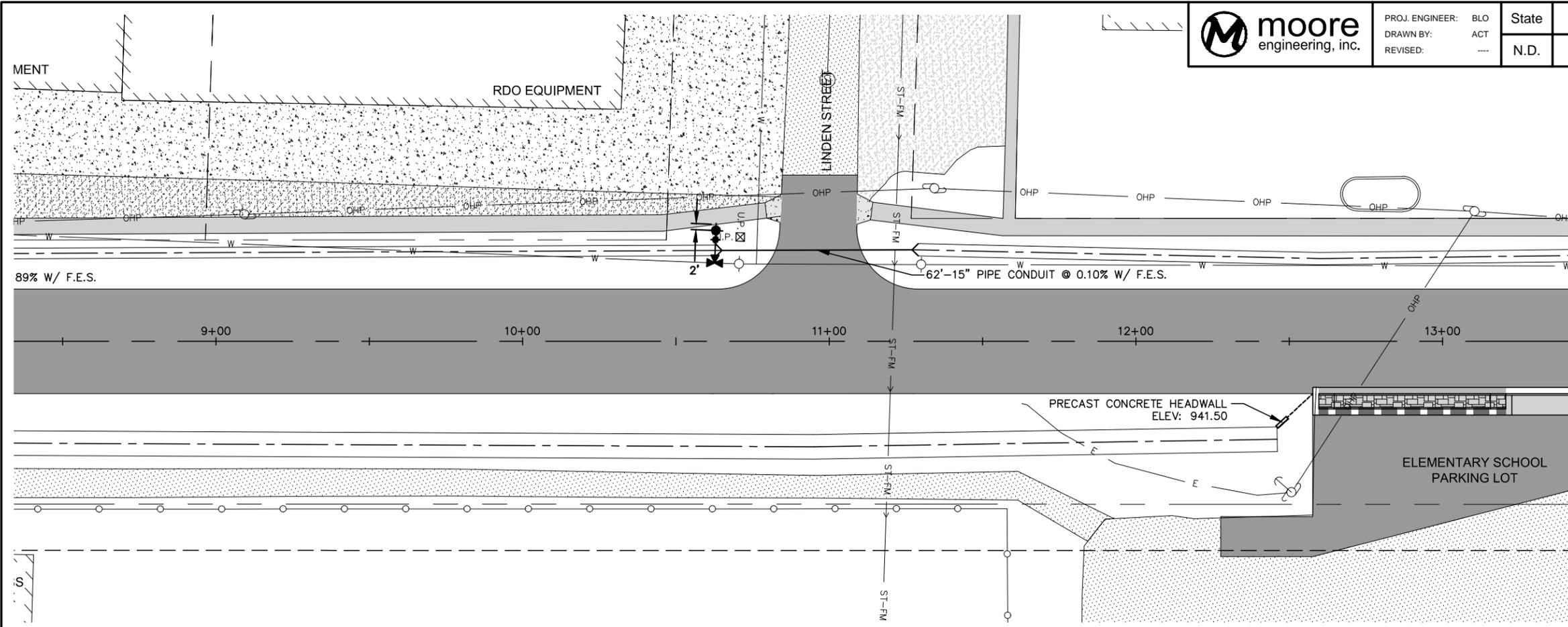
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES -0+40 TO 4+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

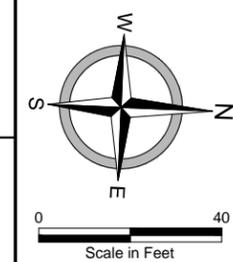
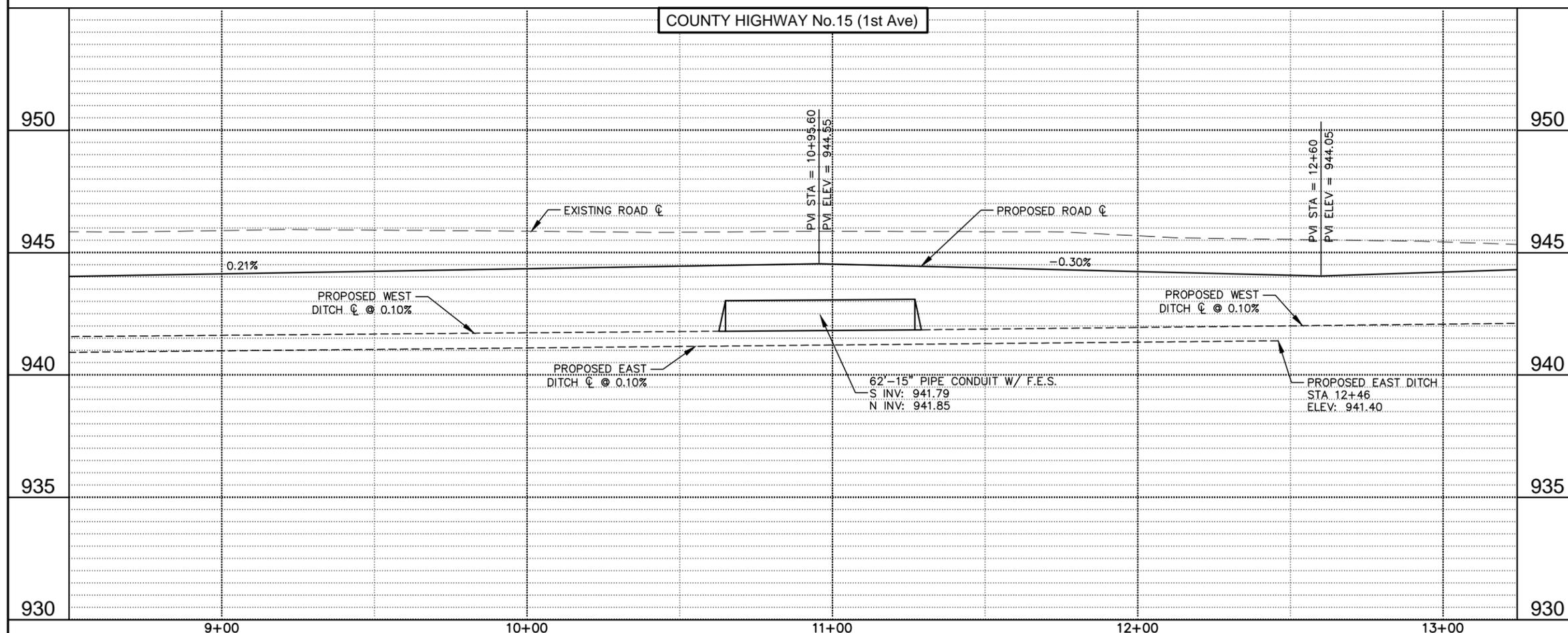


This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 4+00 TO 8+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

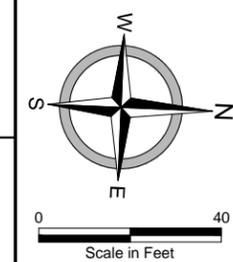
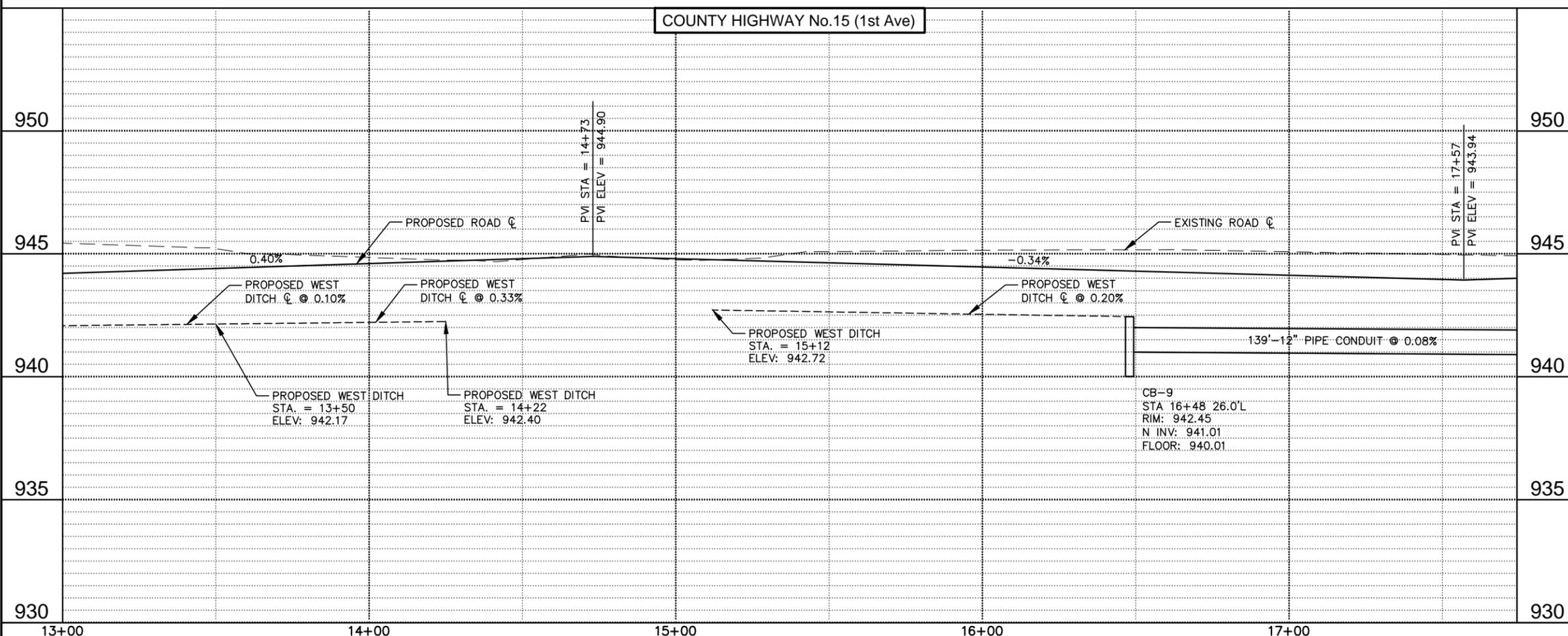
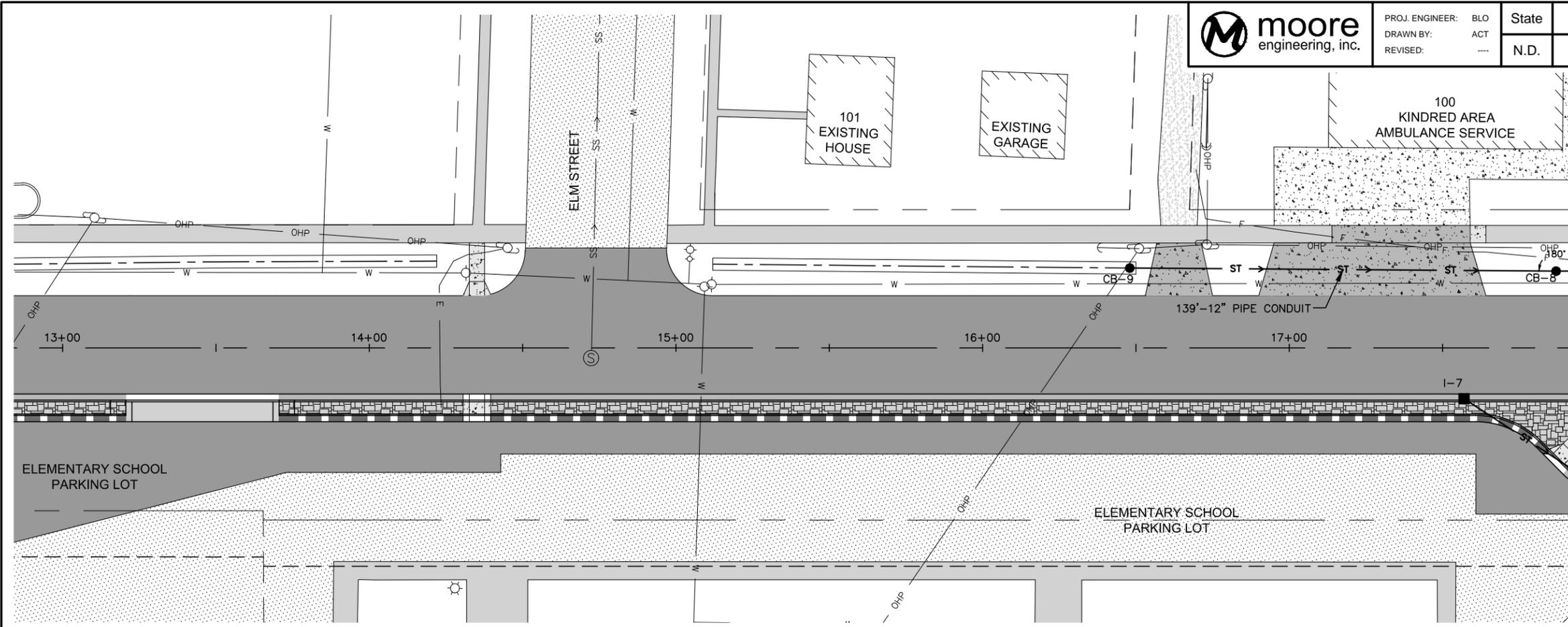


NOTES:
1. HYDRANT NOZZLE TO FACE WEST.



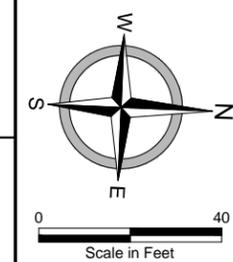
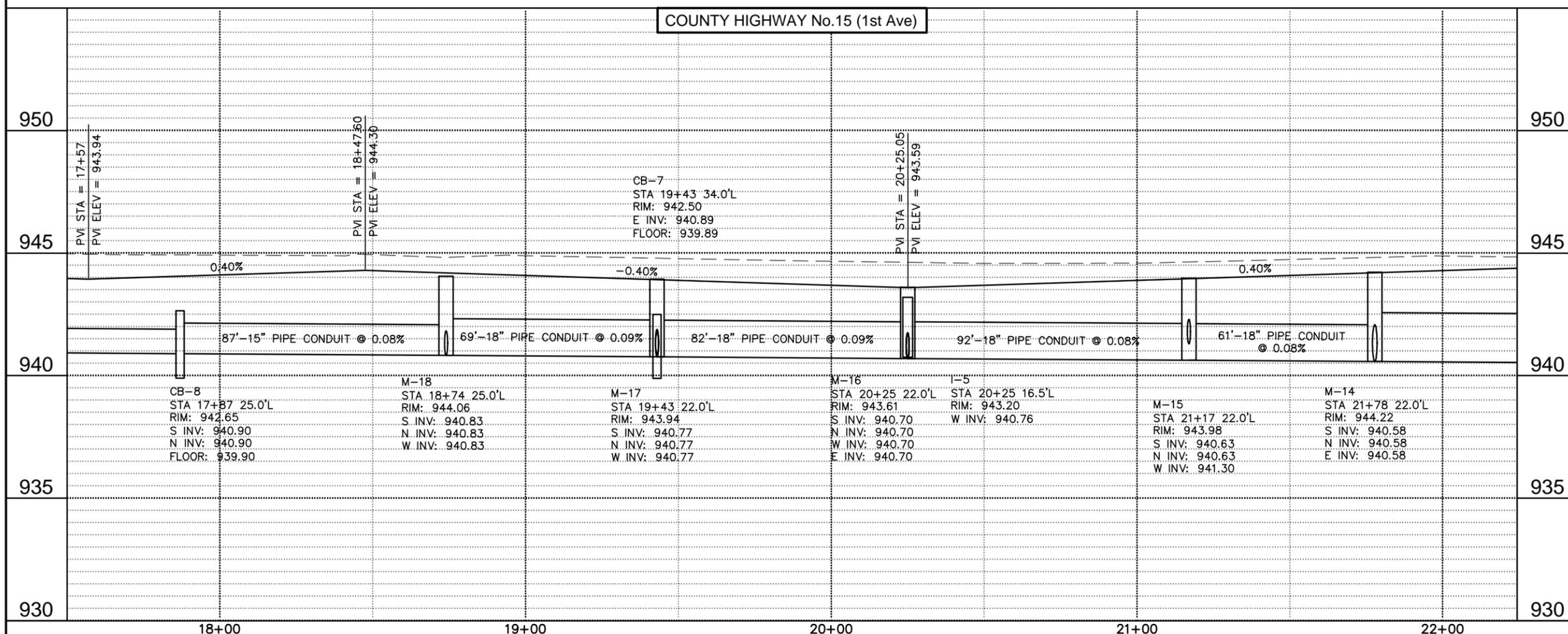
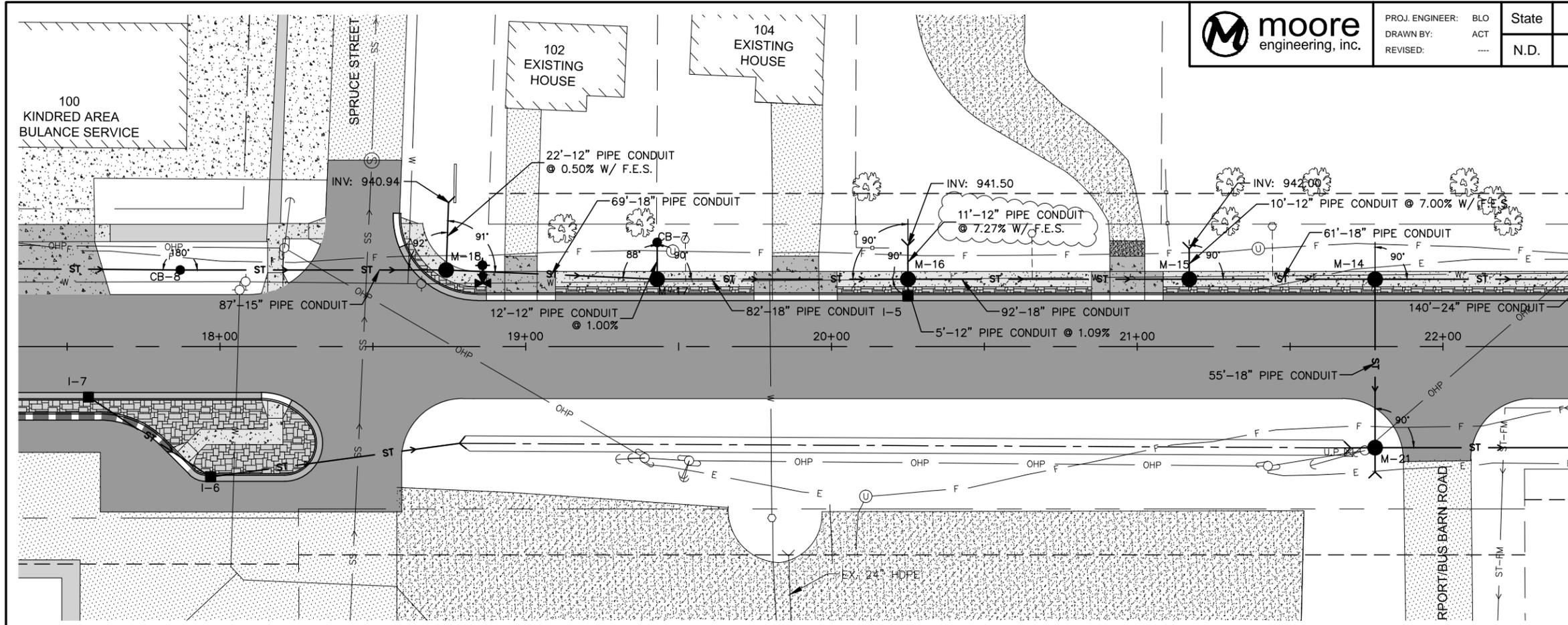
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 8+50 TO 13+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



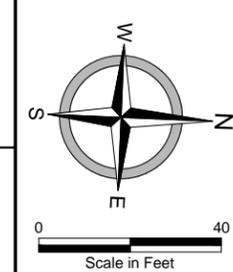
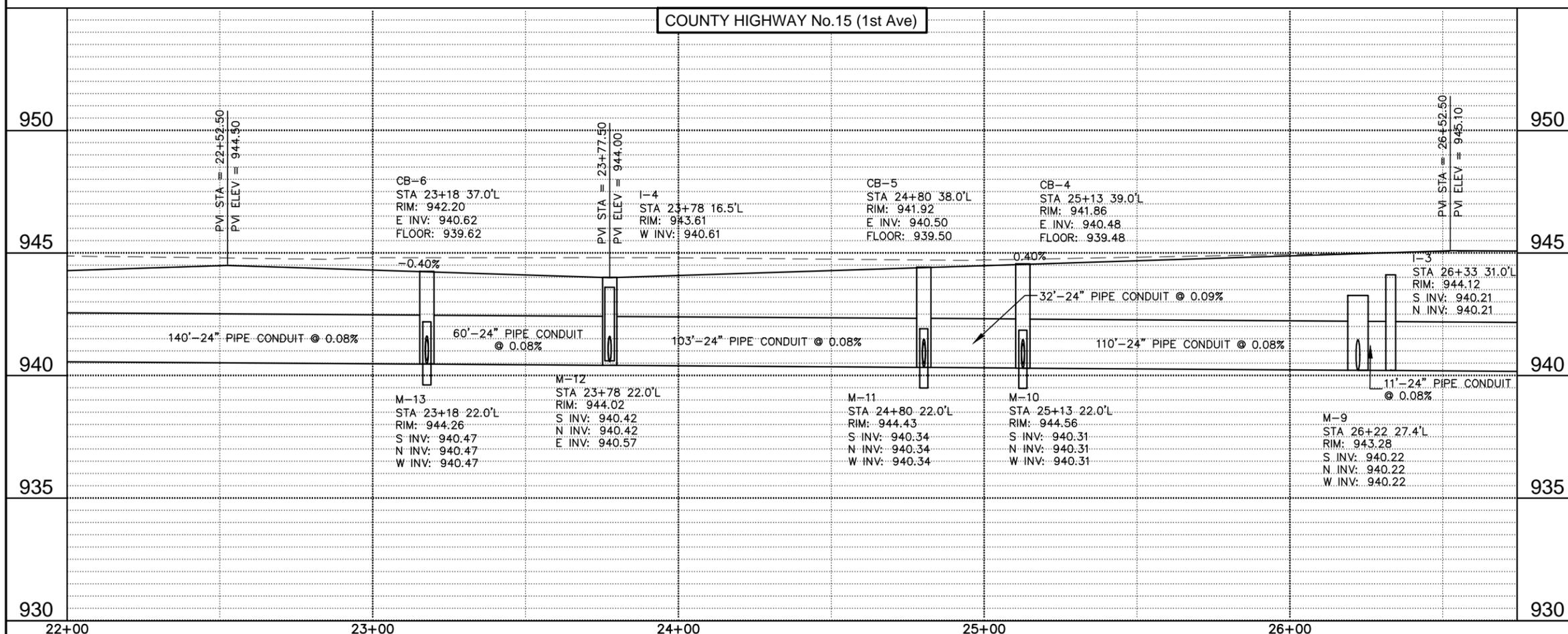
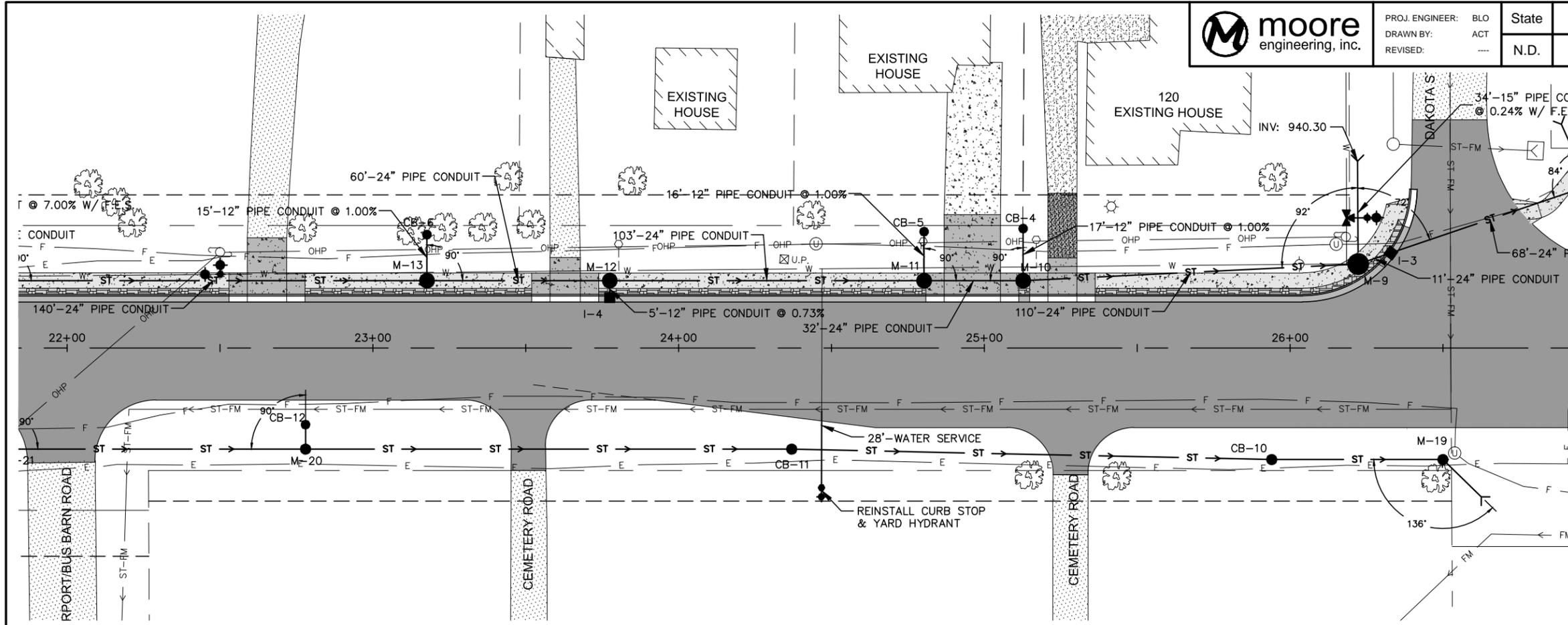
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 13+00 TO 17+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



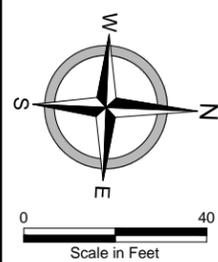
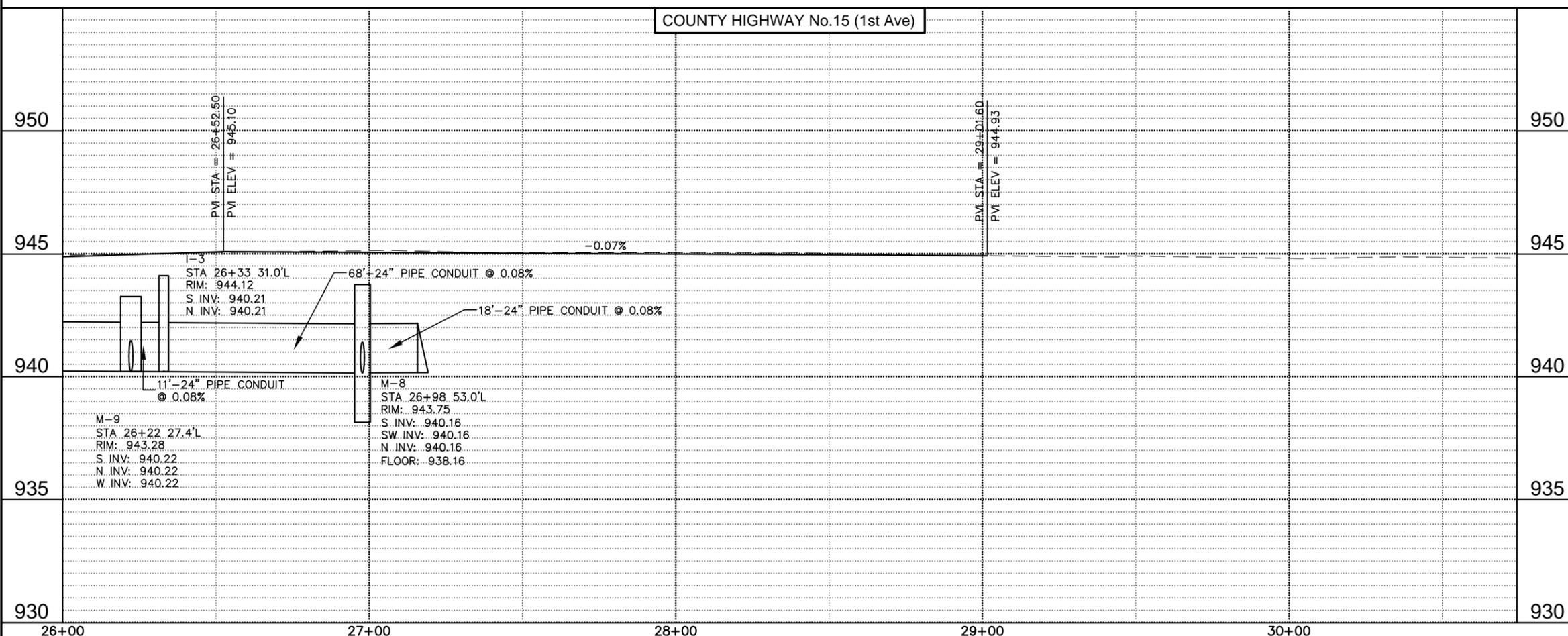
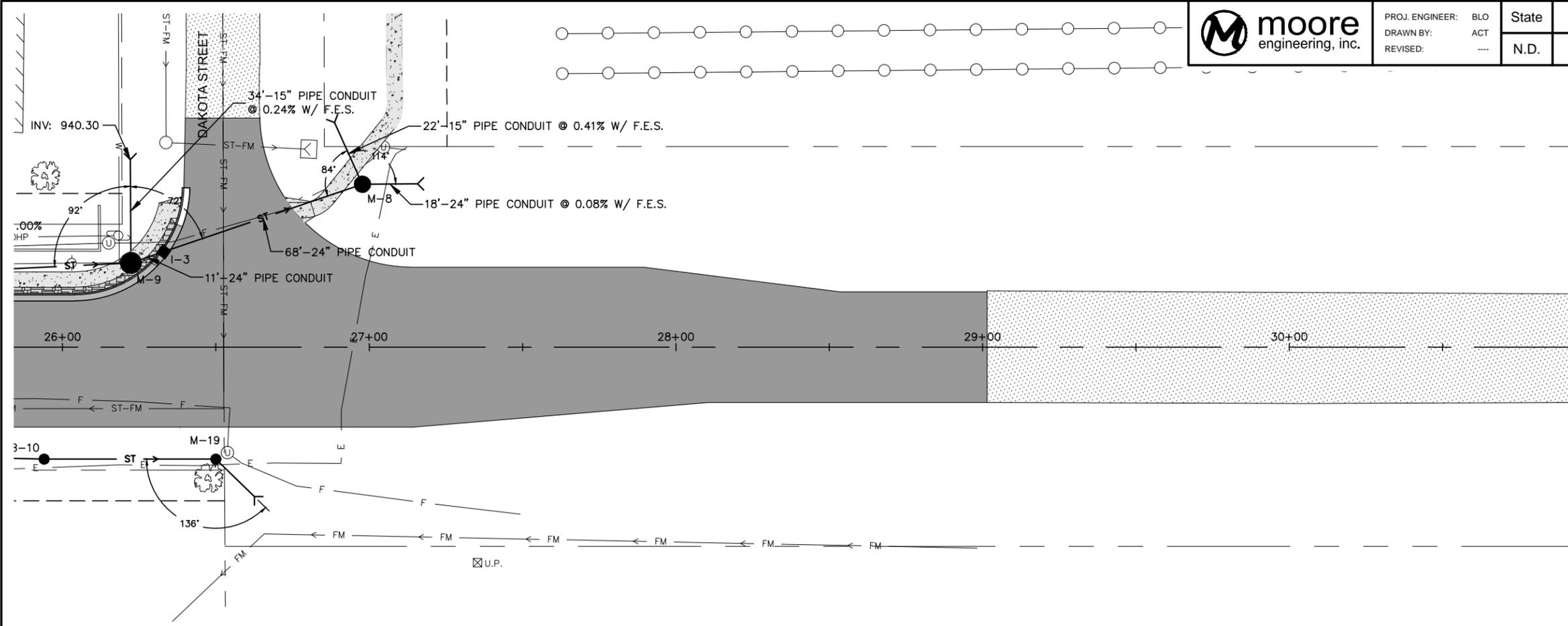
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 17+50 TO 22+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



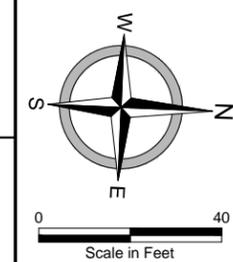
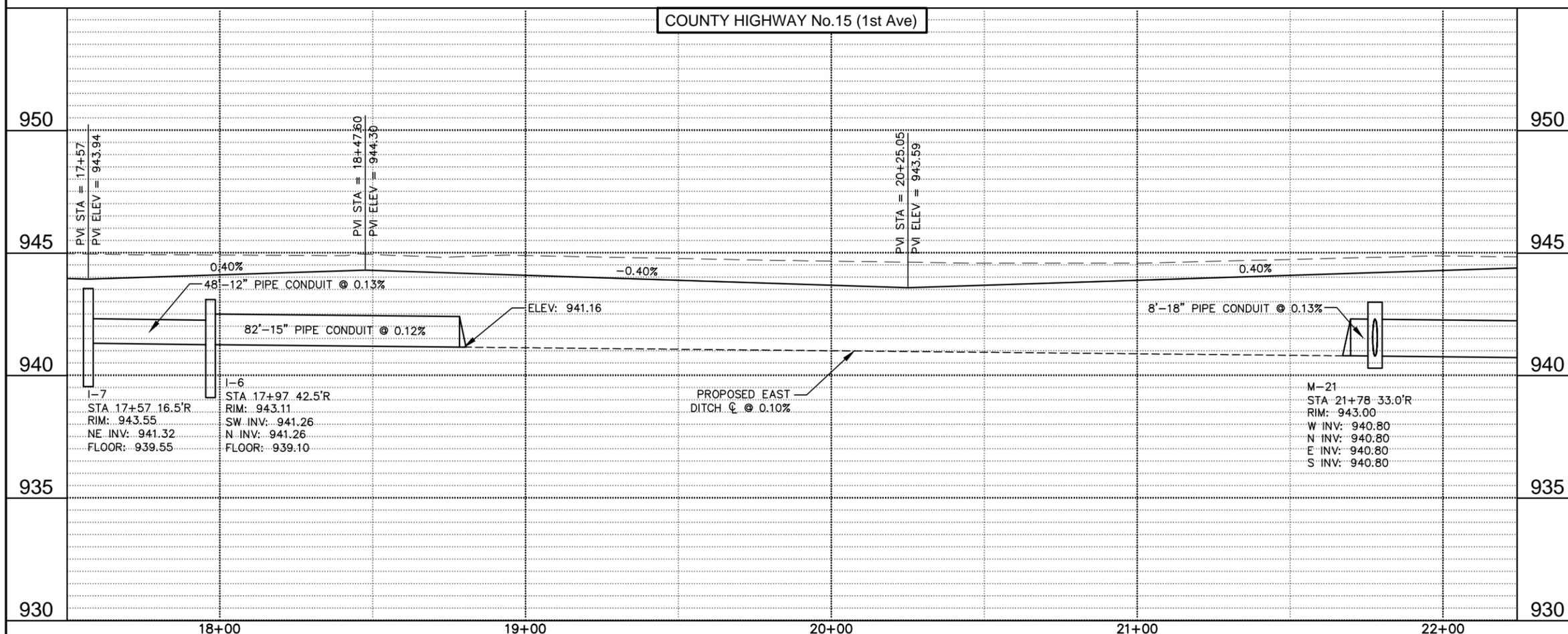
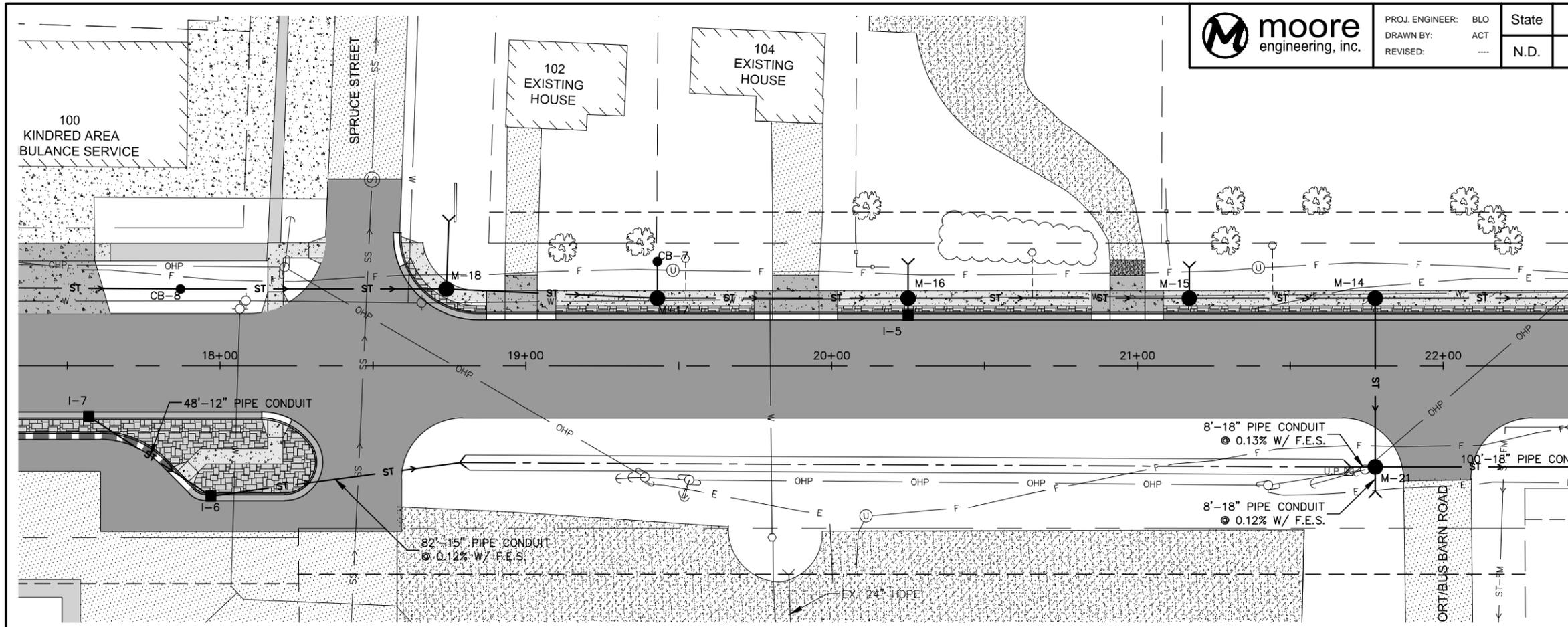
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 22+00 TO 26+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



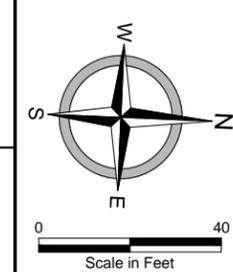
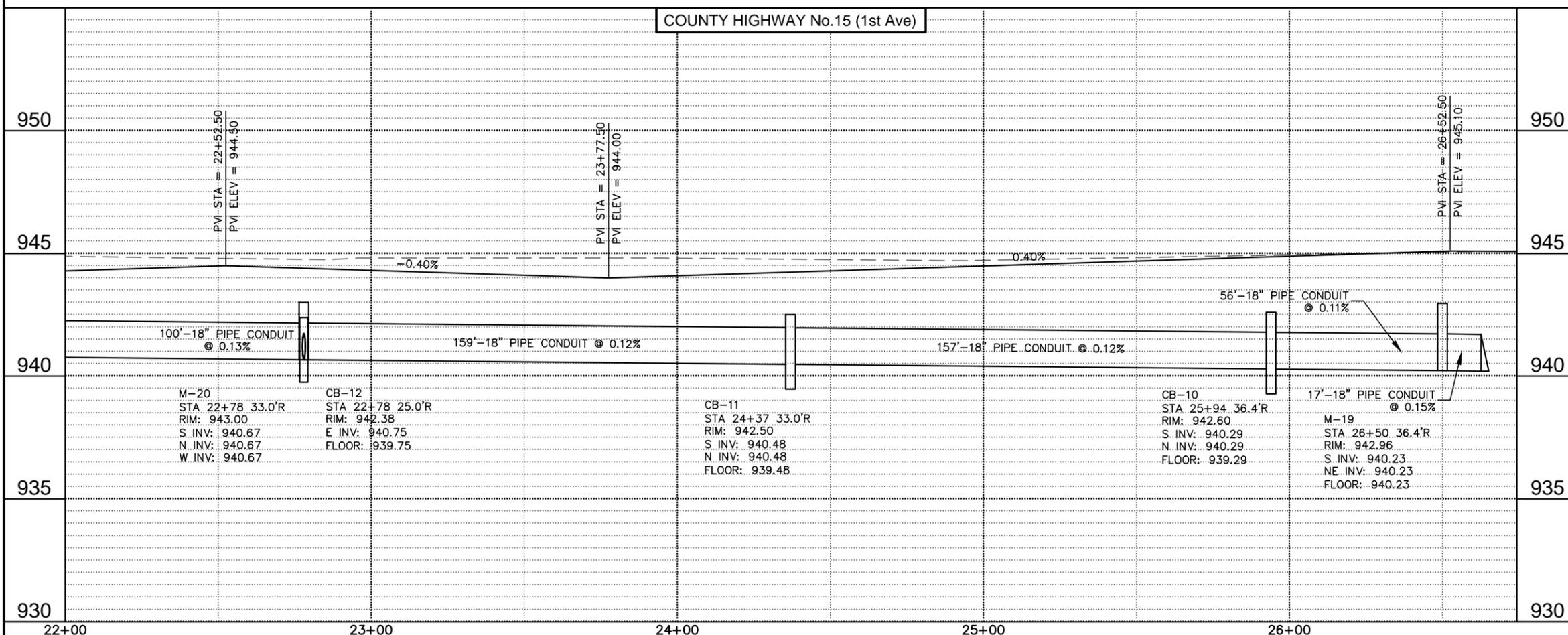
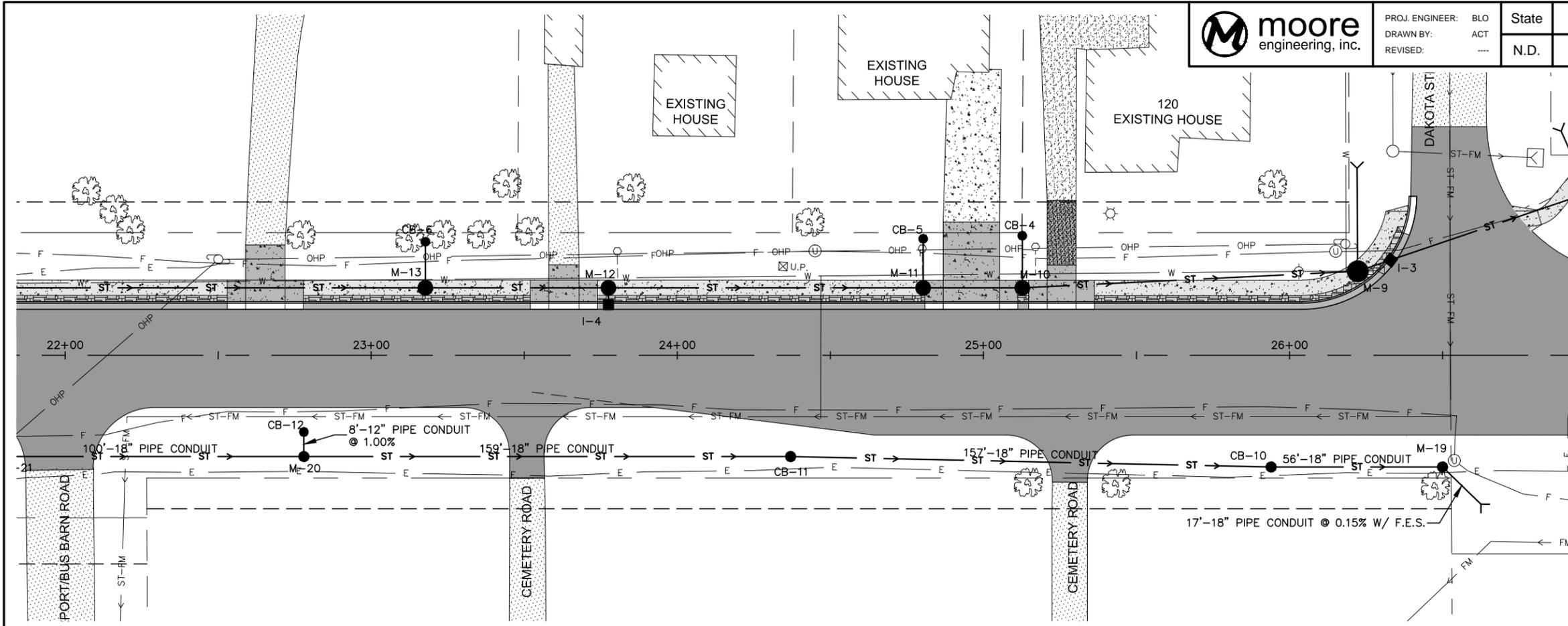
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES 26+00 TO 30+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



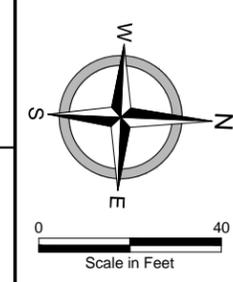
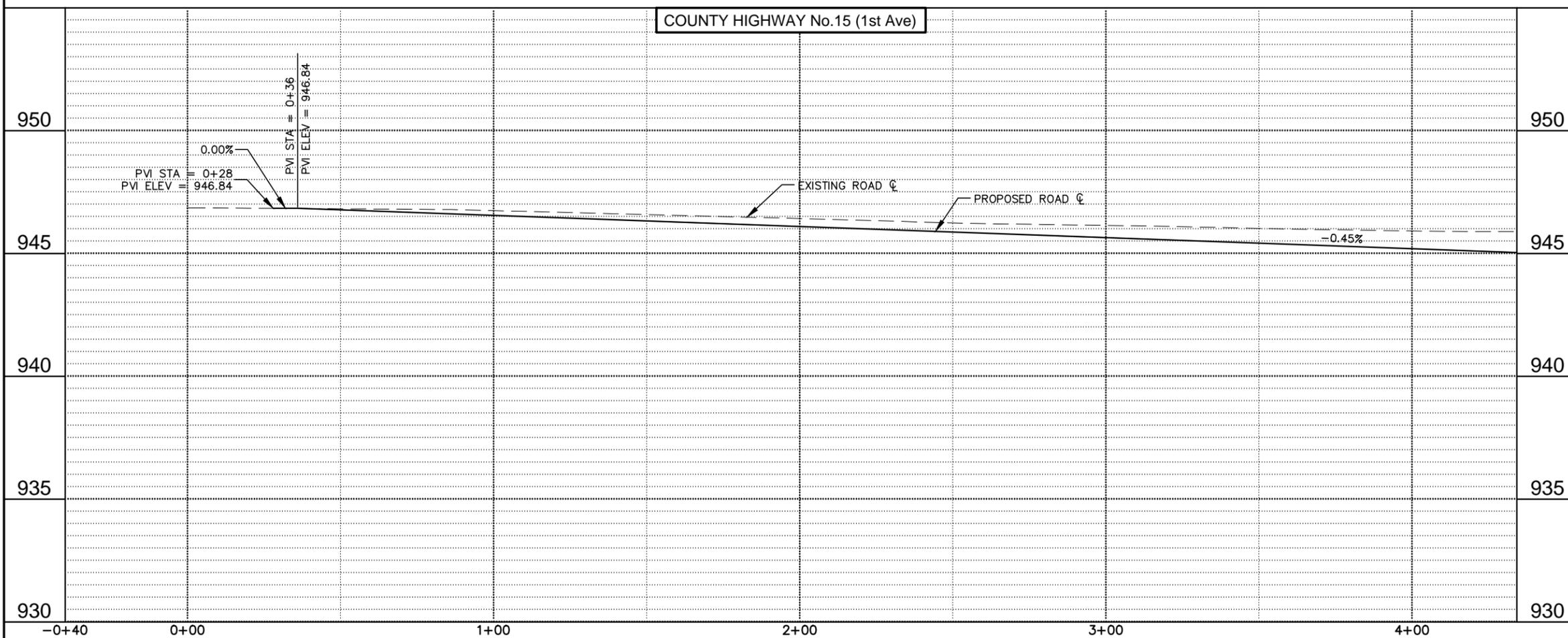
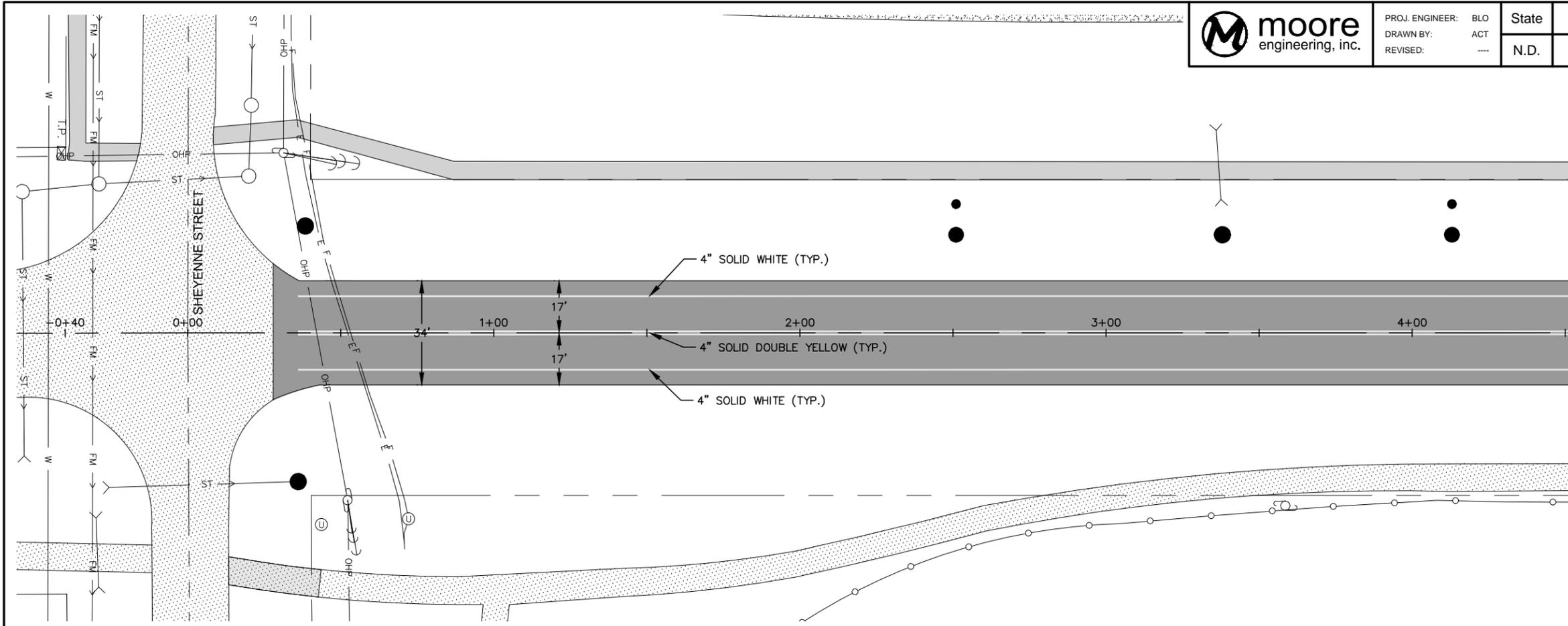
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - UNDERGROUND UTILITIES EAST SIDE 17+50 TO 22+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



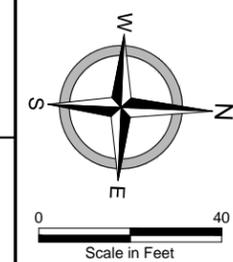
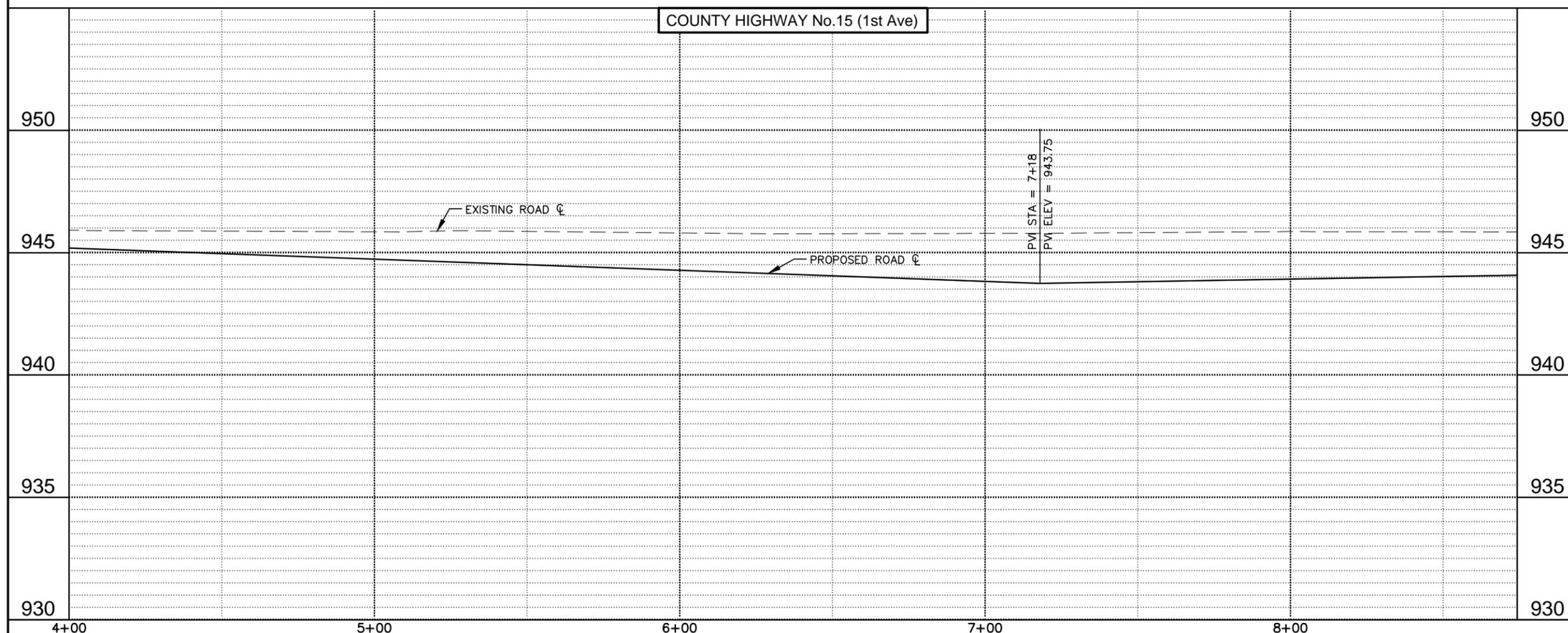
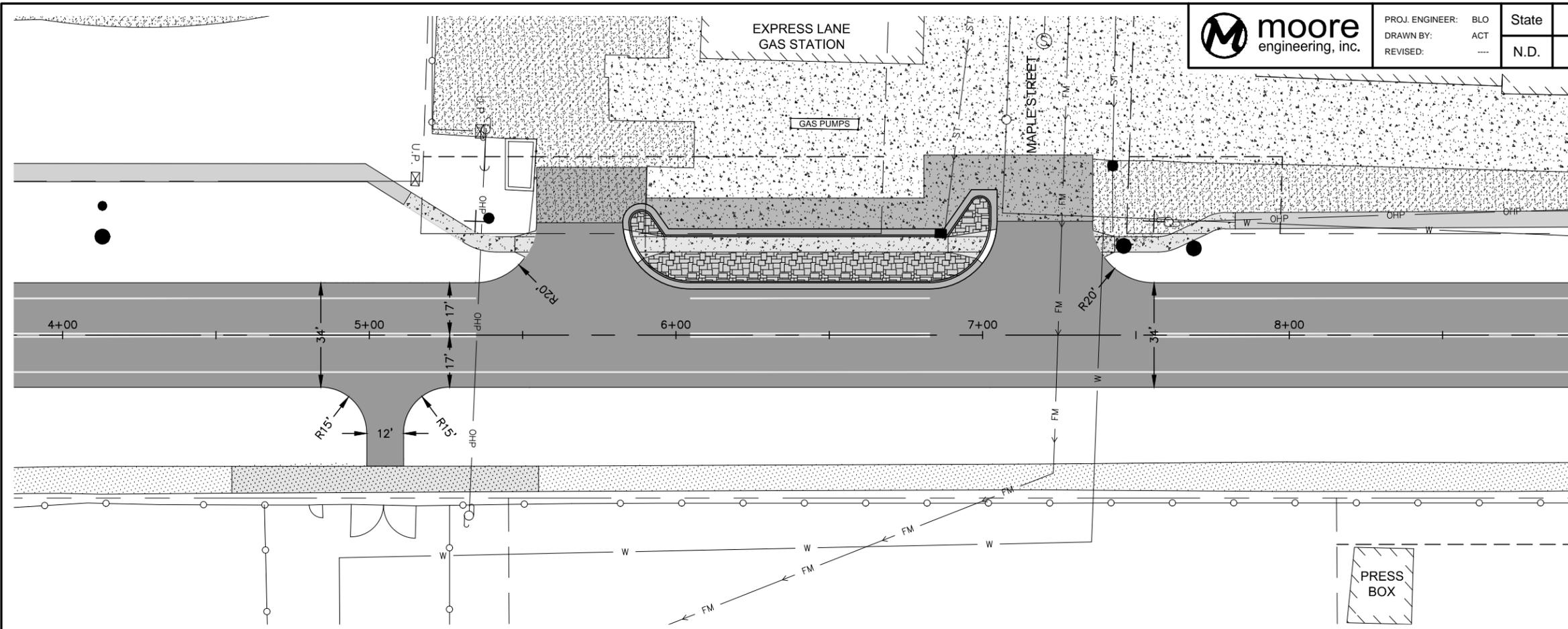
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
 PLAN AND PROFILE - UNDERGROUND UTILITIES EAST SIDE 22+00 TO 26+50
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
-0+40 TO 4+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
4+00 TO 8+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

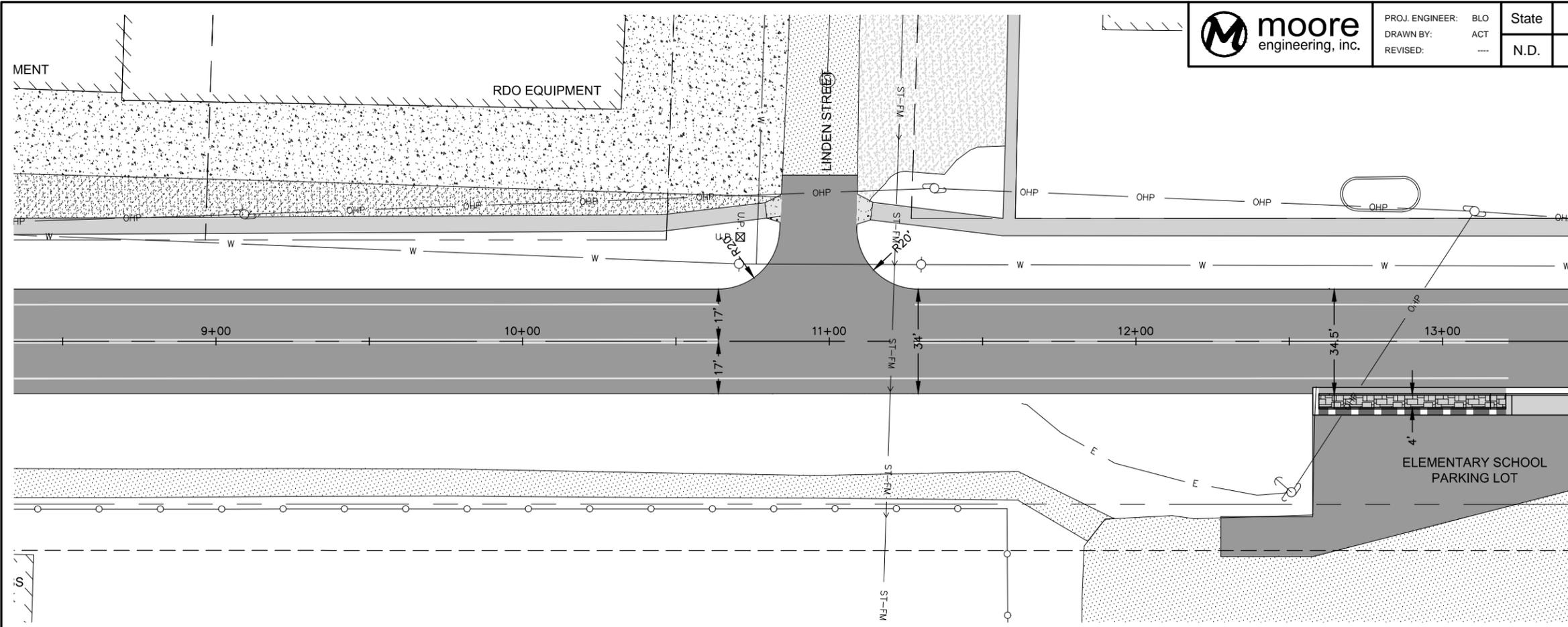


PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

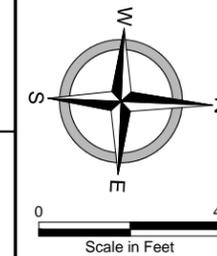
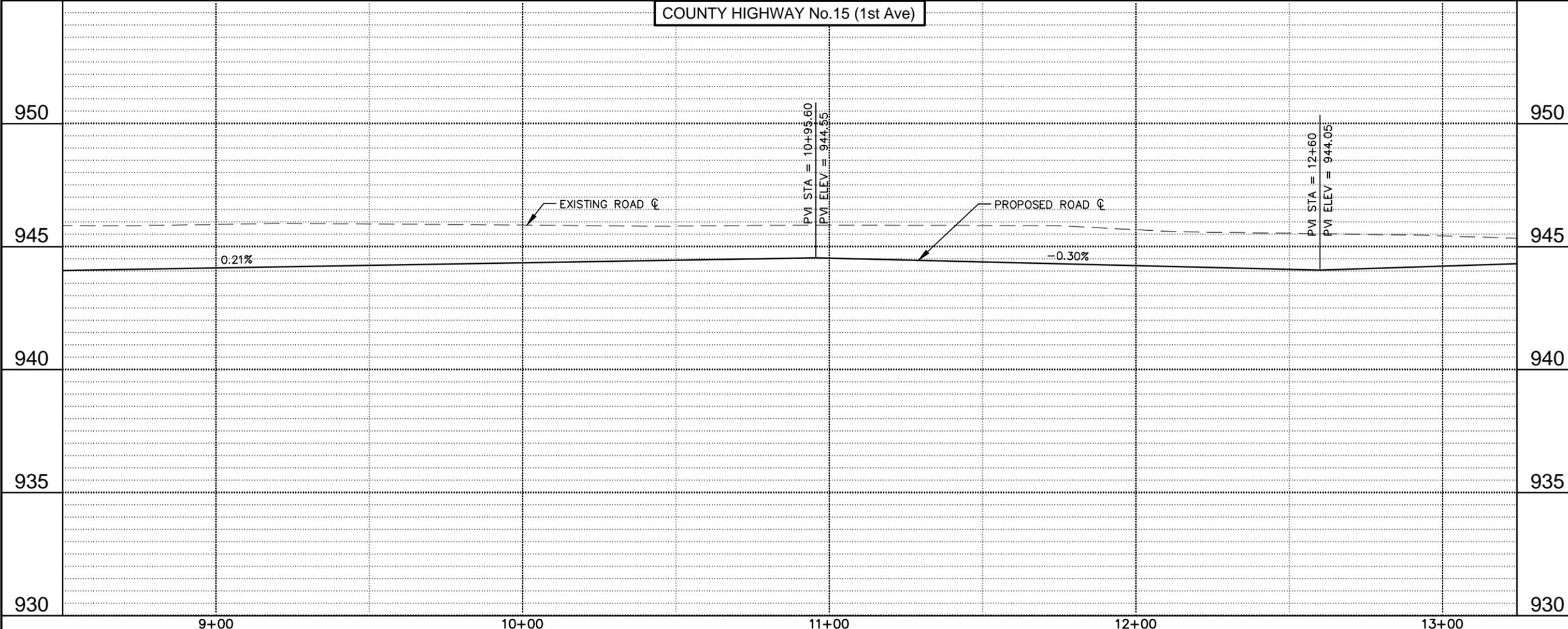
State
 N.D.

PROJECT No.
 CH1107

Section No. 060
 Page No. 12

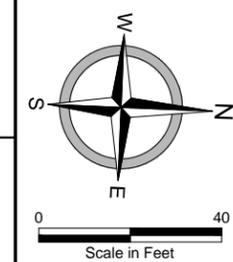
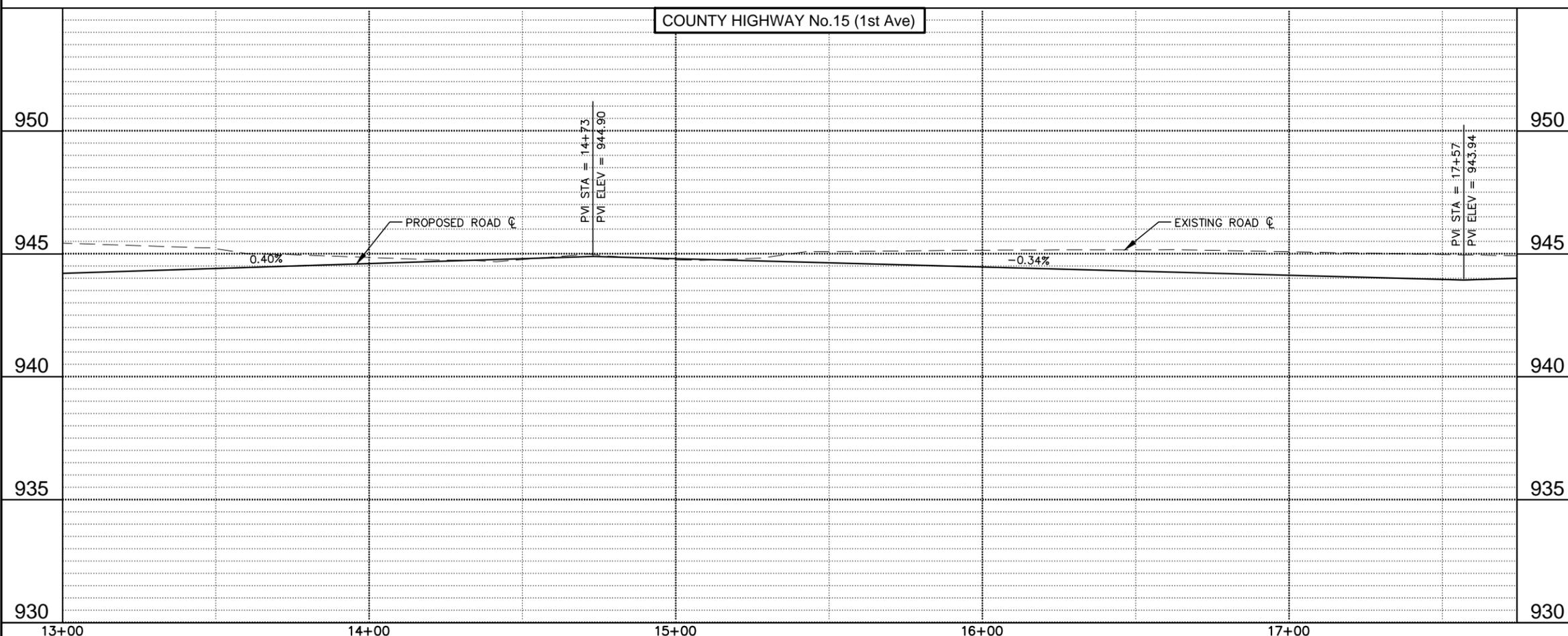
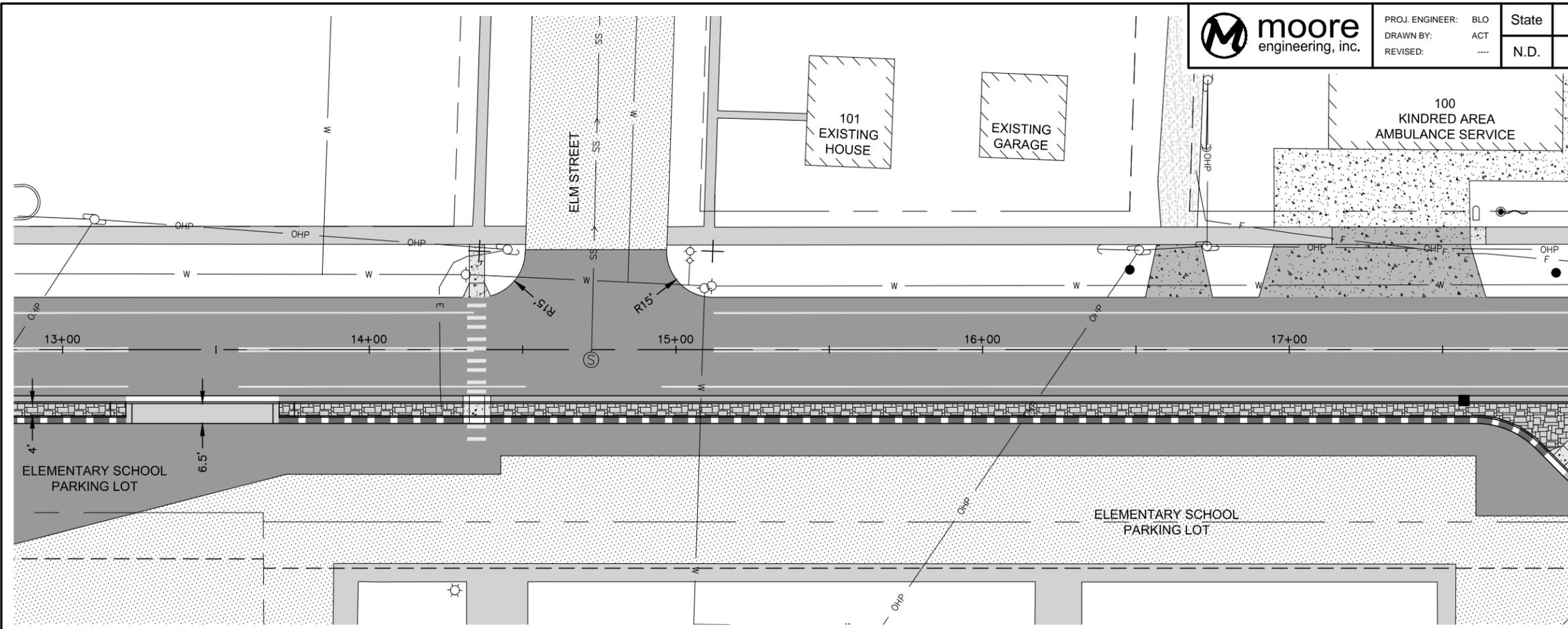


COUNTY HIGHWAY No. 15 (1st Ave)



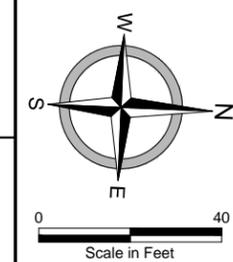
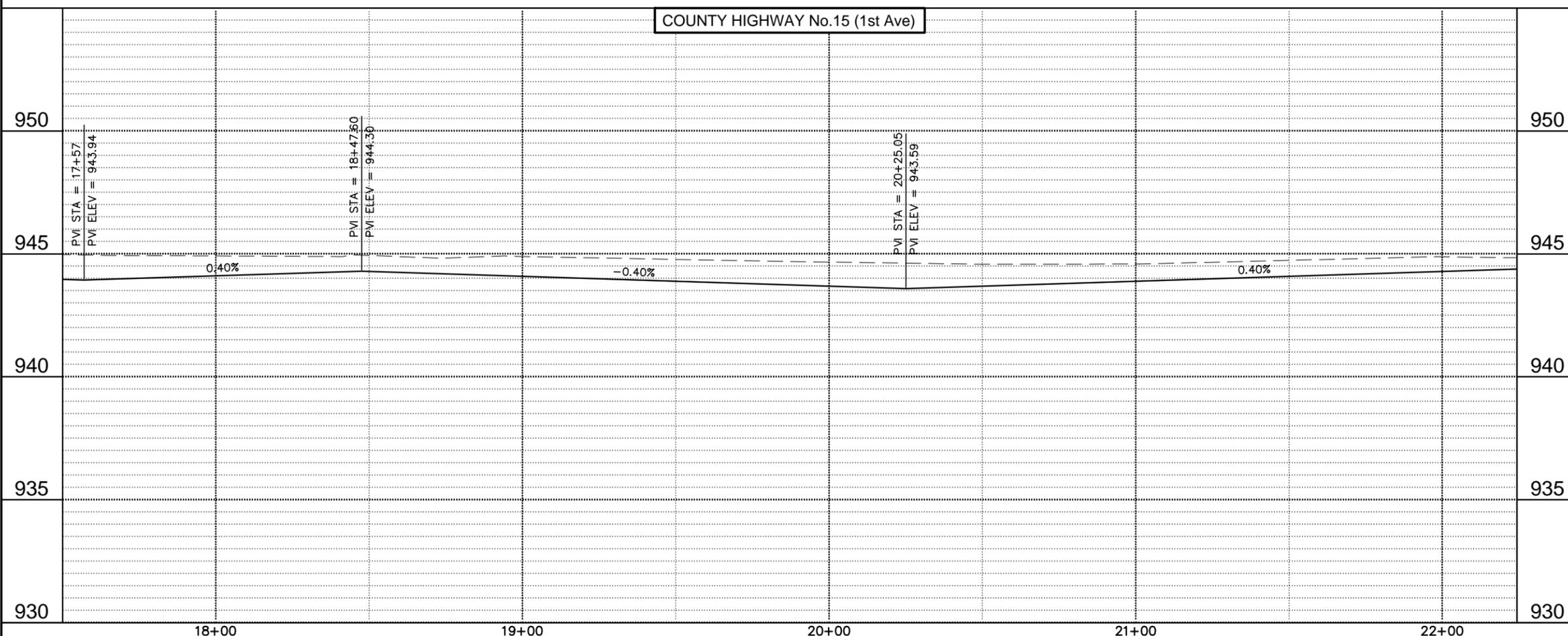
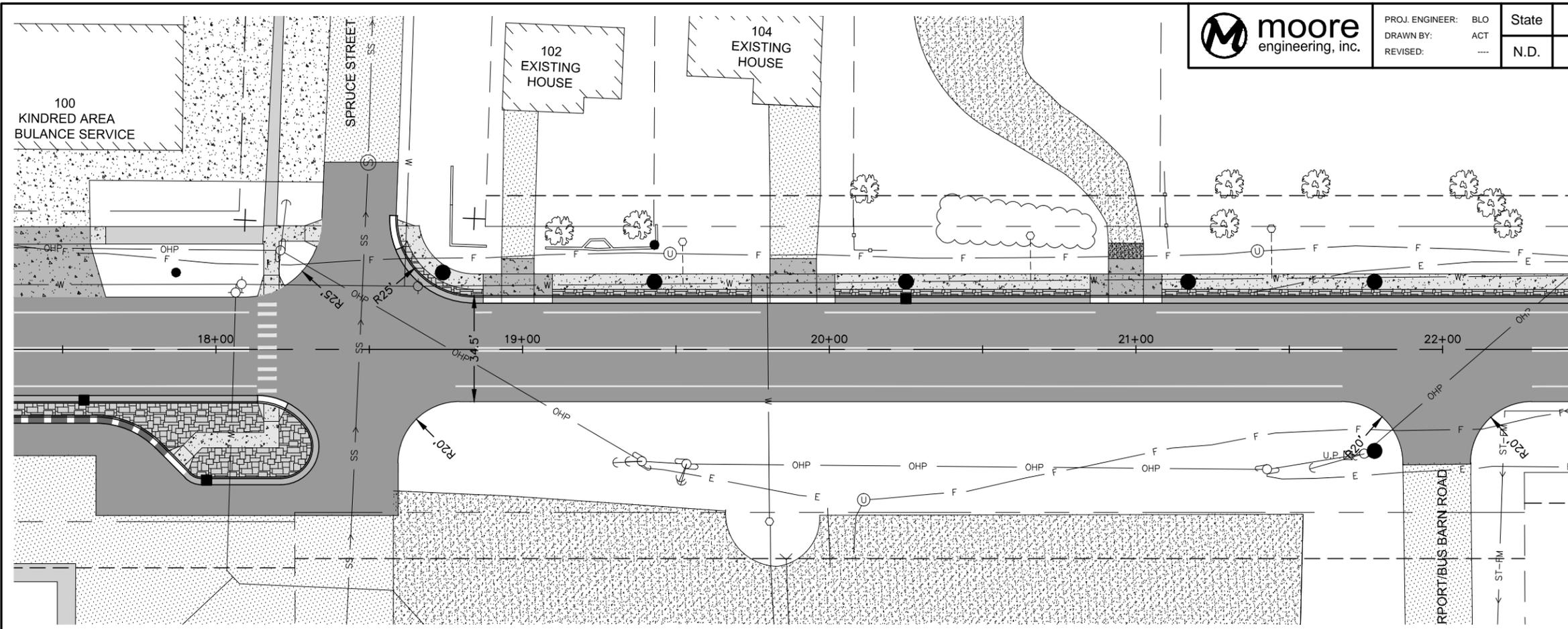
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
 8+50 TO 13+00
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



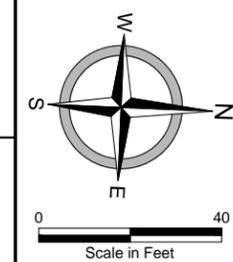
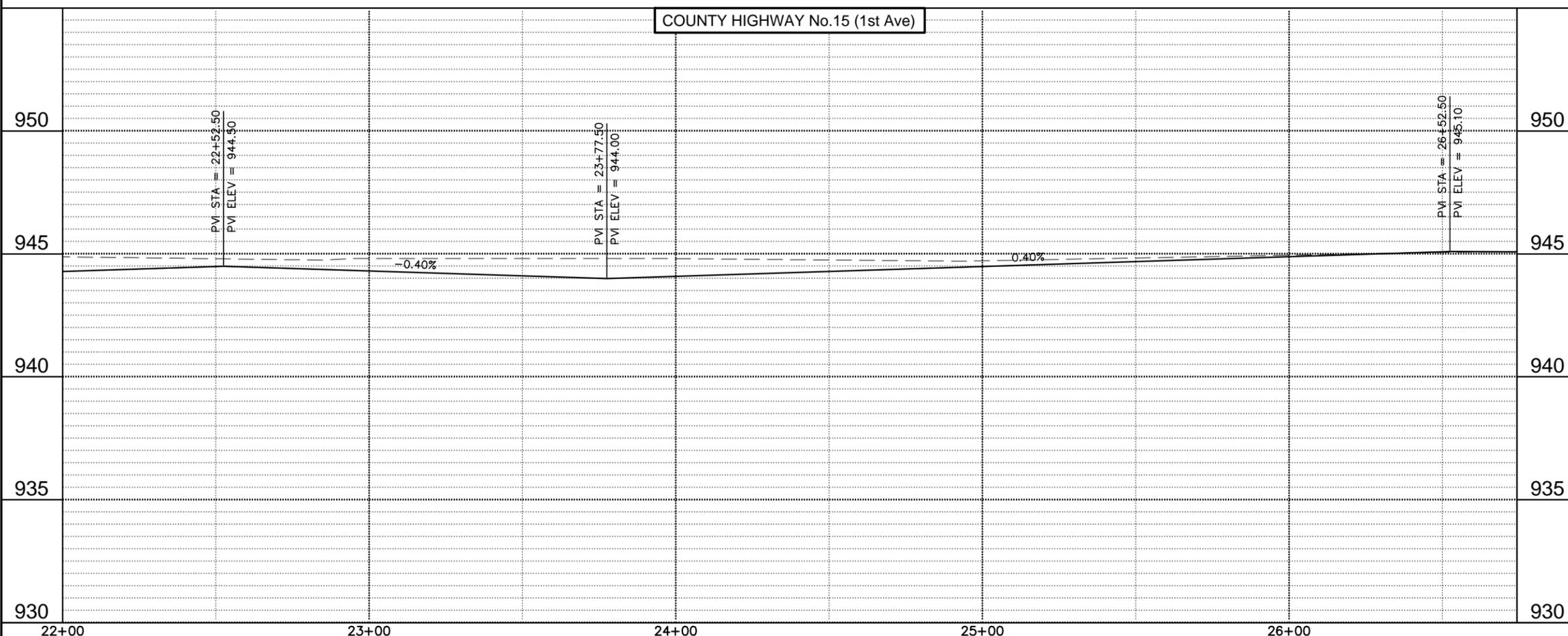
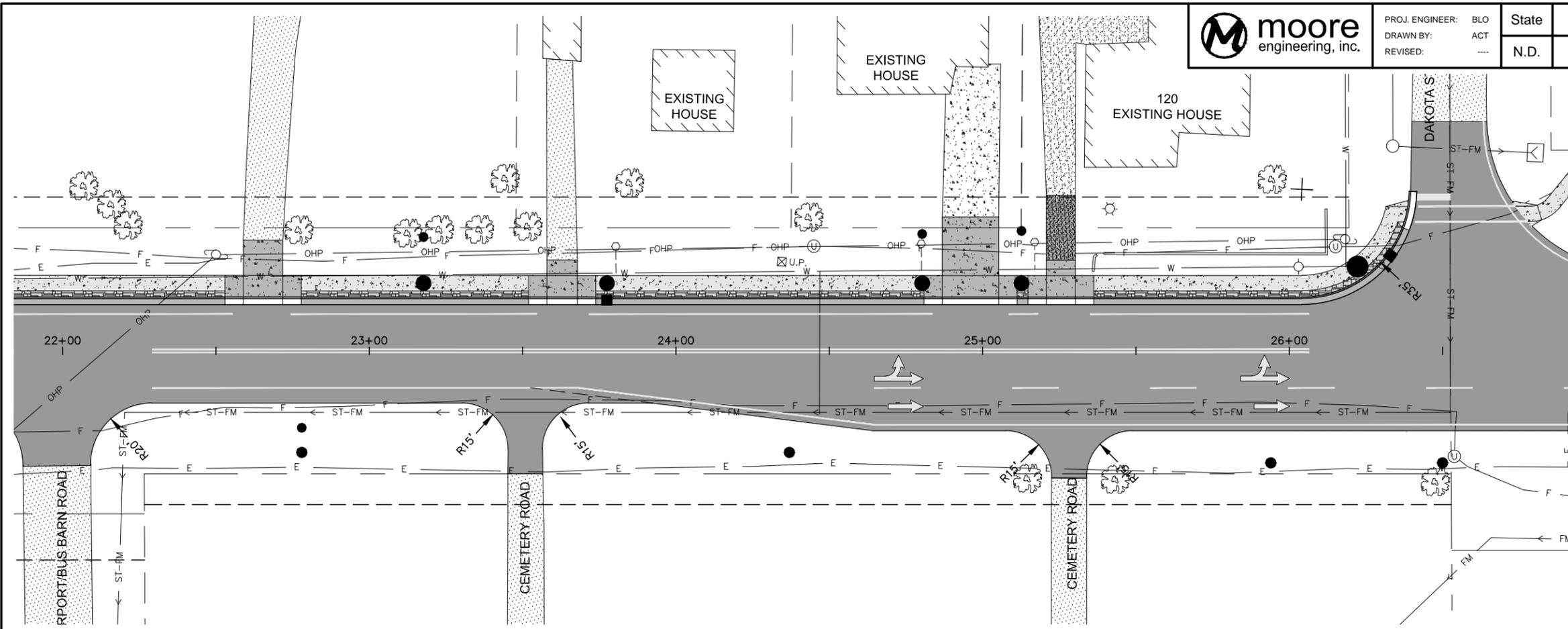
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
 13+00 TO 17+50
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



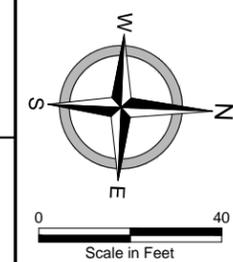
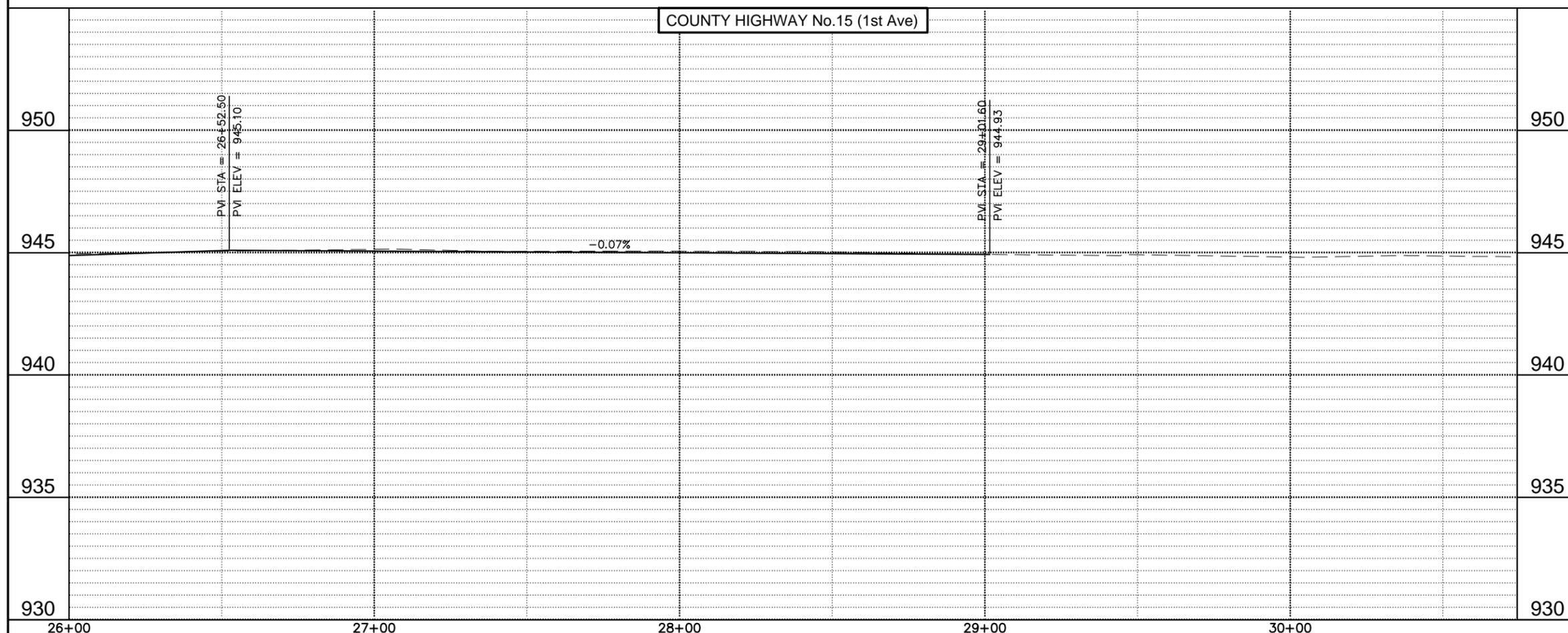
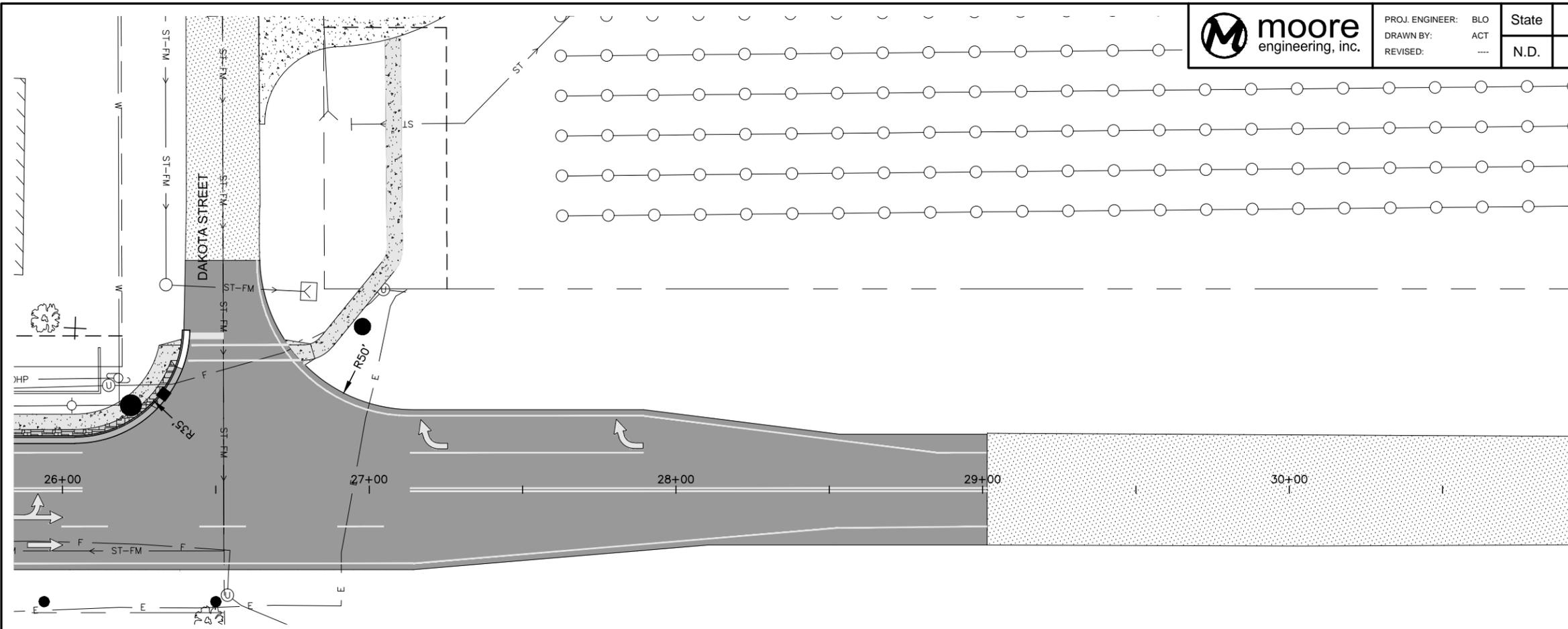
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
17+50 TO 22+00
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



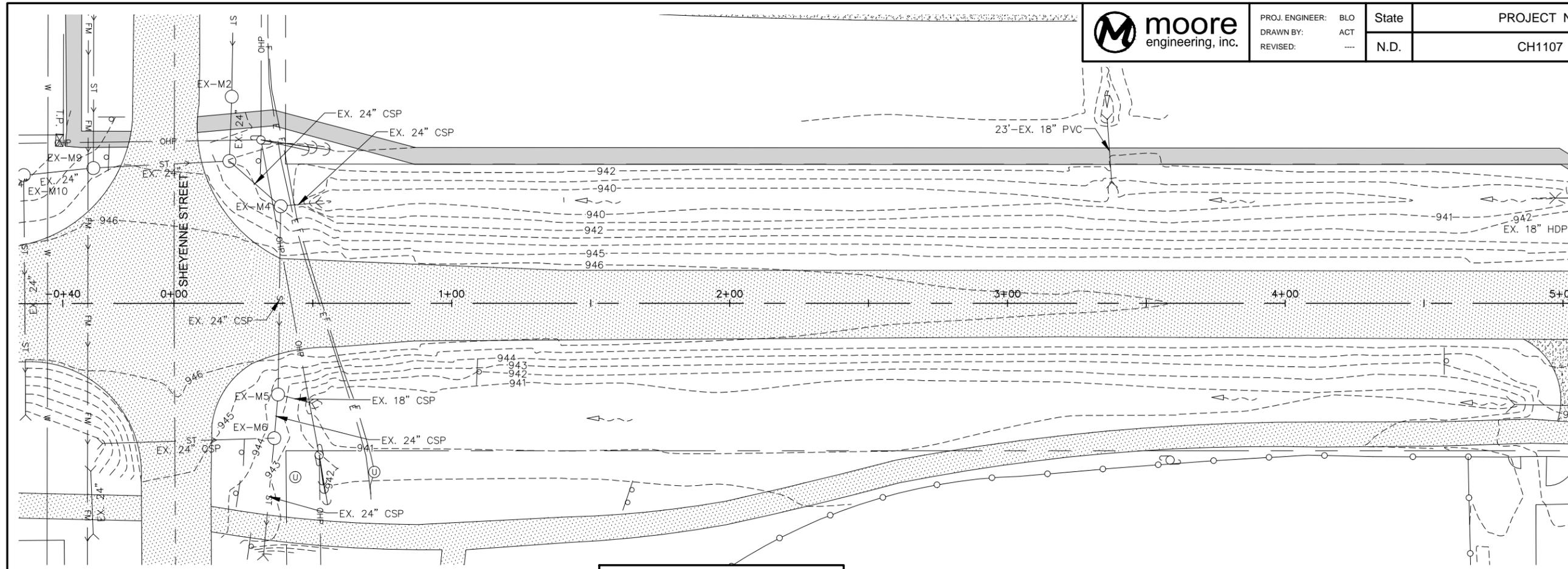
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
22+00 TO 26+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

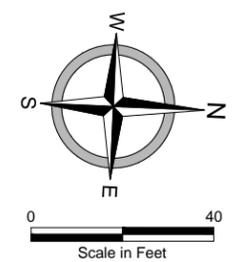
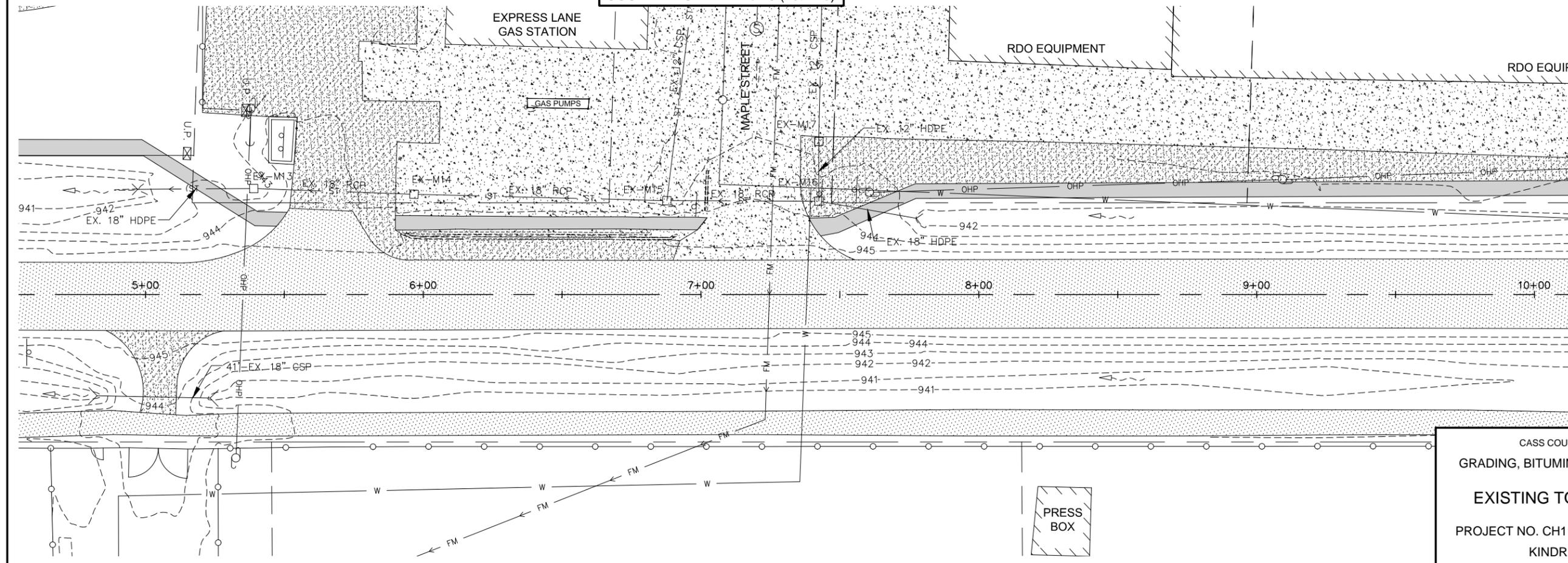


This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
PLAN AND PROFILE - ROADWAY DESIGN
26+00 TO 30+50
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

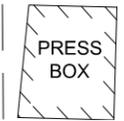


COUNTY HIGHWAY No. 15 (1st Ave)



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
EXISTING TOPOGRAPHIC SURVEY
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



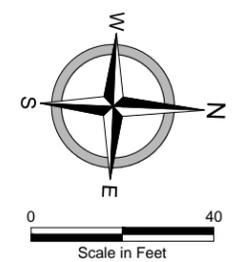
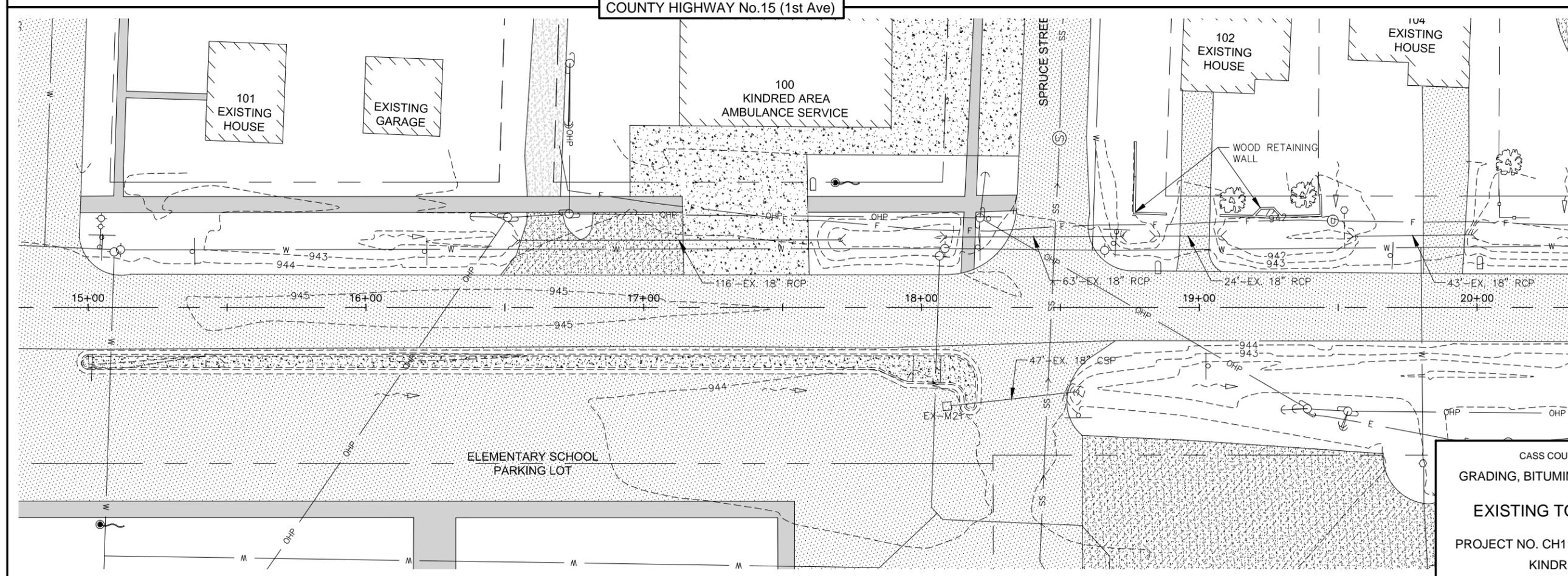
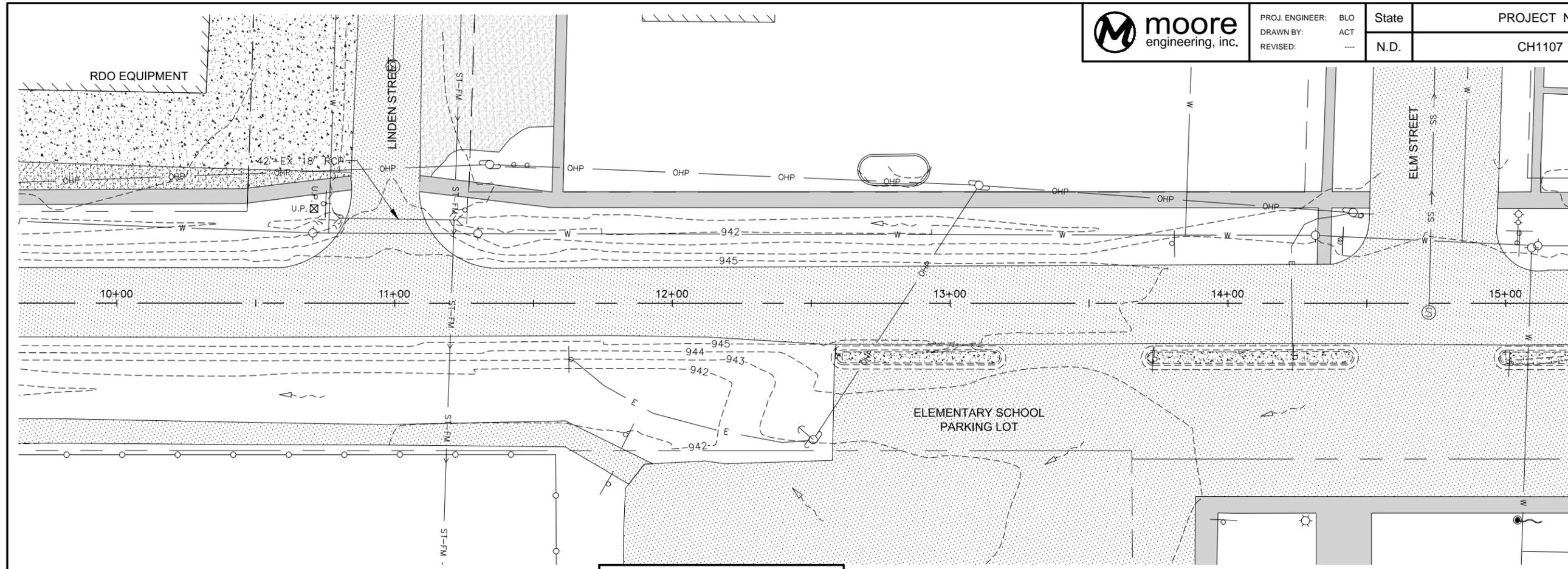


PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State
 N.D.

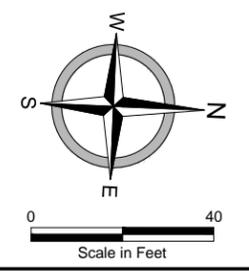
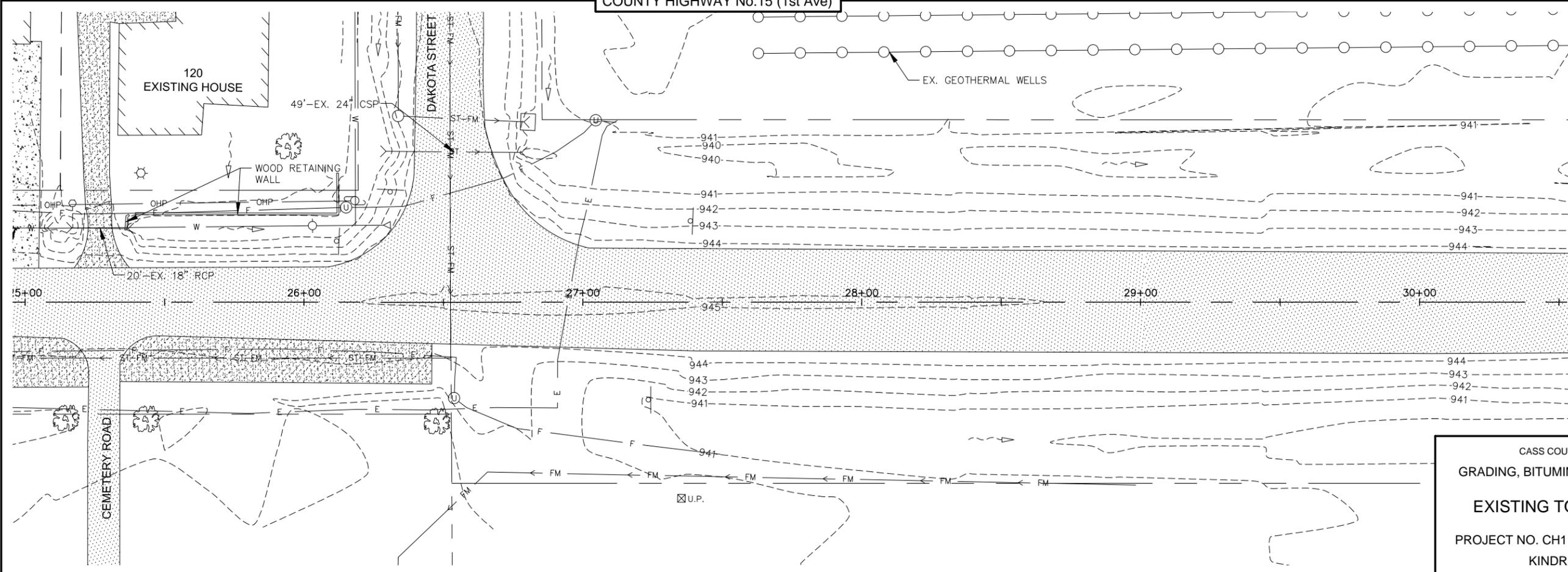
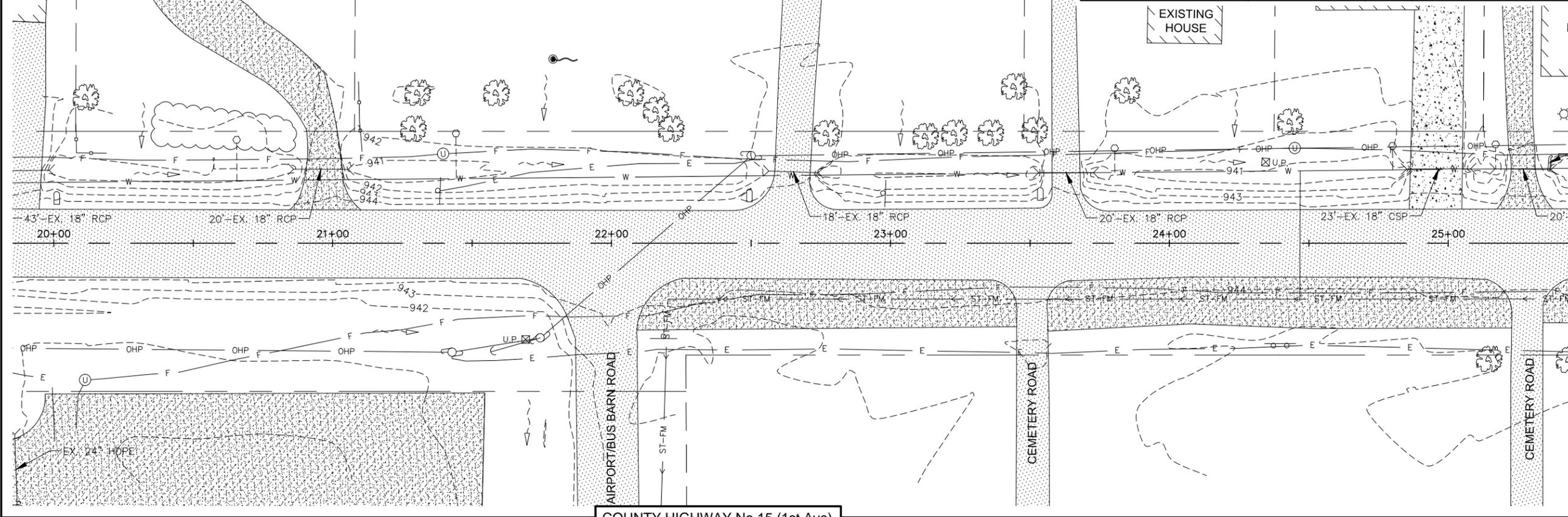
PROJECT No.
 CH1107

Section No. 70
 Page No. 2



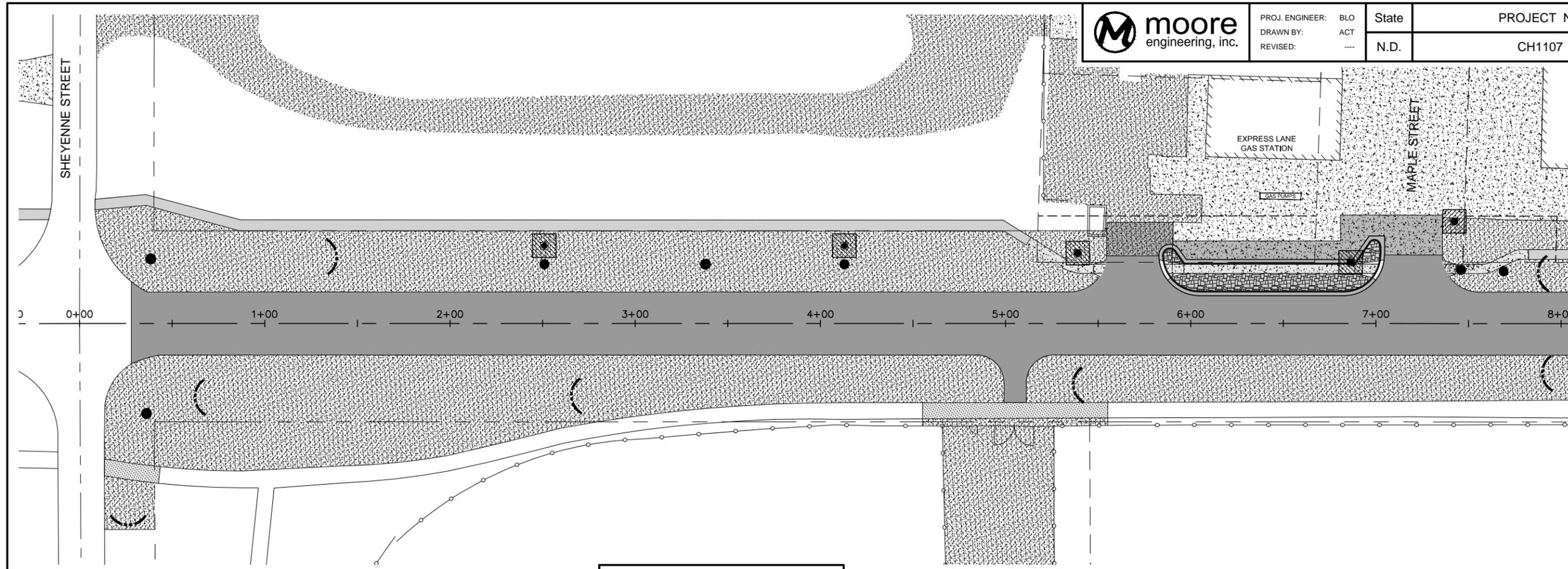
This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
EXISTING TOPOGRAPHIC SURVEY
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA

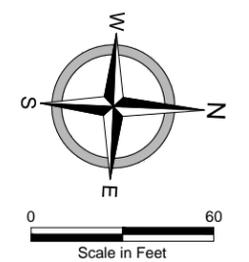
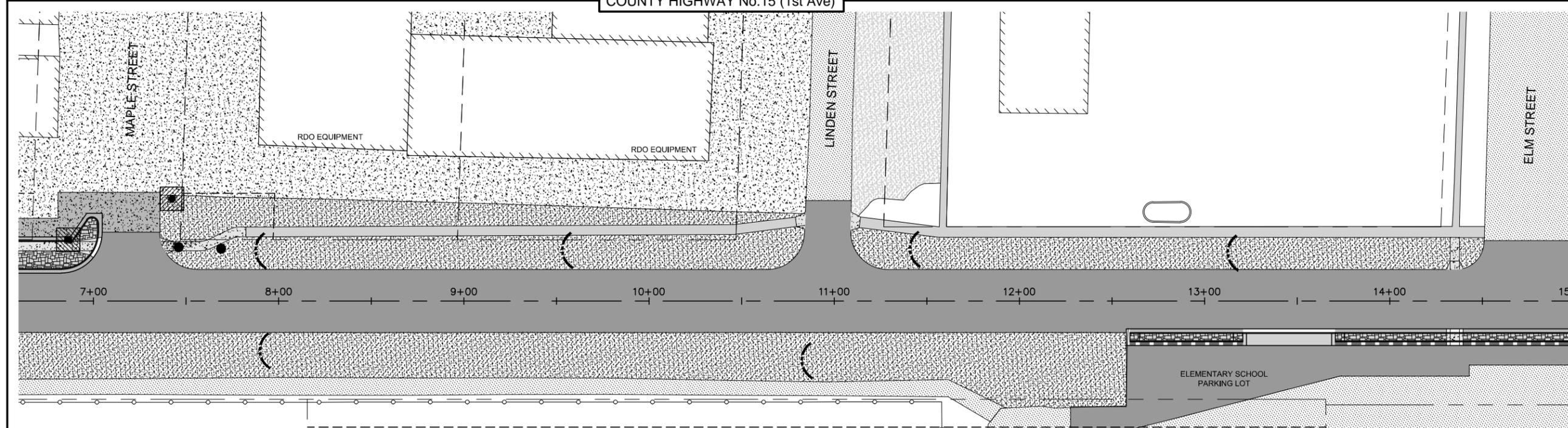


This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
EXISTING TOPOGRAPHIC SURVEY
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



COUNTY HIGHWAY No. 15 (1st Ave)



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
EROSION AND SEDIMENT CONTROL
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

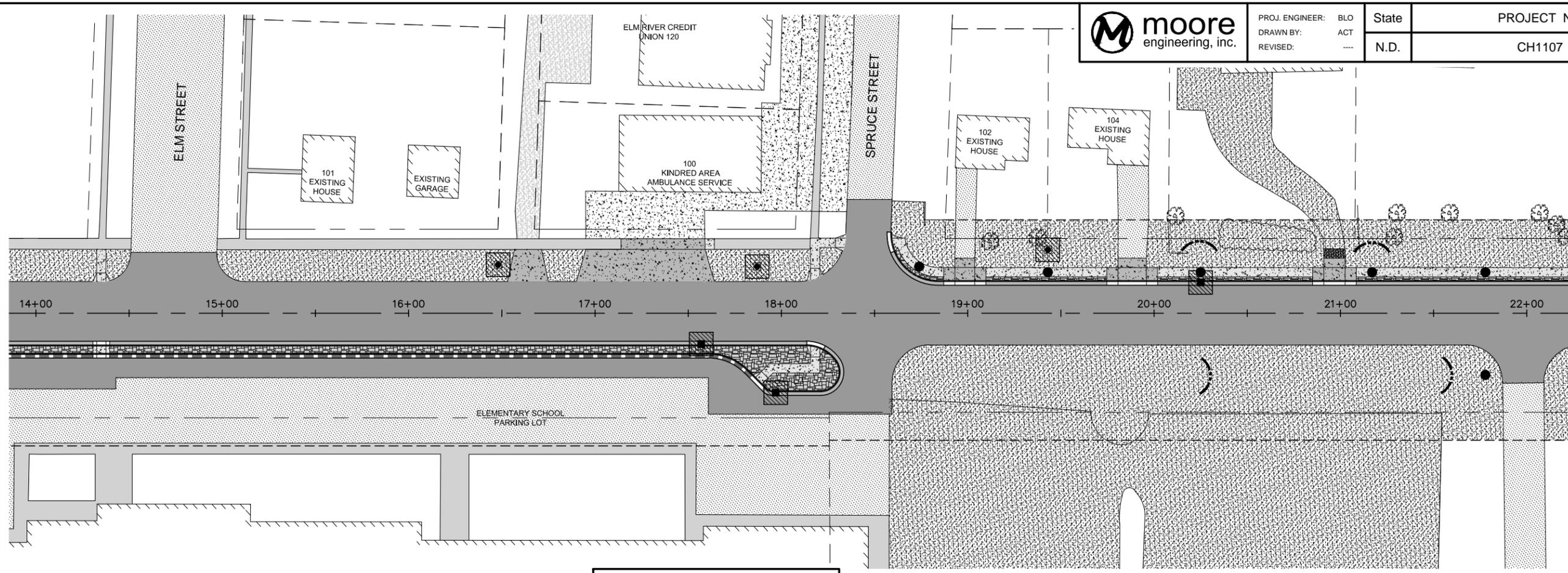


PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

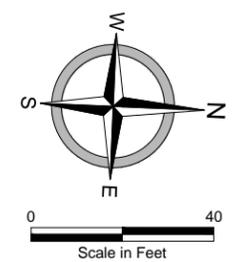
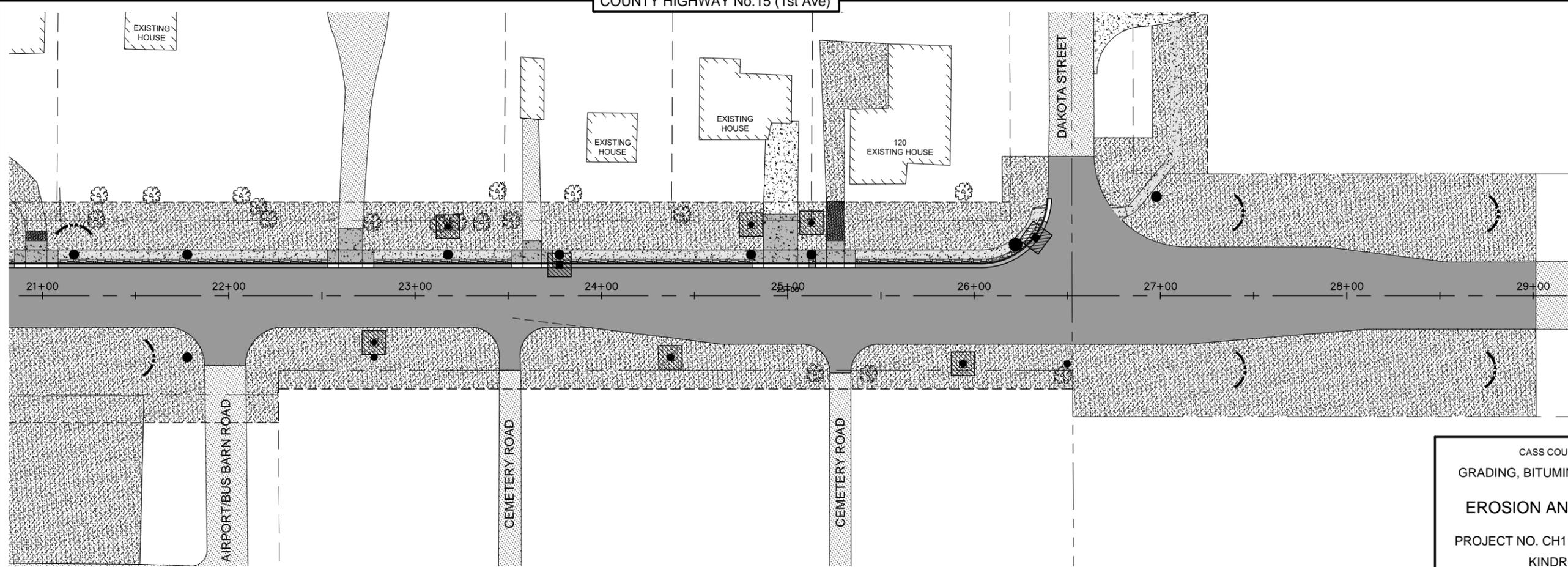
State
 N.D.

PROJECT No.
 CH1107

Section No.	Page No.
75	2

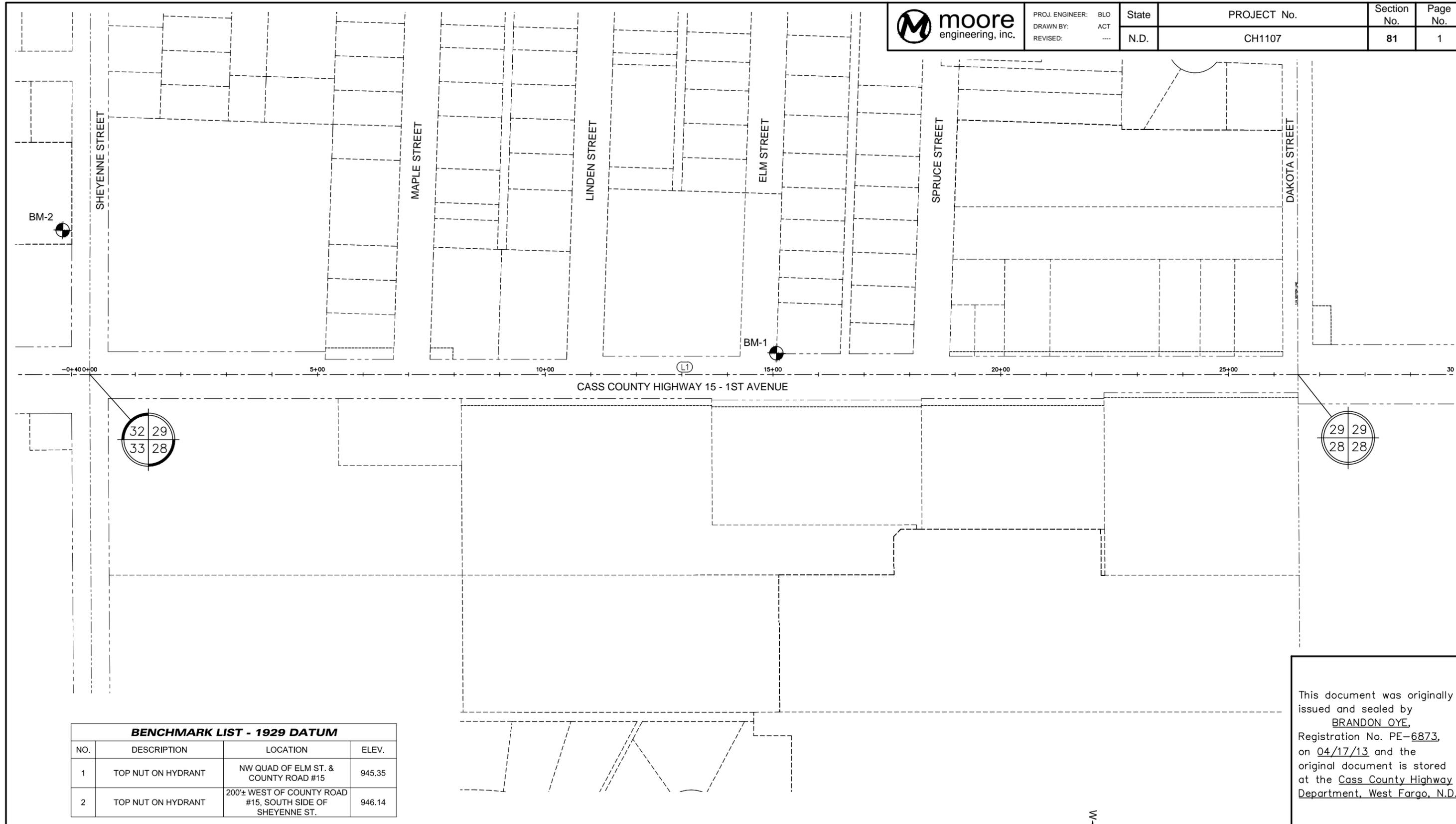


COUNTY HIGHWAY No. 15 (1st Ave)



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
 EROSION AND SEDIMENT CONTROL
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



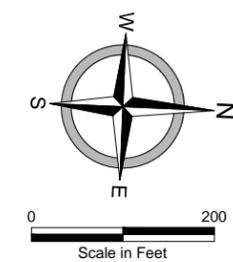
BENCHMARK LIST - 1929 DATUM

NO.	DESCRIPTION	LOCATION	ELEV.
1	TOP NUT ON HYDRANT	NW QUAD OF ELM ST. & COUNTY ROAD #15	945.35
2	TOP NUT ON HYDRANT	200'± WEST OF COUNTY ROAD #15, SOUTH SIDE OF SHEYENNE ST.	946.14

HIGHWAY No.15 / 1ST AVENUE ALIGNMENT TABLE

Number	Length	Radius	Delta	Bearing	Start Sta.	End Sta.	Start Point	End Point
L1	2692.54	N/A	N/A	N2°26'15"W	-0+40	26+52.54	N 376037.49 E 2844892.30	N 378727.60 E 2844777.79
L2	2653.02	N/A	N/A	N2°26'36"W	26+52.54	53+05.57	N 378727.60 E 2844777.79	N 381378.21 E 2844664.68

NOTES:
 1. HORIZONTAL PROJECT CONTROL IS BASED ON "STATE PLANE GROUND COORDINATES, SOUTH ZONE".
 2. VERTICAL PROJECT CONTROL IS BASED ON "1929 DATUM".



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
SURVEY COORDINATE & CURVE DATA
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ----

State
N.D.

PROJECT No.
CH1107

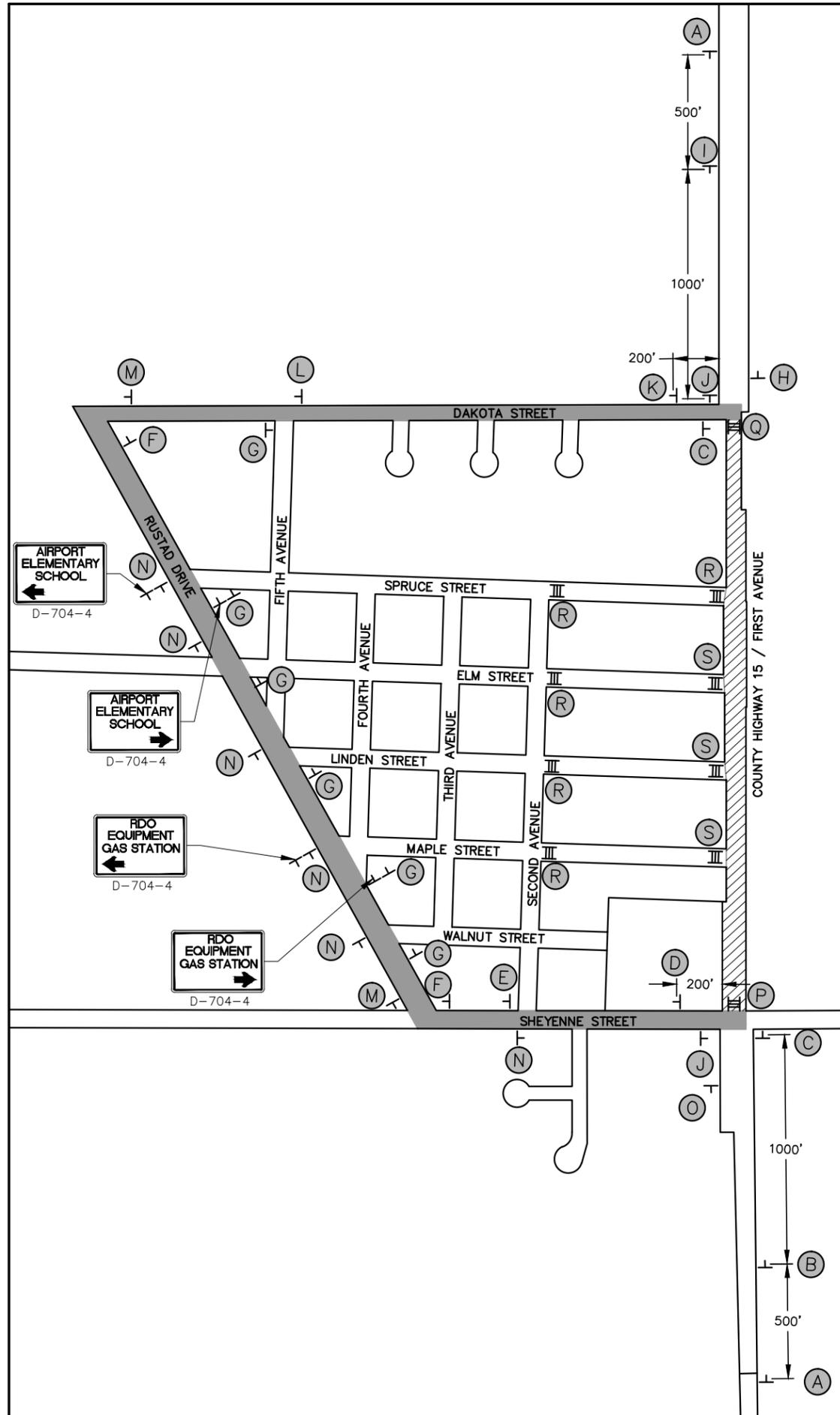
Section No. 100
Page No. 1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)	0	6	0
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES	0	34	0
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)	0	26	0
G20-2-48	48"x24"	END ROAD WORK	0	19	0
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)	0	18	0
G20-10-108	108"x48"	CONTRACTOR SIGN	0	64	0
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS	0	37	0
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW	0	30	0
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	0	59	0
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)	0	10	0
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)	0	10	0
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)	0	10	0
M3-1-24	24"x12"	NORTH (Mounted on route marker post)	11	7	77
M3-2-24	24"x12"	EAST (Mounted on route marker post)	0	7	0
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)	11	7	77
M3-4-24	24"x12"	WEST (Mounted on route marker post)	0	7	0
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)	26	7	182
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT	0	15	0
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT	2	23	46
M5-1-21	21"x15"	ARROW AHD AND RT or LT (Mounted on route marker post)	3	7	21
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)	0	7	0
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)	8	7	56
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)	0	7	0
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)	13	7	91
R1-1-48	48"x48"	STOP	0	32	0
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back	0	5	0
R1-2-60	60"x60"	YIELD	0	29	0
R2-1-48	48"x60"	SPEED LIMIT ___	0	39	0
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	0	10	0
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT	0	35	0
R4-1-48	48"x60"	DO NOT PASS	0	39	0
R4-7-48	48"x60"	KEEP RIGHT SYMBOL	0	39	0
R5-1-48	48"x48"	DO NOT ENTER	0	35	0
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT	0	13	0
R7-1-12	12"x18"	NO PARKING	0	11	0
R10-6-24	24"x36"	STOP HERE ON RED	0	16	0
R11-2-48	48"x30"	ROAD CLOSED	5	28	140
R11-2a-48	48"x30"	STREET CLOSED	0	28	0
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY	0	31	0
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY	0	31	0
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC	5	31	155
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW	0	35	0
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW	0	35	0
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW	0	35	0
W1-6-48	48"x24"	LARGE ARROW	0	26	0
W3-1-48	48"x48"	STOP AHEAD SYMBOL	0	35	0
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL	0	35	0
W3-4-48	48"x48"	BE PREPARED TO STOP	0	35	0
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	0	35	0
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL	0	35	0
W5-1-48	48"x48"	ROAD NARROWS	0	35	0
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE	0	35	0
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW	0	35	0
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL	0	35	0
W8-1-48	48"x48"	BUMP	0	35	0
W8-3-48	48"x48"	PAVEMENT ENDS	0	35	0
W8-7-48	48"x48"	LOOSE GRAVEL	0	35	0
W8-9a-48	48"x48"	SHOULDER DROP-OFF	0	35	0
W8-11-48	48"x48"	UNEVEN LANES	0	35	0
W8-12-48	48"x48"	NO CENTER STRIPE	0	35	0
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY	0	35	0
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT.	0	35	0
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT.	0	35	0
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY	0	35	0
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL	0	35	0
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL	0	35	0
W13-1-24	24"x24"	___ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)	0	11	0
W13-4-48	48"x60"	RAMPS ARROW	0	39	0
W14-3-48	48"x36"	NO PASSING ZONE	0	23	0

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	0	35	0
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT	2	35	70
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT.	0	35	0
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT.	0	35	0
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or ___ FT.	0	35	0
W20-7a-48	48"x48"	FLAGGING SYMBOL	0	35	0
W20-7k-24	24"x18"	___ FEET (Mounted on warning sign post)	0	10	0
W20-8-48	48"x48"	STREET CLOSED	0	35	0
W20-51-48	48"x48"	EQUIPMENT WORKING	0	35	0
W20-52-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)	0	12	0
W21-1a-48	48"x48"	WORKERS SYMBOL	0	35	0
W21-2-48	48"x48"	FRESH OIL	0	35	0
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT	0	35	0
W21-5-48	48"x48"	SHOULDER WORK	0	35	0
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED	0	35	0
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT.	0	35	0
W21-6a-48	48"x48"	SURVEY CREW AHEAD	0	35	0
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or ___ FT.	0	35	0
W21-51-48	48"x48"	MATERIAL ON ROADWAY	0	35	0
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK	0	35	0
	0 24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)	0	11	0
SPECIAL SIGNS					
M1-6-24	24"x24"	COUNTY HIGHWAY ROUTE MARKER	10	10	100
M4-8A-24	24"x18"	END DETOUR	2	7	14
R9-9-24	24"x12"	SIDEWALK CLOSED	14	7	98
TOTAL					1127

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
7040100	FLAGGING	MHR	0
7041041	ATTENUATION DEVICE-TYPE B-55	EACH	0
7041043	ATTENUATION DEVICE-TYPE B-65	EACH	0
7041044	ATTENUATION DEVICE-TYPE B-70	EACH	0
7041050	TYPE I BARRICADES	EACH	14
7041051	TYPE II BARRICADES	EACH	0
7041052	TYPE III BARRICADES	EACH	25
7041060	DELINEATOR DRUMS	EACH	60
7041065	TRAFFIC CONES	EACH	0
7041067	TUBULAR MARKERS	EACH	0
7041070	DELINEATOR	EACH	0
7041072	FLEXIBLE DELINEATORS	EACH	0
7041081	VERTICAL PANELS - BACK TO BACK	EACH	0
7041085	SEQUENCING ARROW PANEL - TYPE A	EACH	0
7041086	SEQUENCING ARROW PANEL - TYPE B	EACH	0
7041087	SEQUENCING ARROW PANEL - TYPE C	EACH	0
7041088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	0
7041095	TYPE B FLASHERS	EACH	0
7043501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	0
7043510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	0
7620200	RAISED PAVEMENT MARKERS	EACH	0
7620420	SHORT TERM 4IN LINE - TYPE R	LF	0
7620430	SHORT TERM 4IN LINE - TYPE NR	LF	0
7621500	OBLITERATION OF PVMT MK	SF	0
7722110	FLASHING BEACON - POST MOUNTED	EACH	0

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
TRAFFIC CONTROL DEVICES LIST
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



TRAFFIC CONTROL LEGEND

- CONSTRUCTION SITE
- DETOUR ROUTE
- POST MOUNTED SIGN
- TYPE III BARRICADE



PROJ. ENGINEER: BLO
 DRAWN BY: ACT
 REVISED: ---

State	PROJECT No.	Section No.	Page No.
N.D.	CH1107	100	2

A W20-2-36

B M4-8-24, M3-1-24, M6-3-21, M5-1L-21

C M4-8-24, M3-1-24, M6-1L-21

D M4-8-24, M3-1-24, M1-6-24

E M4-8-24, M3-1-24, M5-1R-21

F M4-8-24, M3-1-24, M6-1R-21

G M4-8-24, M3-3-24, M6-3-21

H M4-8A-24, M3-1-24, M1-6-24

I M4-8-24, M3-1-24, M5-1R-21

J M4-8-24, M1-6-24, M6-1R-21

K M4-8-24, M1-6-24, M6-1R-21

L M4-8-24, M3-3-24, M6-3-21

M M4-8-24, M3-3-24, M6-1L-21

N M4-8-24, M3-3-24, M6-3-21

O M4-8A-24, M3-1-24, M1-6-24

P R11-2-48, M4-10L-48

Q R11-2-48, M4-10R-48

R R11-4-48

S R11-2-48

This document was originally issued and sealed by BRANDON OYE, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

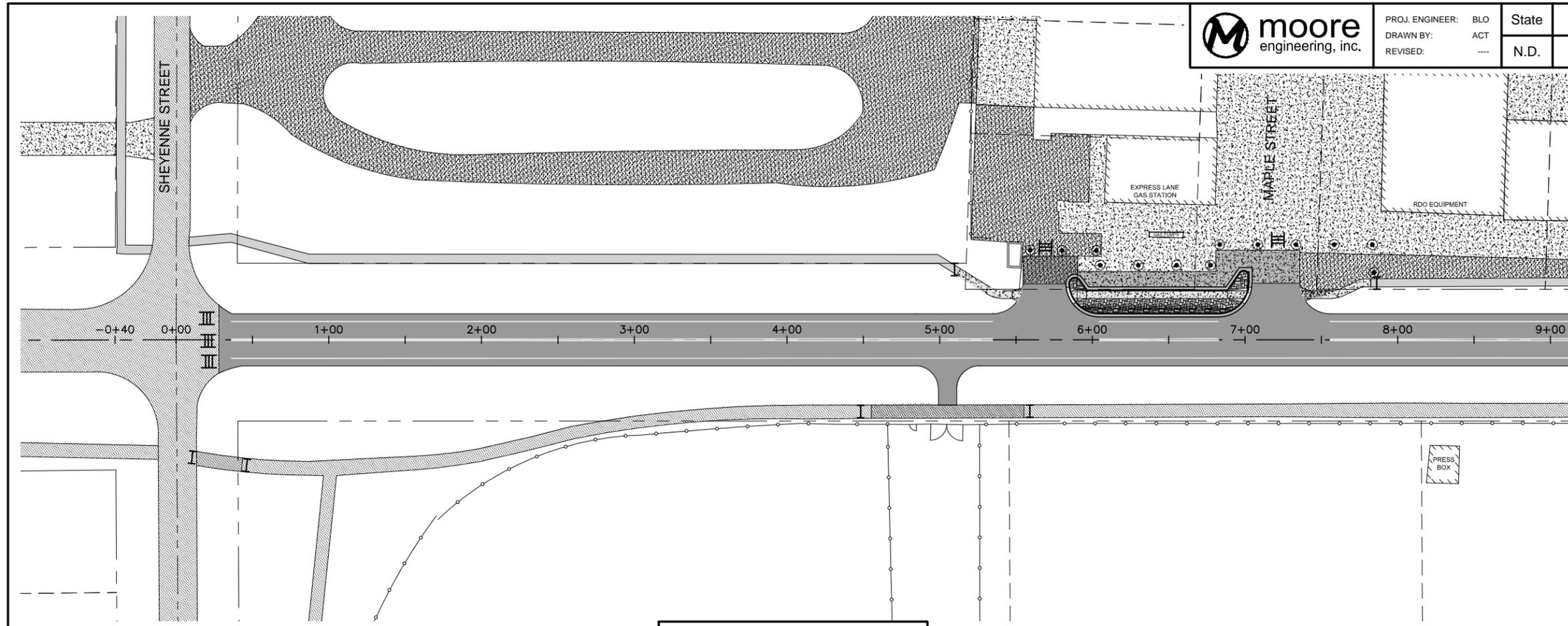
CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
DETOUR PLAN
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA

LEGEND

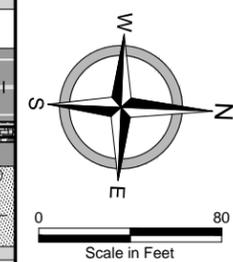
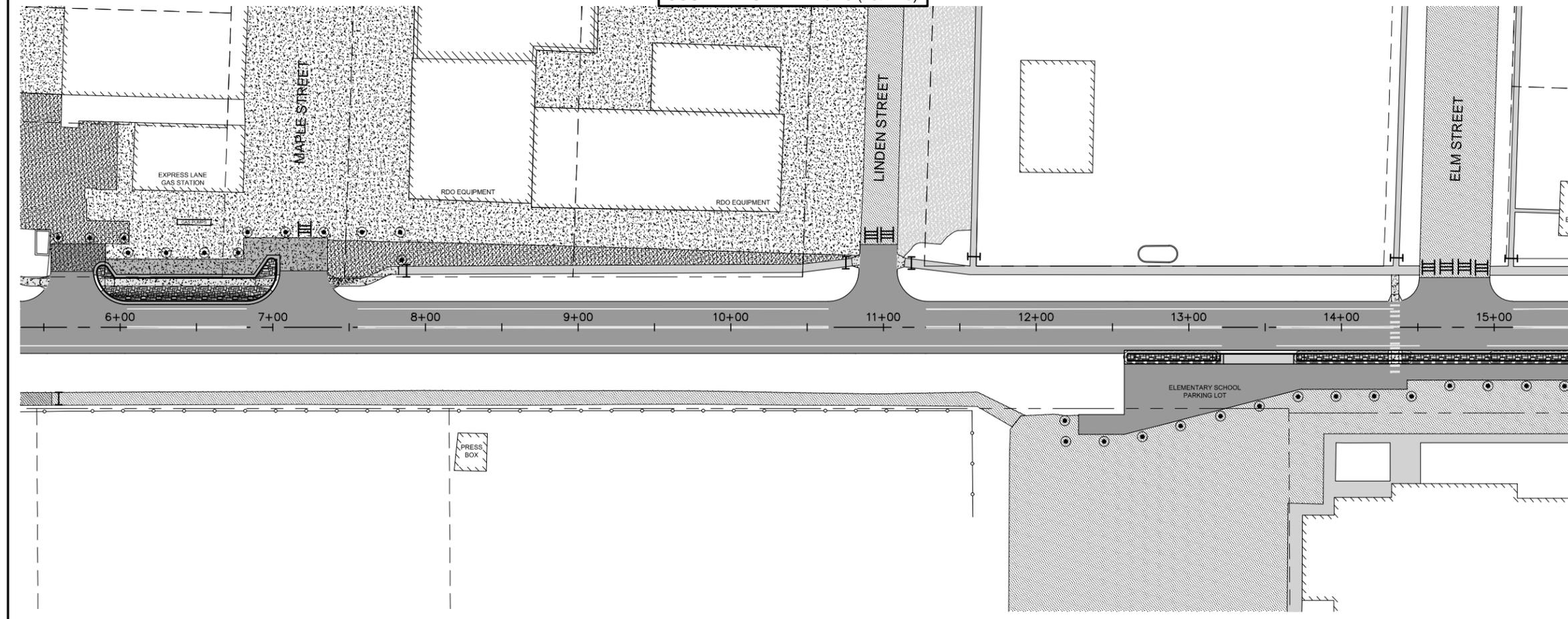
- I : TYPE I BARRICADE WITH
- III : TYPE III BARRICADE WITH.
- ⊙ : DELINEATOR DRUM NEAR EDGE OF PAVEMENT AT 25' SPACING.

NOTES:

1. MOUNT SIGNS ON TYPE III BARRICADES PER DETOUR PLAN.
2. MOUNT R9-9-24 "SIDEWALK CLOSED" SIGN ON TYPE I BARRICADE.

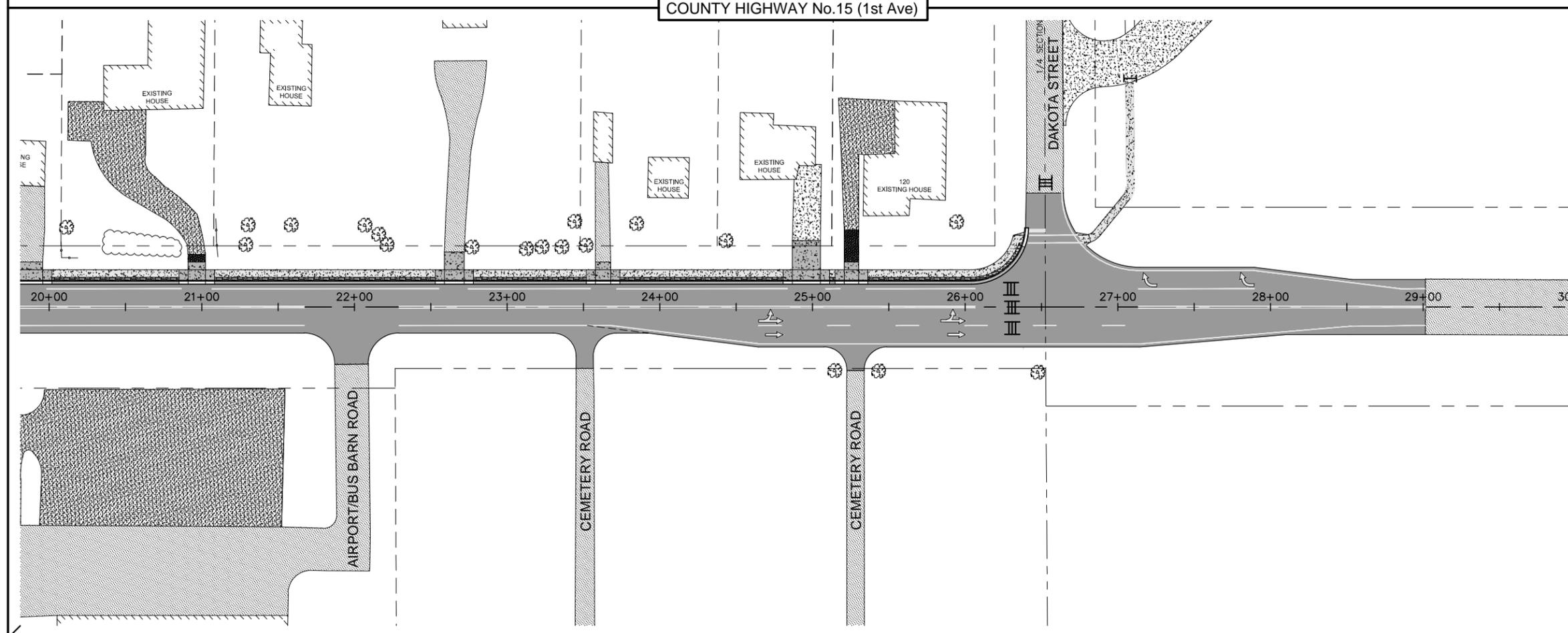
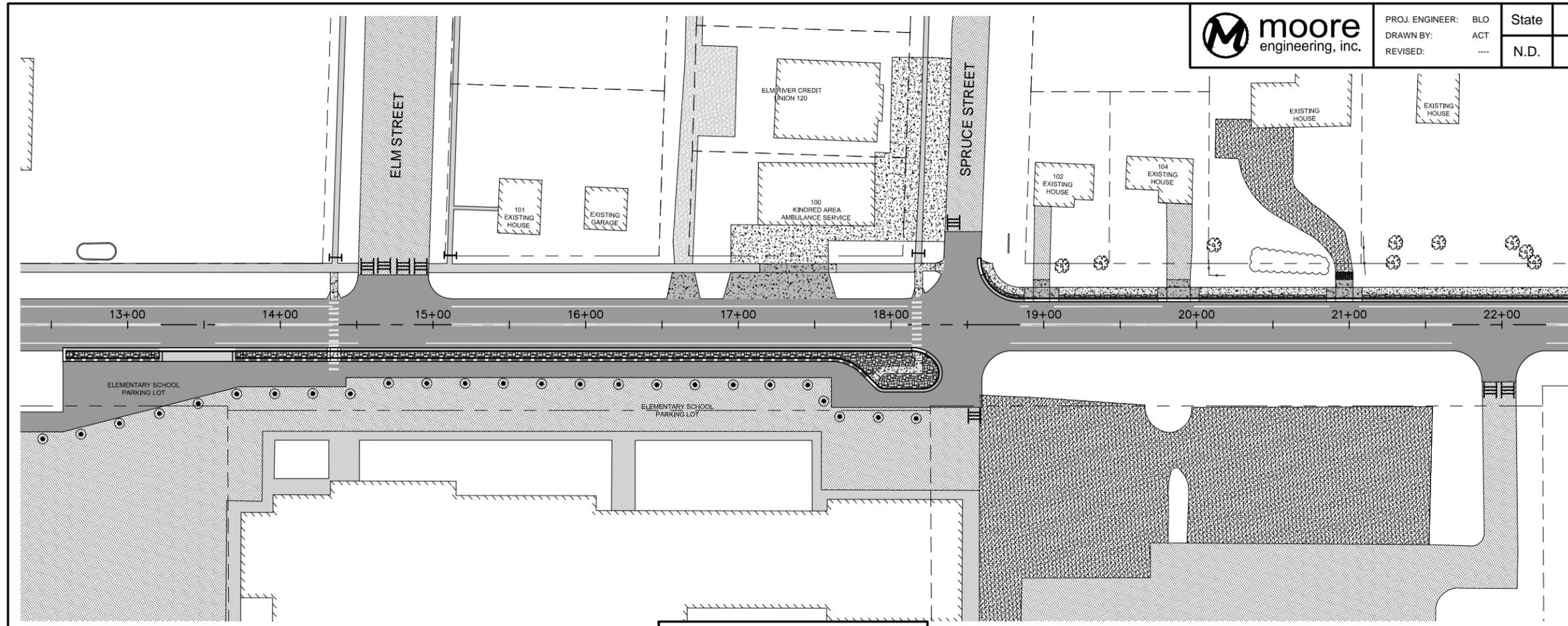


COUNTY HIGHWAY No. 15 (1st Ave)



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
WORK ZONE TRAFFIC CONTROL
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

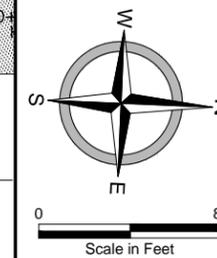


LEGEND

- I : TYPE I BARRICADE WITH
- III : TYPE III BARRICADE WITH.
- ⊙ : DELINEATOR DRUM NEAR EDGE OF PAVEMENT AT 25' SPACING.

NOTES:

1. MOUNT SIGNS ON TYPE III BARRICADES PER DETOUR PLAN.
2. MOUNT R9-9-24 "SIDEWALK CLOSED" SIGN ON TYPE I BARRICADE.



This document was originally issued and sealed by **BRANDON OYE**, Registration No. PE-6873, on 04/17/13 and the original document is stored at the Cass County Highway Department, West Fargo, N.D.

CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
WORK ZONE TRAFFIC CONTROL
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



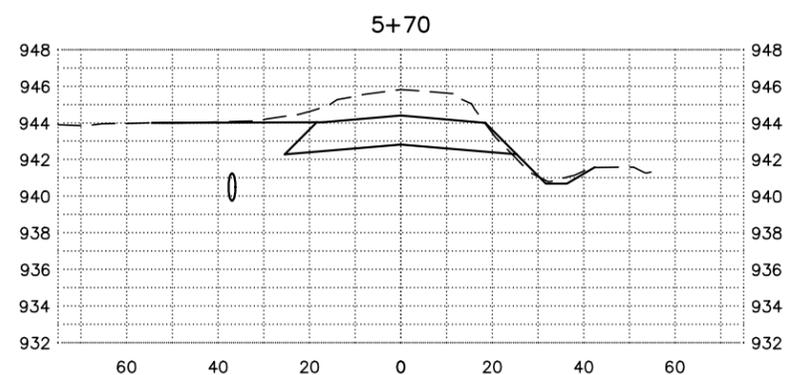
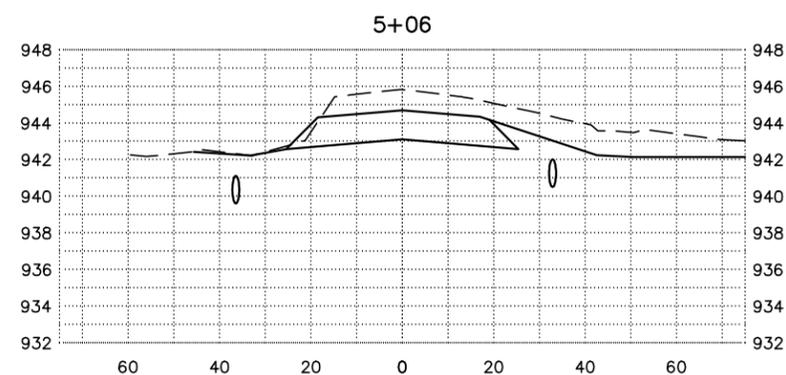
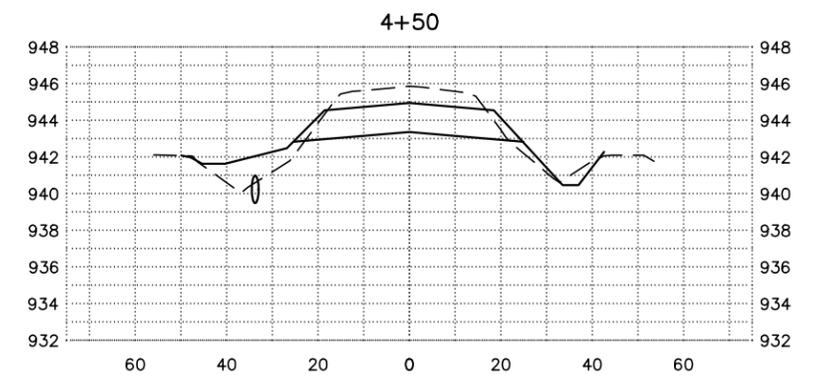
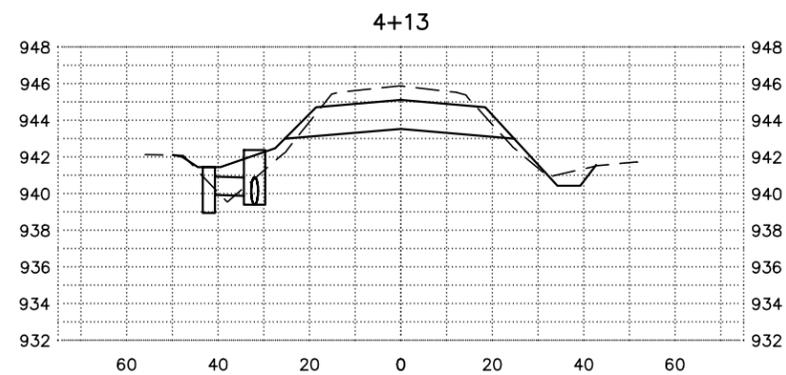
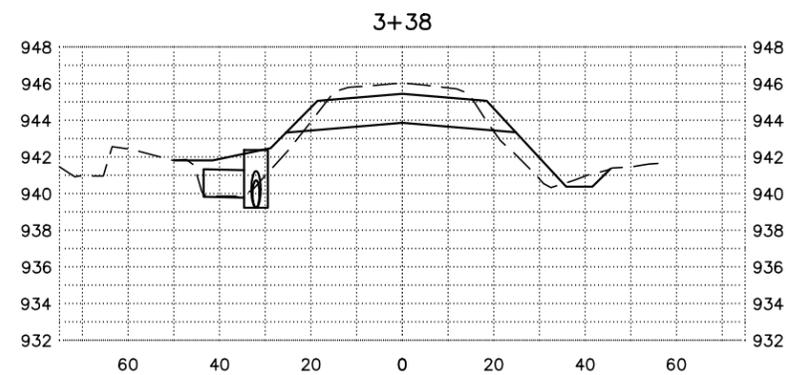
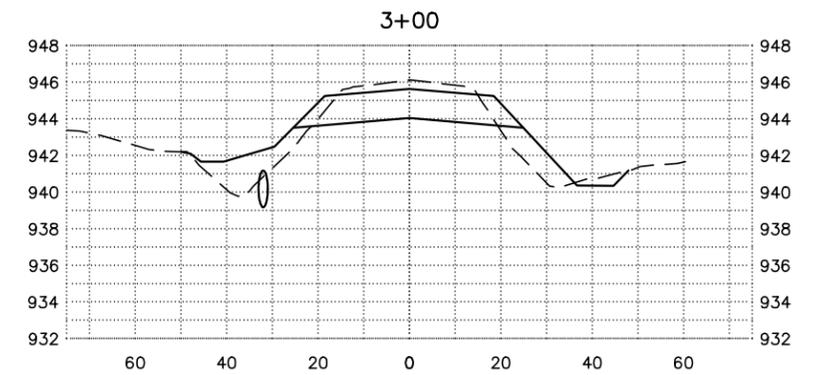
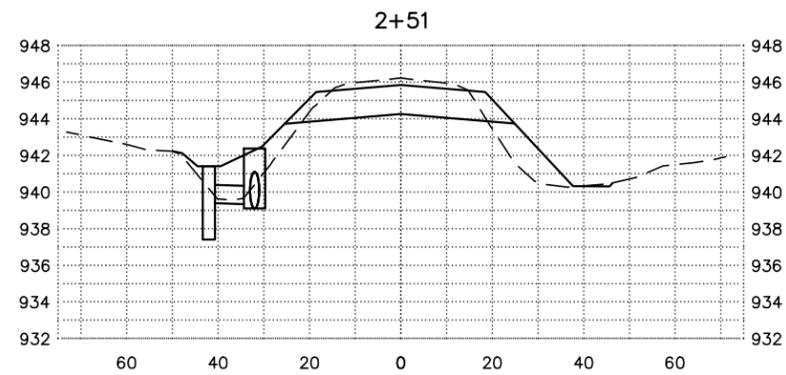
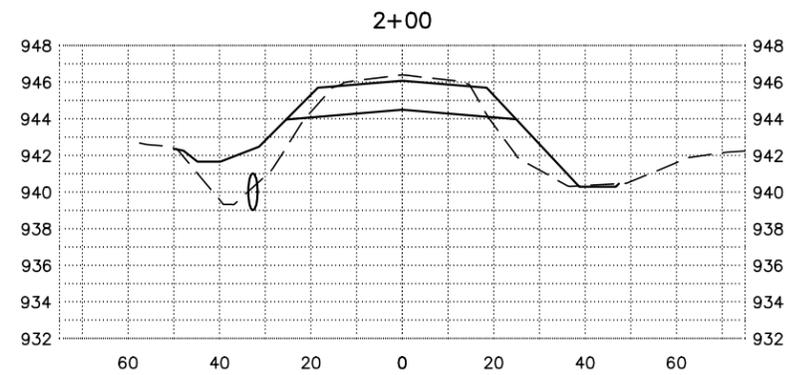
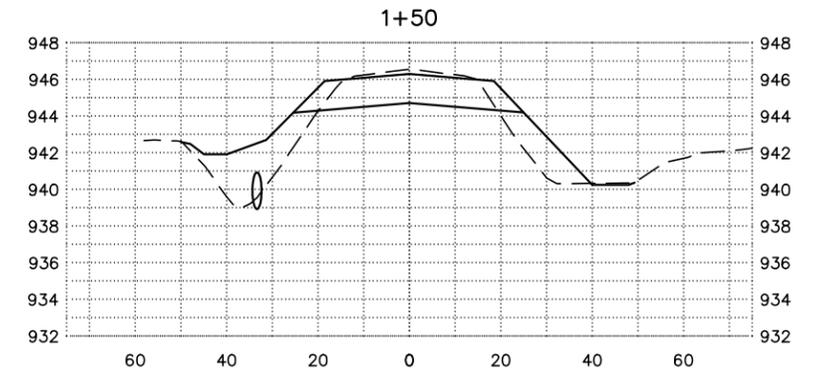
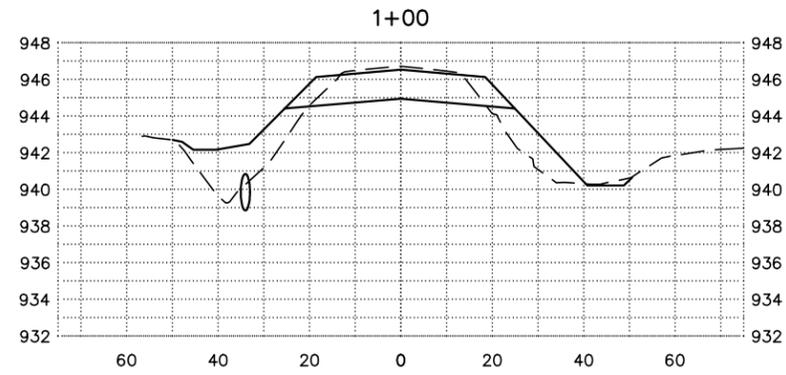
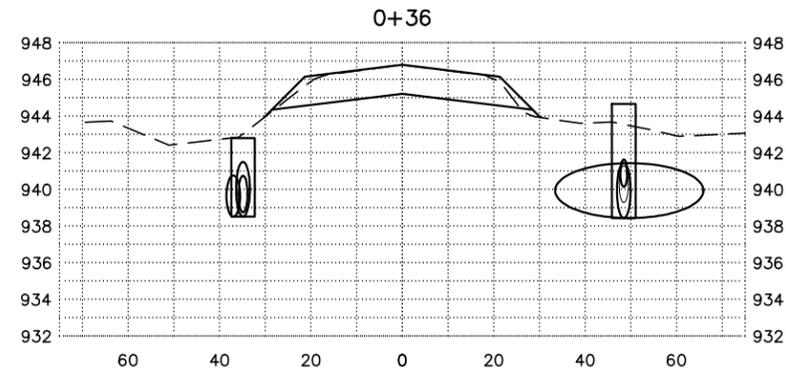
PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.
CH1107

Section No.
200

Page No.
1



CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS

CROSS SECTIONS

PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



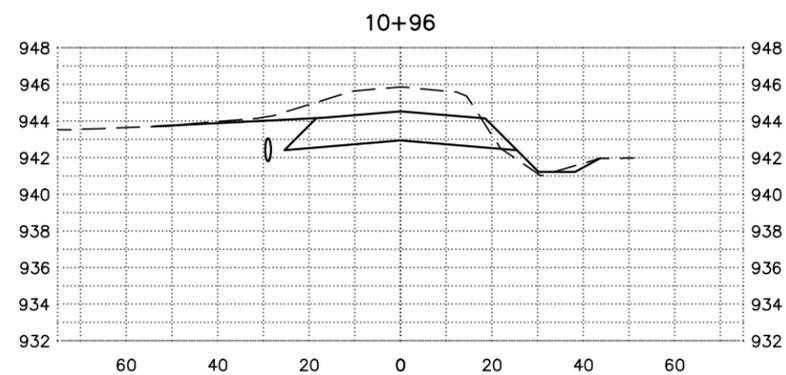
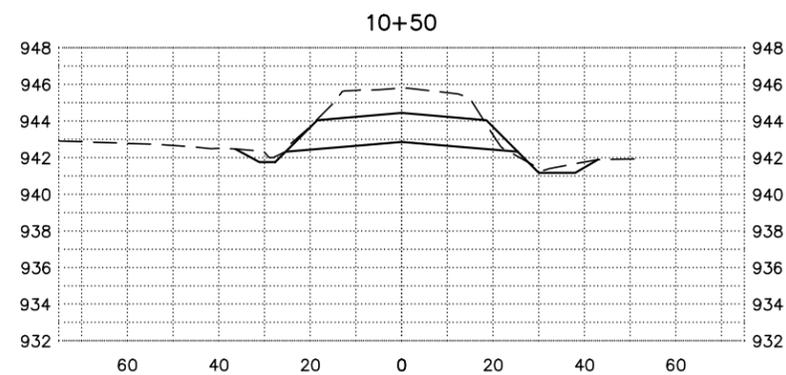
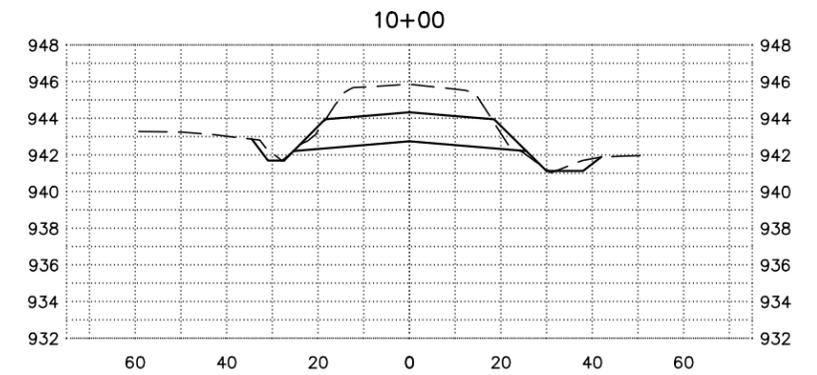
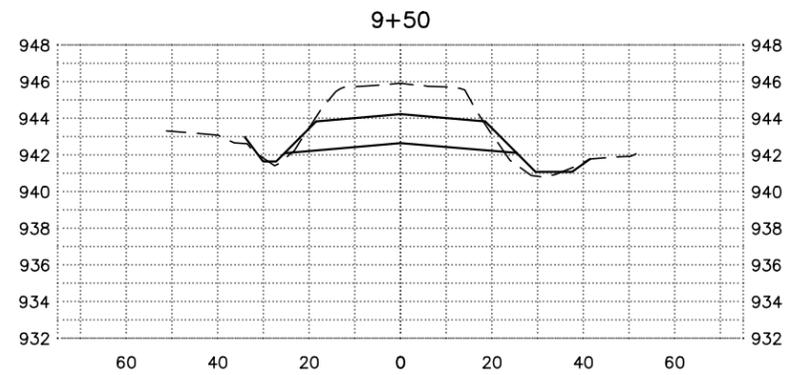
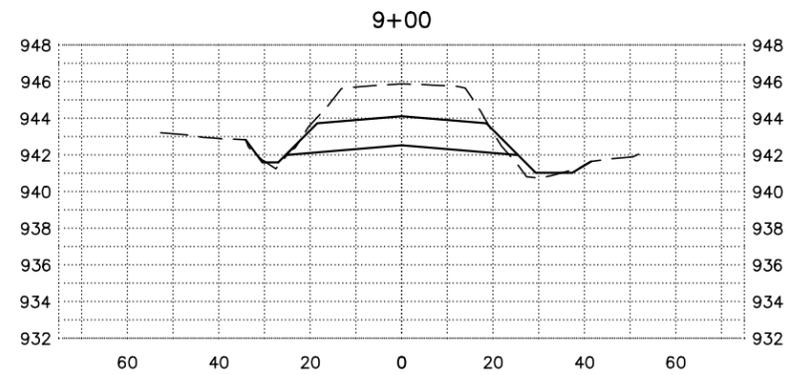
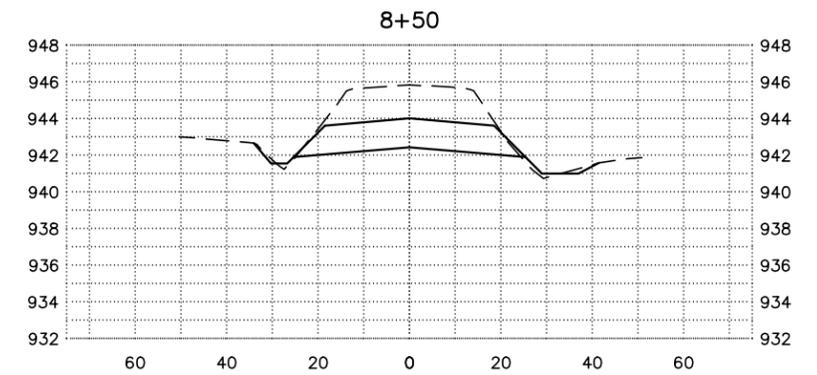
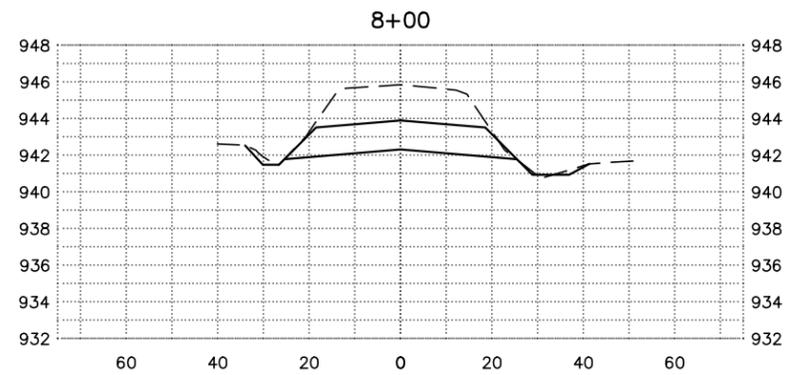
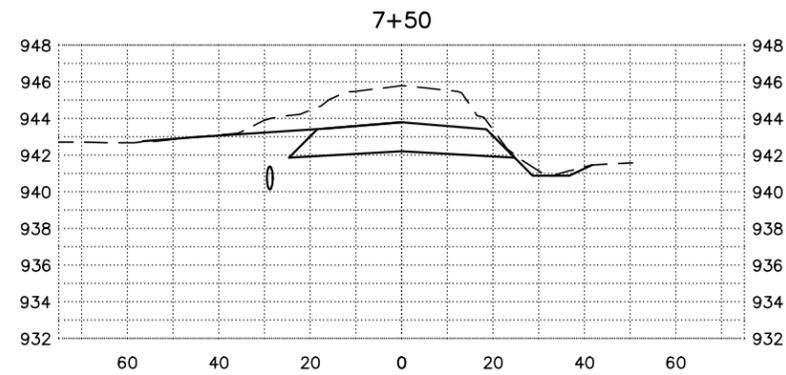
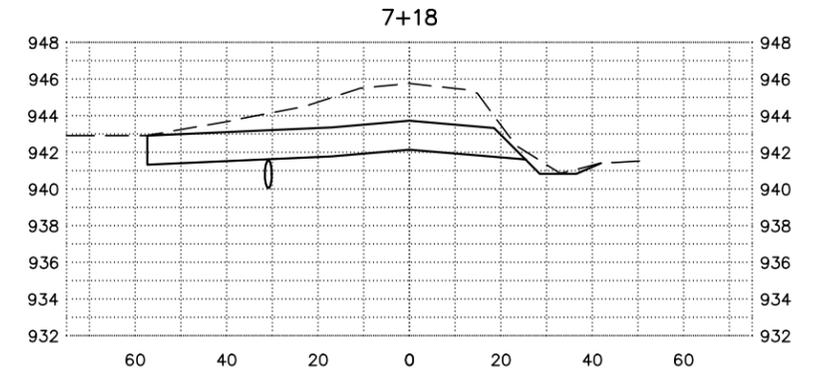
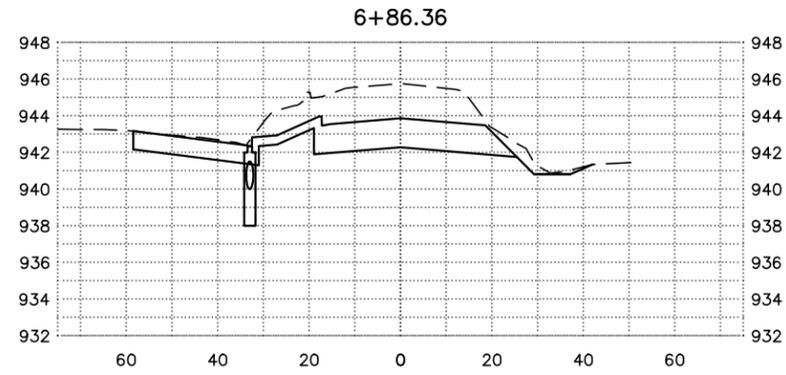
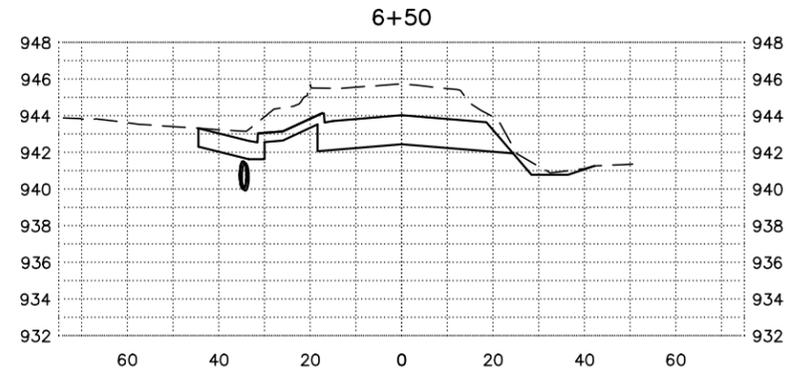
PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.
CH1107

Section No.
200

Page No.
2



CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
CROSS SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

PROJECT No.

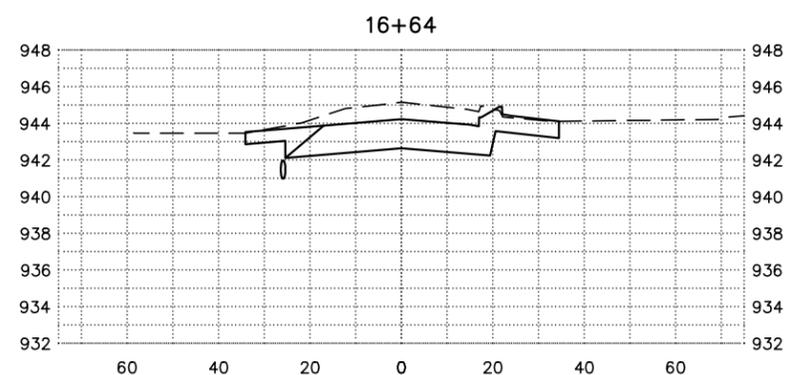
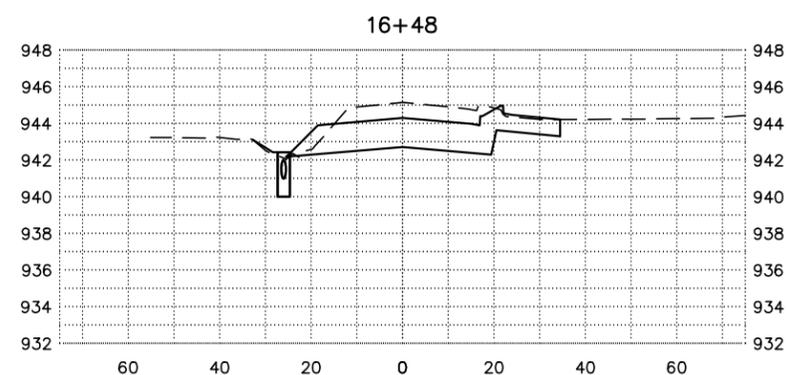
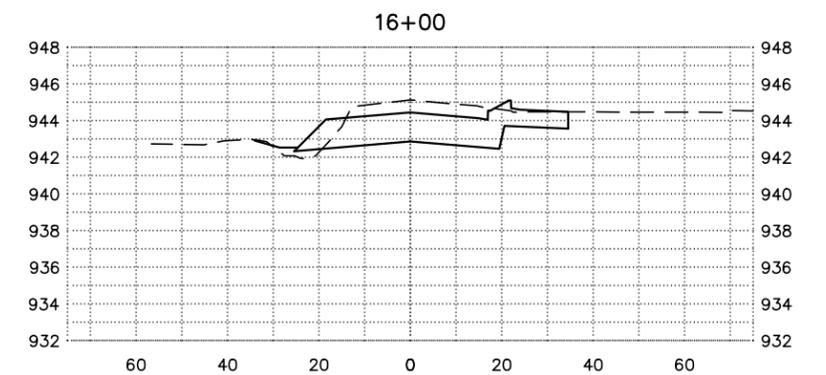
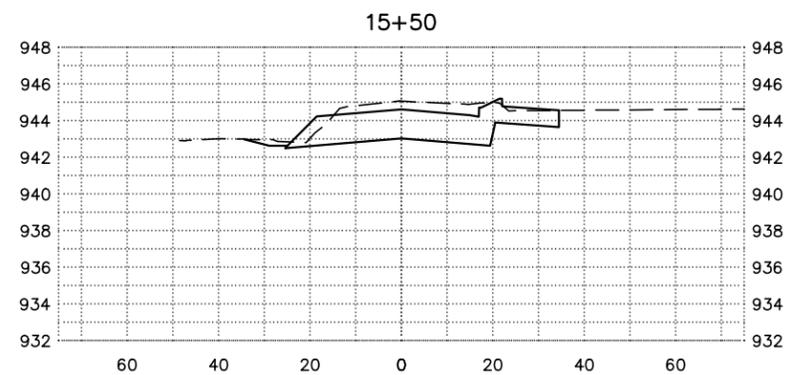
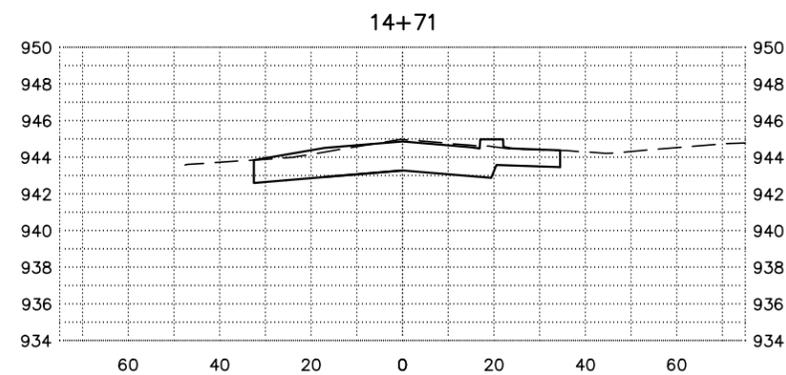
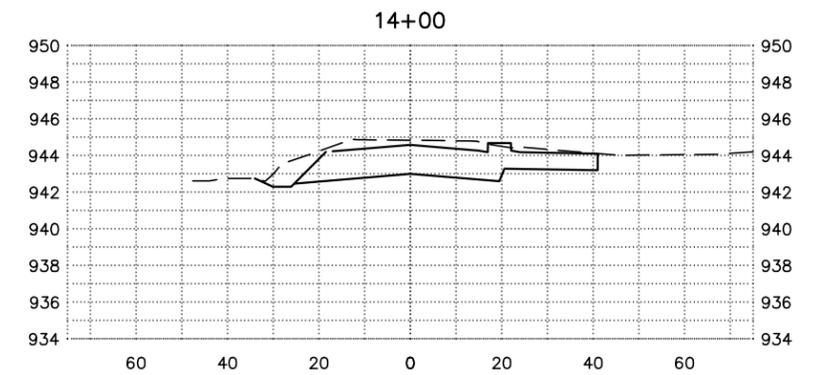
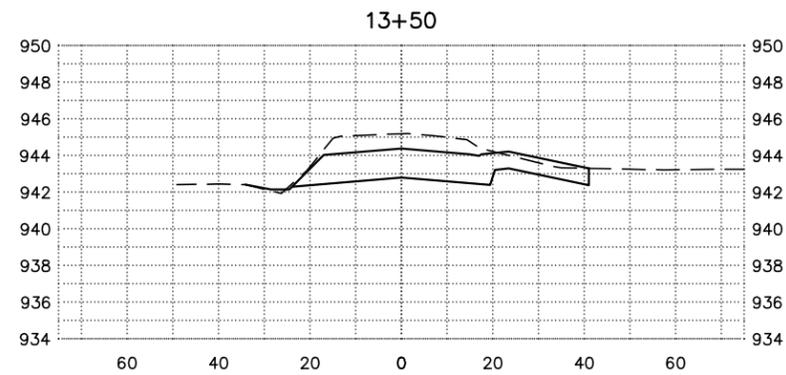
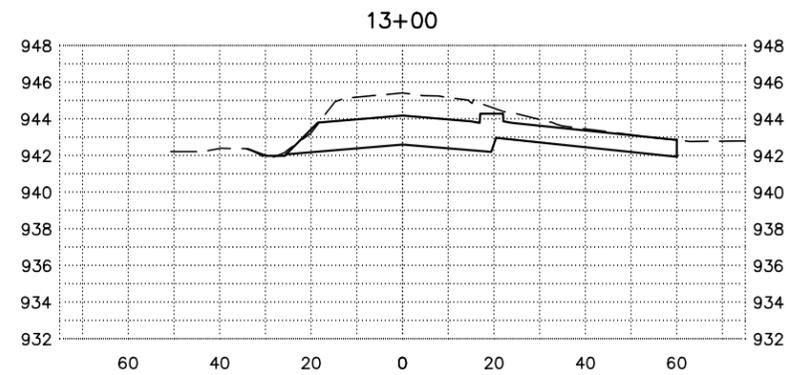
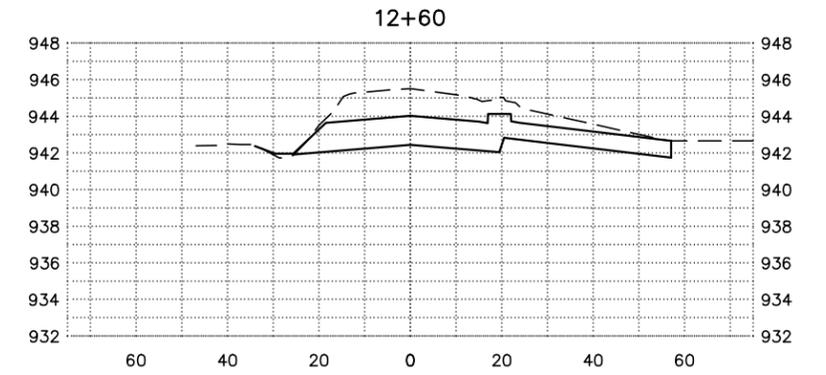
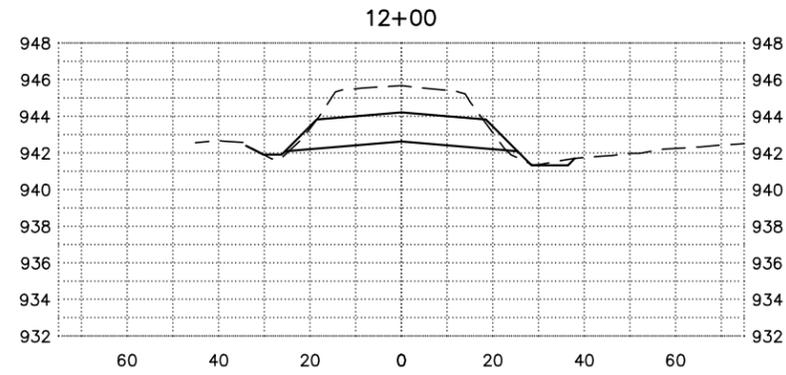
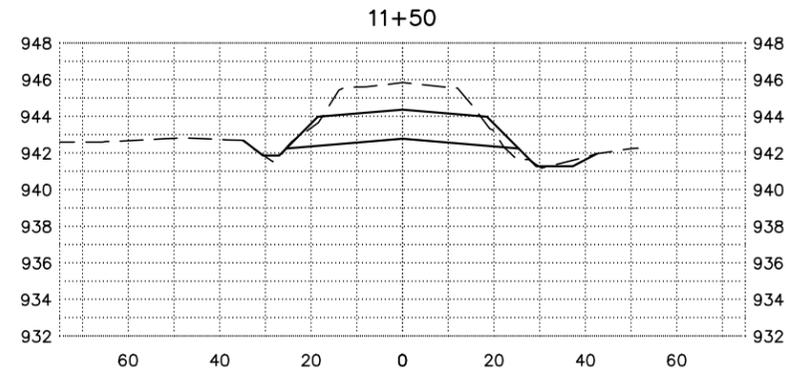
CH1107

Section No.

200

Page No.

3



CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS

CROSS SECTIONS

PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



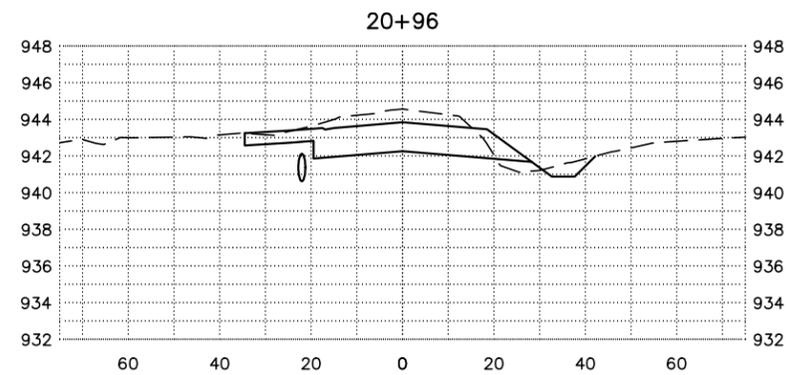
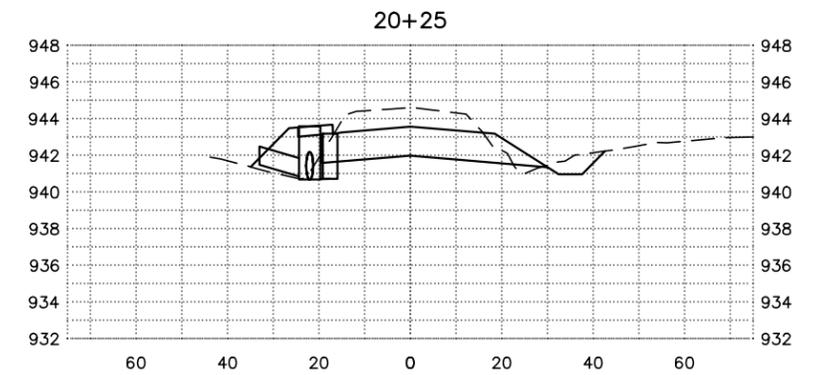
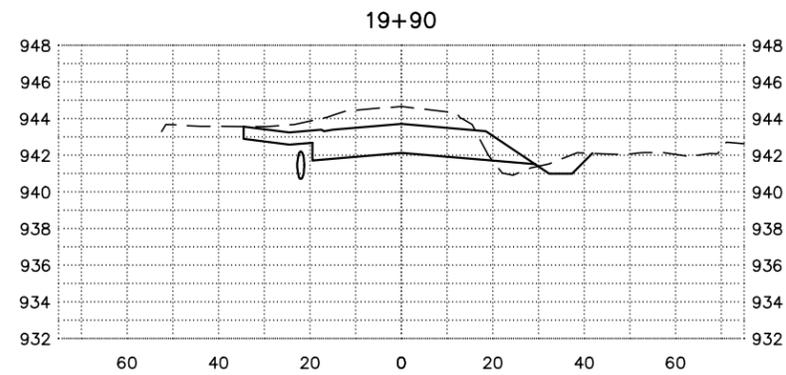
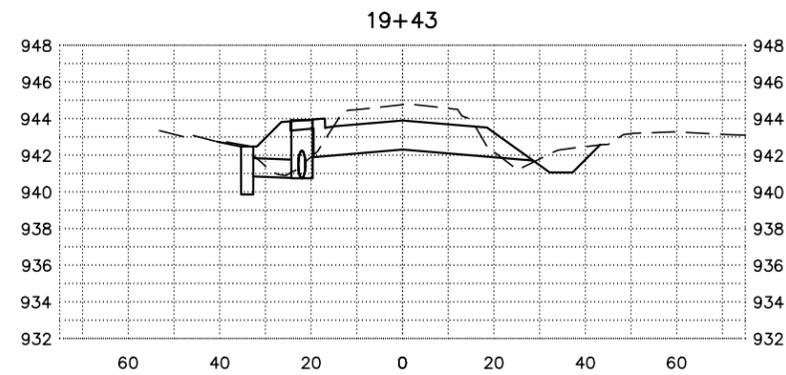
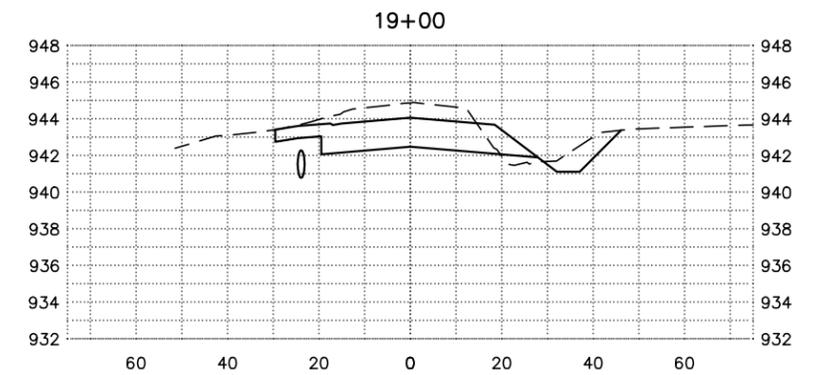
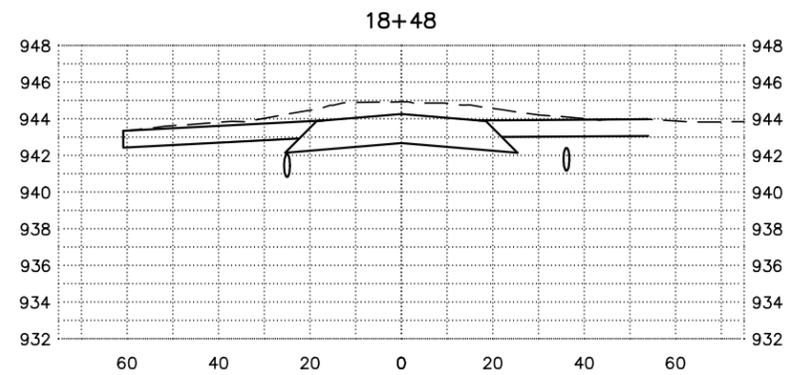
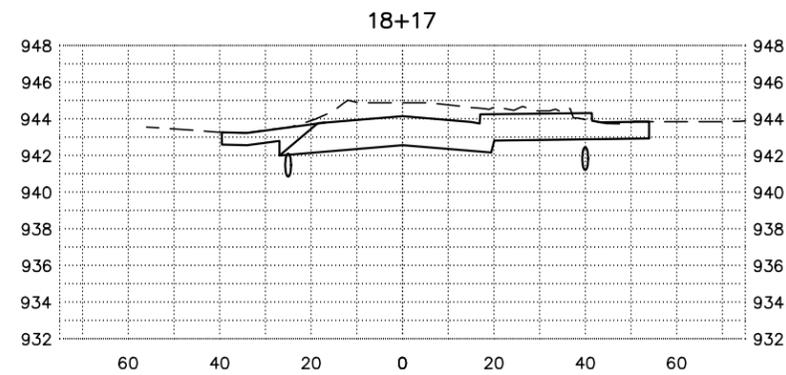
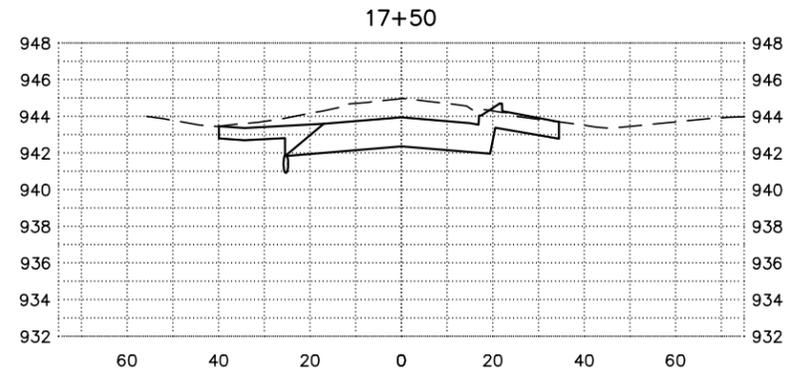
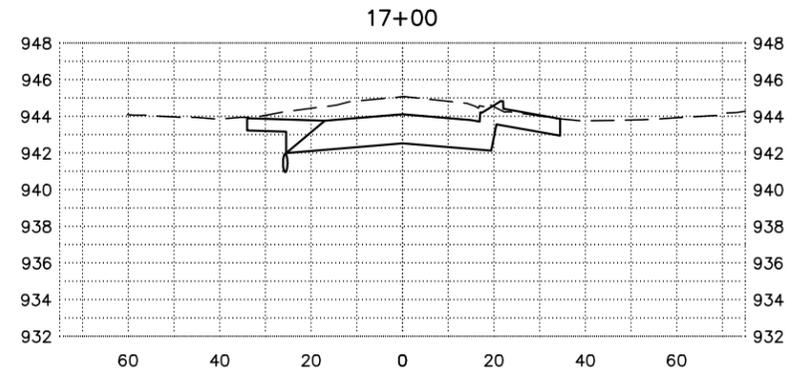
PROJ. ENGINEER: BLO
DRAWN BY: ACT
REVISED: ---

State
N.D.

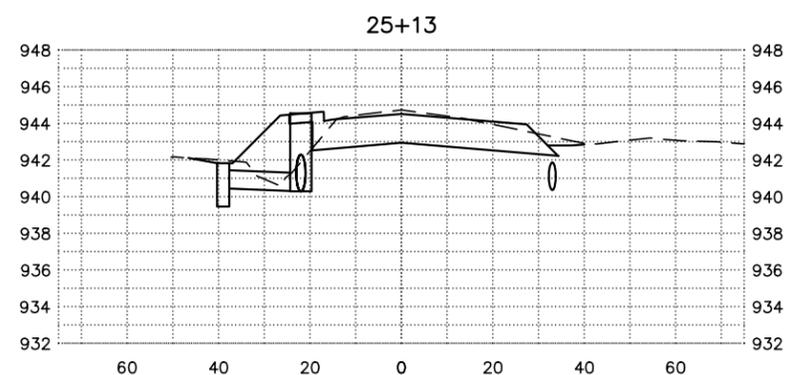
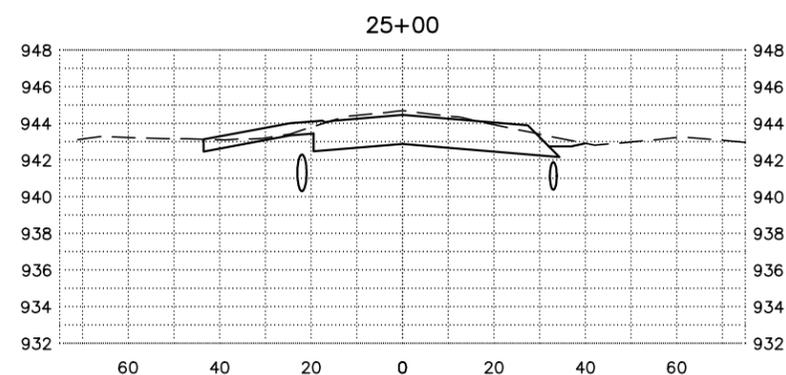
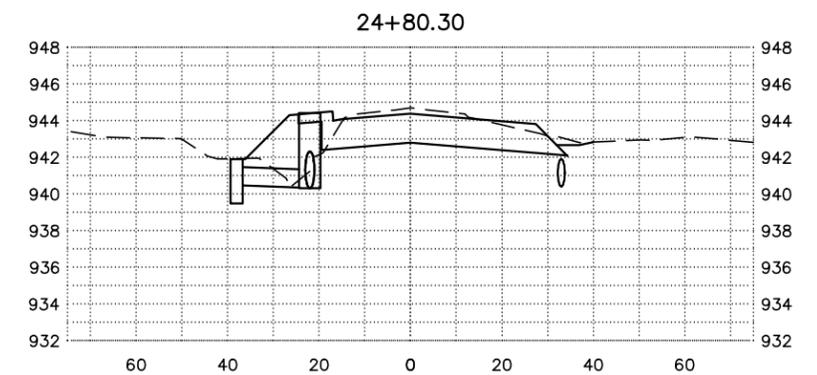
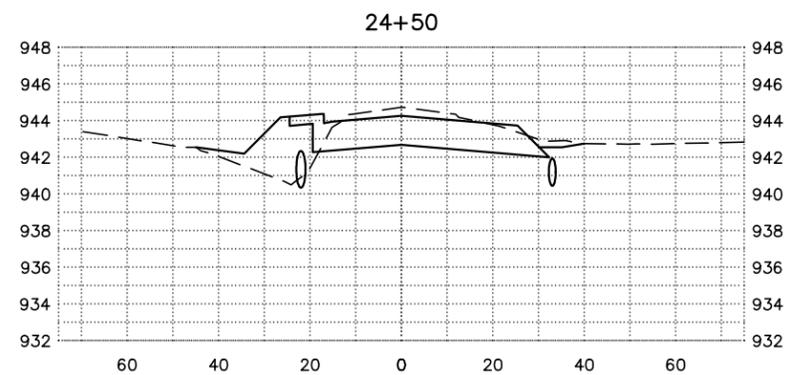
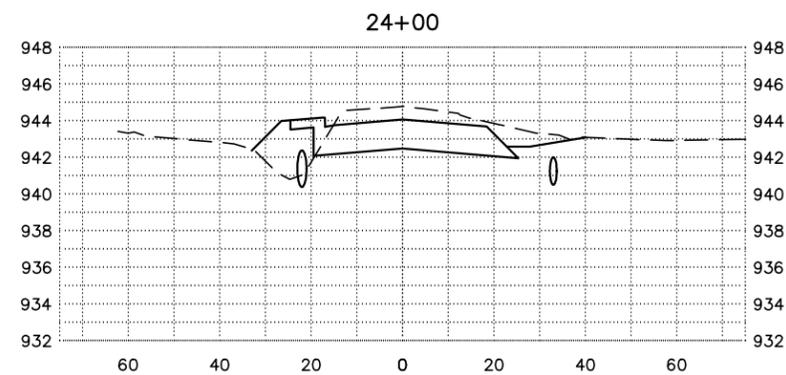
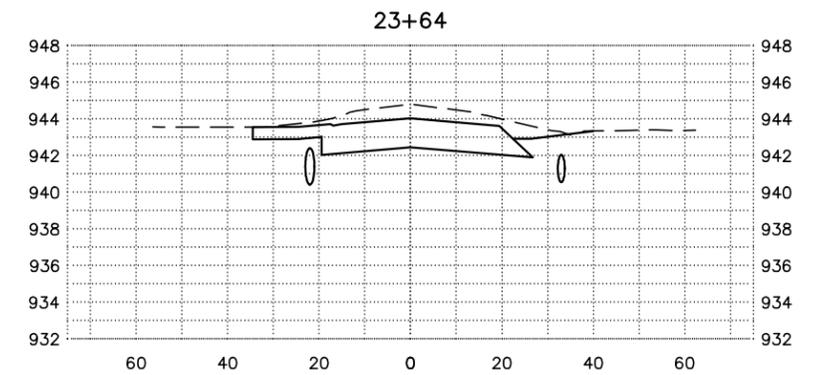
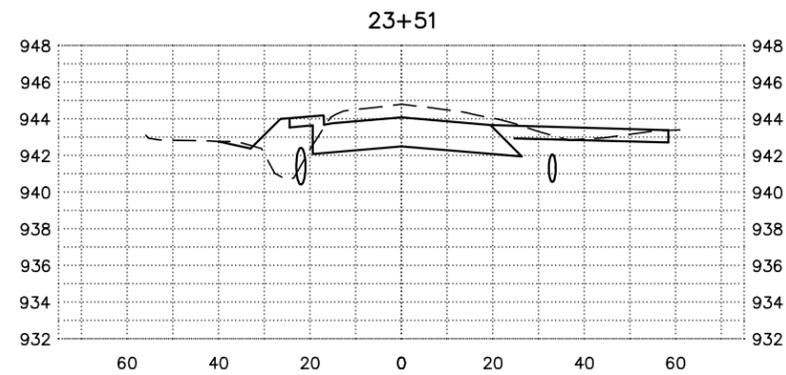
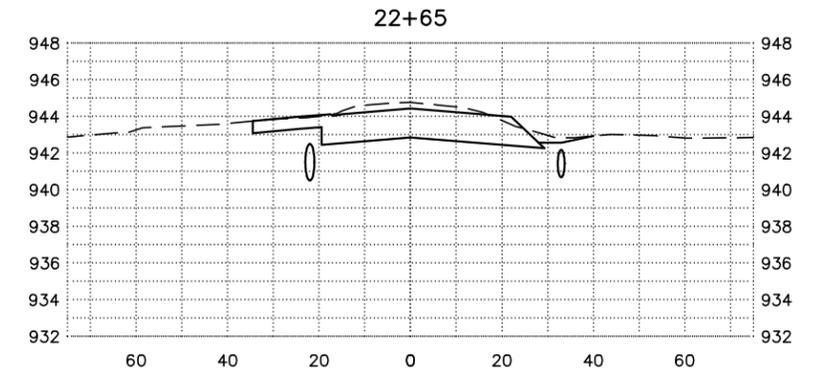
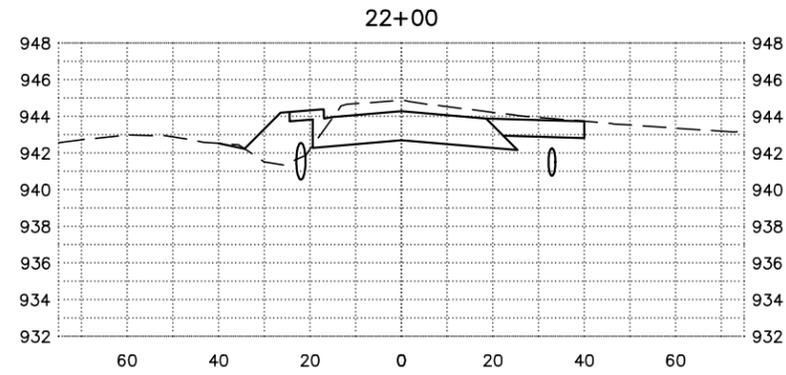
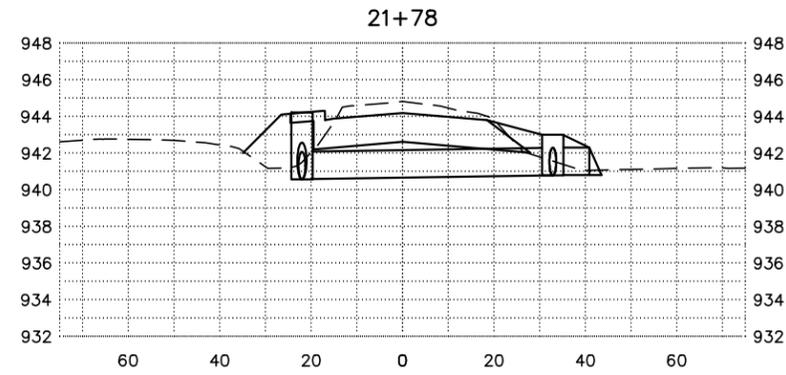
PROJECT No.
CH1107

Section No.
200

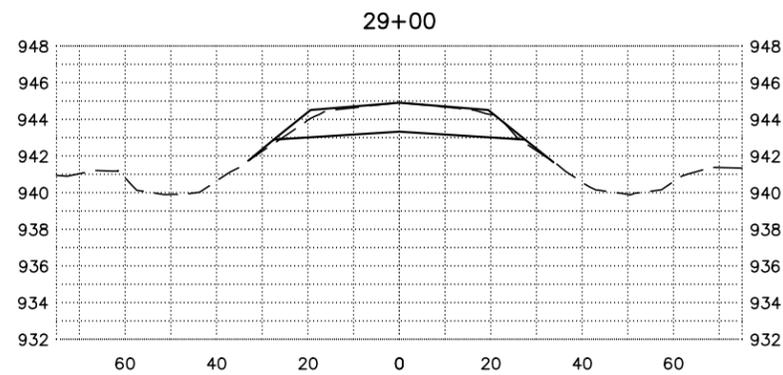
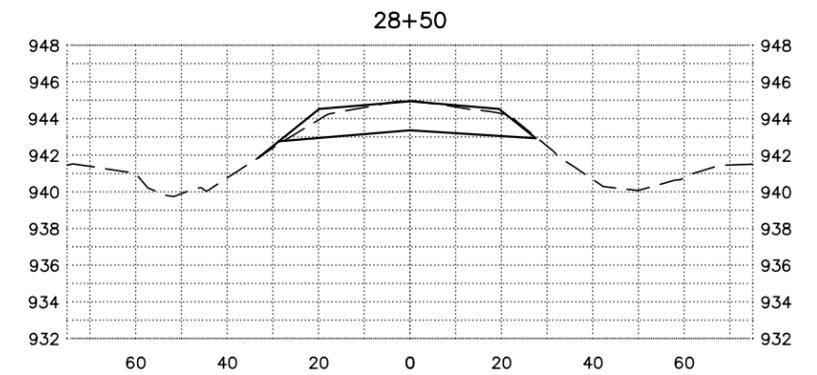
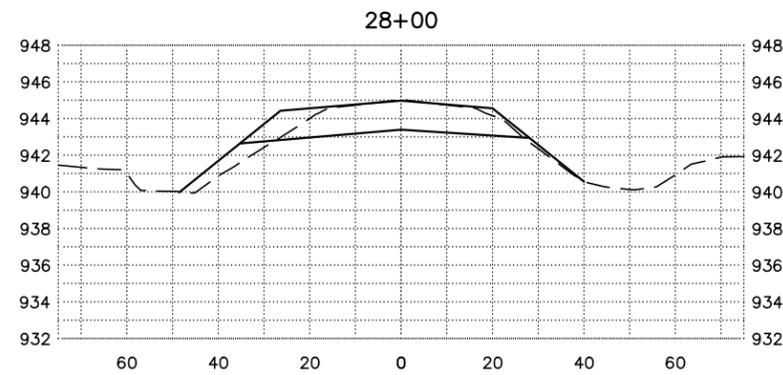
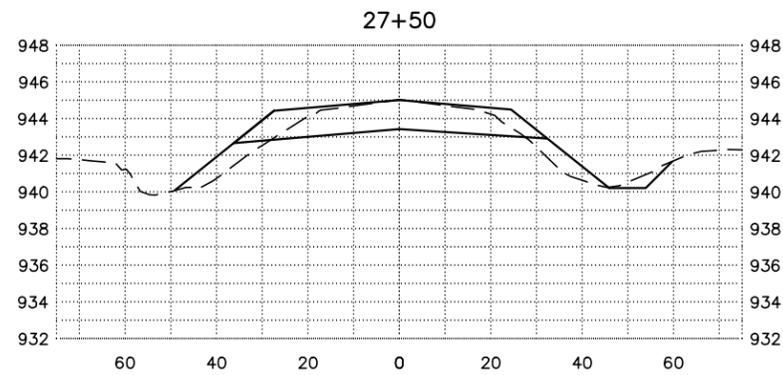
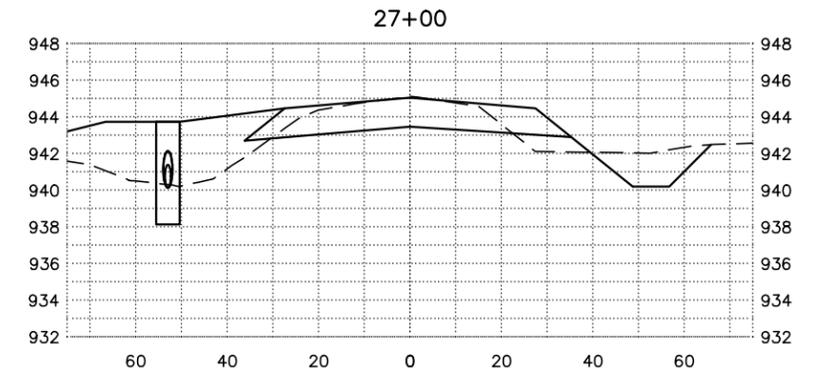
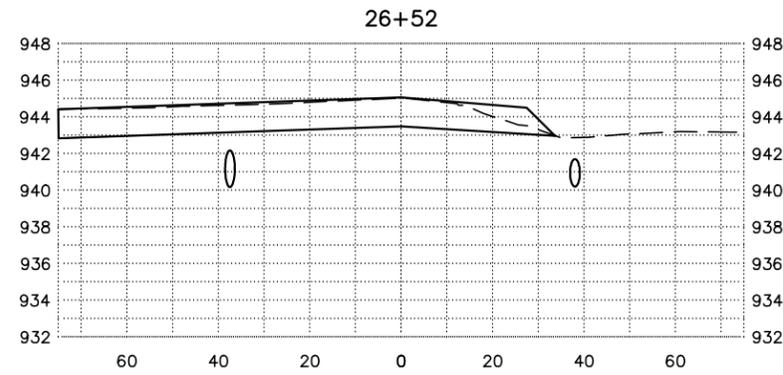
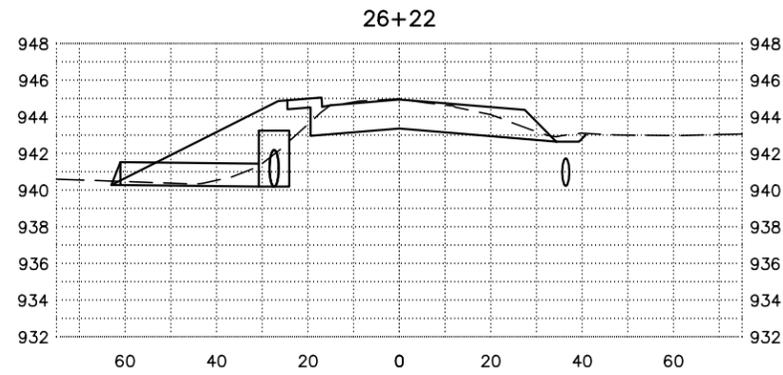
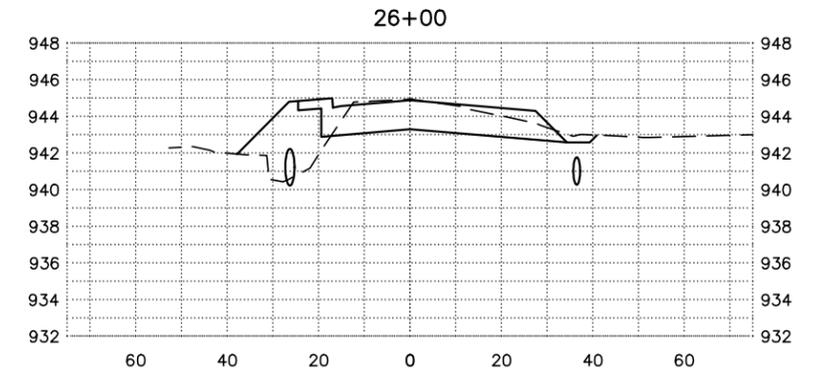
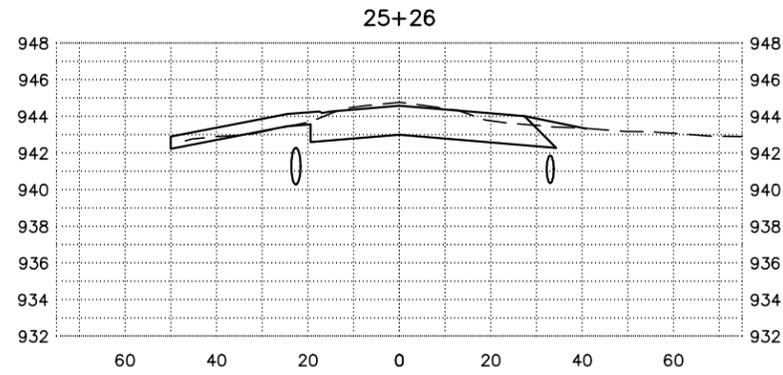
Page No.
4



CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
CROSS SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA



CASS COUNTY HIGHWAY DEPARTMENT
 GRADING, BITUMINOUS SURFACE & INCIDENTALS
 CROSS SECTIONS
 PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
 KINDRED, NORTH DAKOTA



CASS COUNTY HIGHWAY DEPARTMENT
GRADING, BITUMINOUS SURFACE & INCIDENTALS
CROSS SECTIONS
PROJECT NO. CH1107, CASS COUNTY HIGHWAY 15
KINDRED, NORTH DAKOTA

WORK ZONE BUSINESS SIGN DETAILS

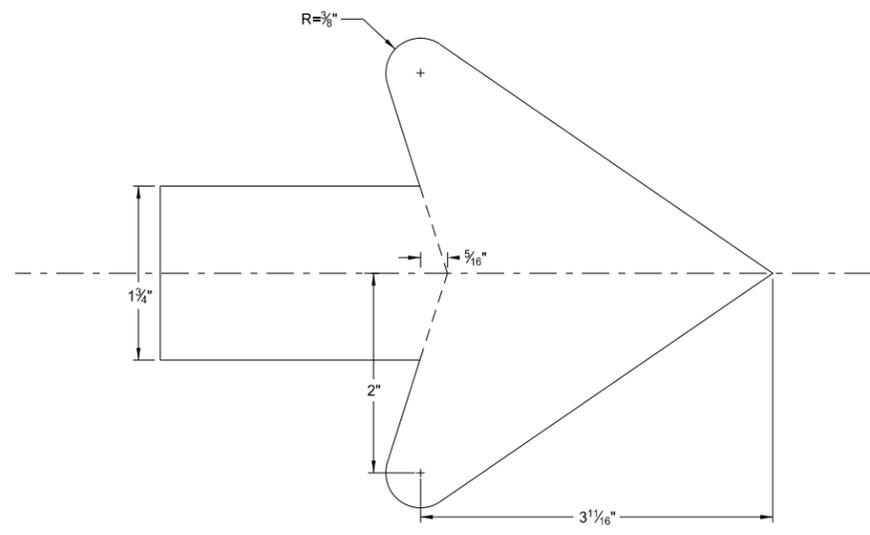
D-704-4

SIGN NUMBER	Con Sign					STATION(S):	AREA: 6.0 Sq.Ft.				
WIDTH x HEIGHT	3'-0" x 2'-0"										
BORDER WIDTH	0.5" (Inset 0")										
CORNER RADIUS	1.5"										
MOUNTING	Ground										
BACKGROUND	TYPE: 3A Reflective COLOR: Blue										
LEGEND/BORDER	TYPE: 3A Reflective COLOR: White										
SYMBOL	X	Y	WID	HT	ANGLE						
ARDD	4.5	1.5	4.8	6	180						
ARDD	25.5	1.5	4.8	6	0						

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITION (X)											LENGTH	SIZE	SERIES
S	T	E	A	K		H	O	U	S	E	27.1	4	ClearviewHwy-1-W
4.5	6.8	9.2	11.3	14.4	16.3	18.7	21.5	24.7	27.4	30.1			
G	A	S		S	T	A	T	I	O	N	26	4	ClearviewHwy-1-W
5	7.8	10.6	12.4	14.6	16.9	19.1	21.9	24.3	25.7	28.9			
C	A	F	E								9.2	4	ClearviewHwy-1-W
13.4	15.9	18.9	21.2										

Note:
The ground mounted business name sign area has been calculated using a 36"x 24" sign panel. The contractor shall determine the size needed and the exact length required to accommodate the message. The maximum size of the sign shall be 36"x24". The letters shall be 4" Clearview 1-W. The color shall be blue background with white legend and border. The sign shall be post mounted. The arrow shall be positioned either on the right or left side of the sign as required.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 9/25/2012 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAIL

D-704-5

SIGN NUMBER	G20-10-108	STATION(S):	AREA: 36.0 Sq.Ft.	
WIDTH x HEIGHT	9'-0" x 4'-0"			
BORDER WIDTH	1.25" (Inset 0.75")			
CORNER RADIUS	3"			
MOUNTING	Ground			
BACKGROUND	TYPE: 3A Reflective COLOR: Fluorescent Orange			
LEGEND/BORDER	TYPE: Non-Refl COLOR: Black			

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITION (X)														LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D	B	Y		69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7			
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96
Y	O	U	R		T	O	W	N								
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2				

Notes:

1. Sign shall be placed a distance of 1/2A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed in urban areas or within city limits.

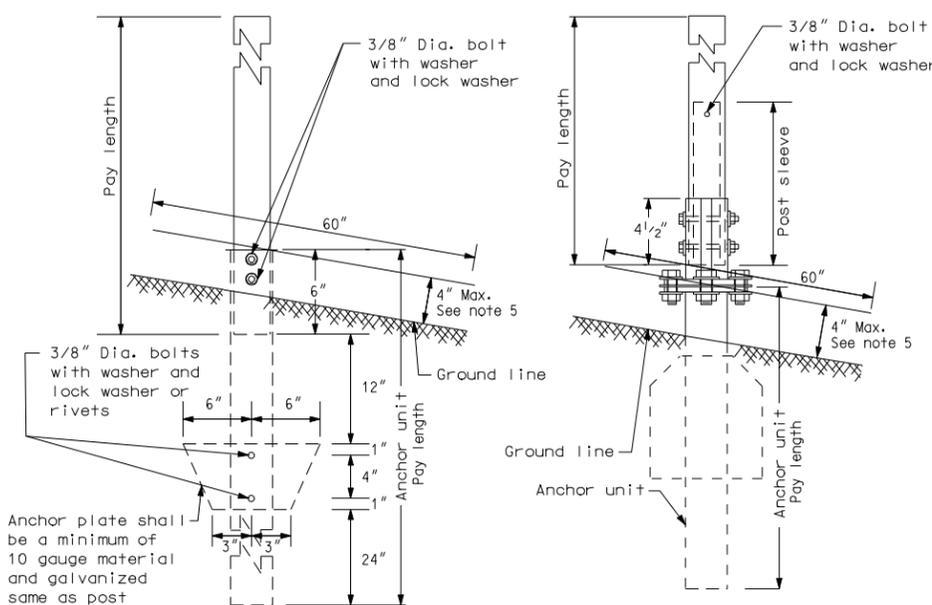
Road Type	Distance between signs min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by
 Roger Weigel
 Registration Number
 PE- 2930,
 on 8/22/12 and the original document is stored at the
 North Dakota Department
 of Transportation

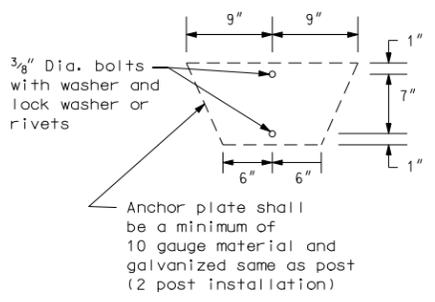
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

PERFORATED TUBE

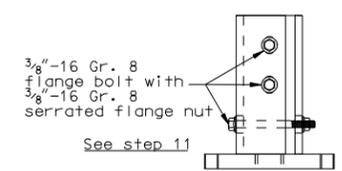


ANCHOR UNIT AND POST ASSEMBLY

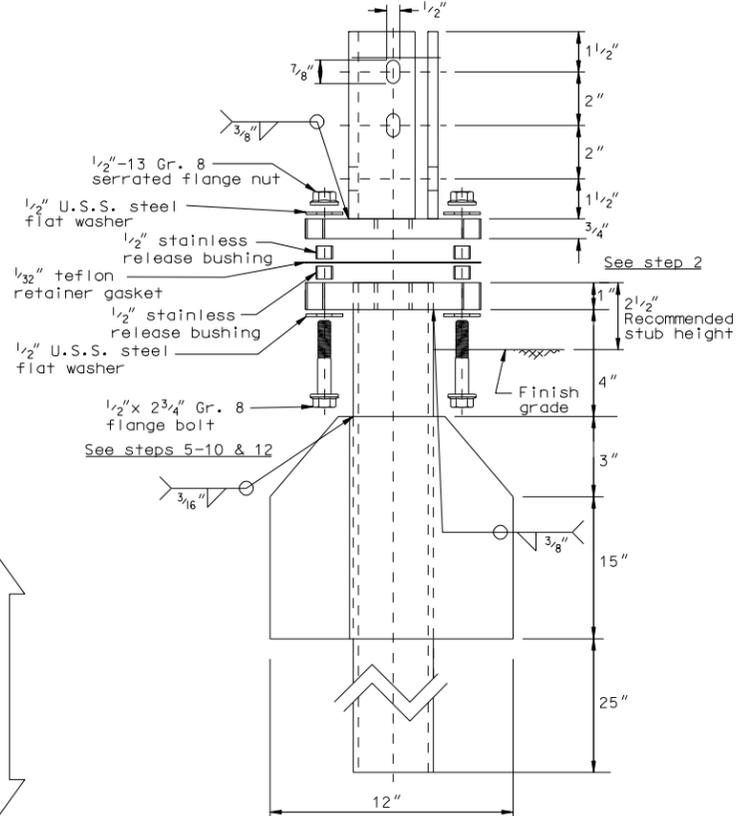
SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY



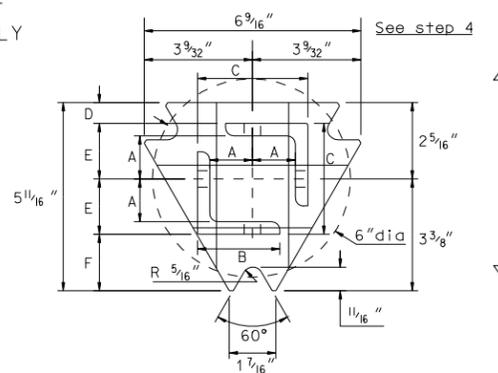
Anchor plate shall be a minimum of 10 gauge material and galvanized same as post (2 post installation)



See step 11



MULTI-DIRECTIONAL SLIP BASE ASSEMBLY

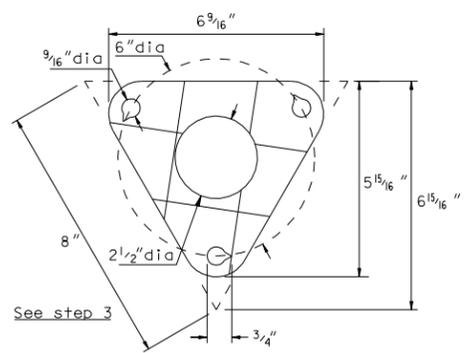


TOP POST RECEIVER

Materials: Plate - ASTM A572 grade 50
Angle receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle

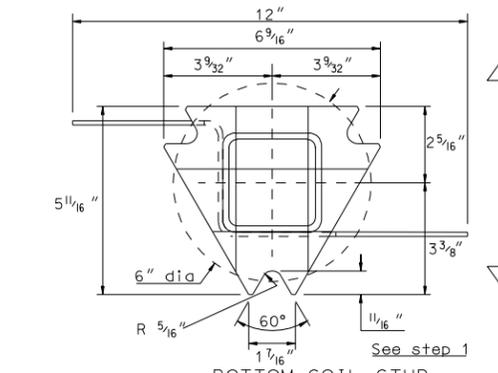
TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 3/64"	2 1/2"	3 1/32"	2 5/32"	1 3/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 3/32"	2 1/2"	3 5/16"	5/8"	1 2/32"	1 3/4"

2 3/16" x 10 gauge may be inserted into 2 1/2" x 10 gauge for additional wind load.



BOLT RETAINER FOR BASE CONNECTION
Materials: 1/32" reprocessed Teflon

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave 2 1/2" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each 1/2" flat washer on to 1 each inverted 1/2"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading 1/2"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each 3/8"-16 gr. 8 flange bolts and 3 each 3/8"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three 1/2"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.



BOTTOM SOIL STUB
Materials: Tube - 3" x 3" x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50

- Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
 2. The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.
 3. Anchor for 2", 2 1/4", and 2 1/2" posts.
 4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
 5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
 6. When used in concrete sidewalk, anchor shall be the same except without the wings.
 7. Four post signs shall have over 8' between the first and fourth posts.

Number of Posts	Telescoping Perforated Tube					
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			B	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	10			Yes	
2	2 1/4	12	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

B - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. 4	Cross Sect. Area In. 2	Section Modulus In. 3
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

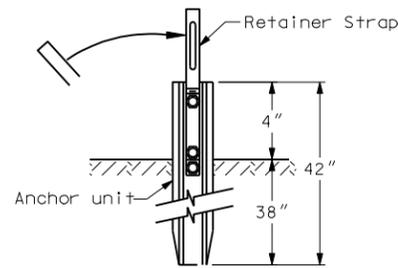
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

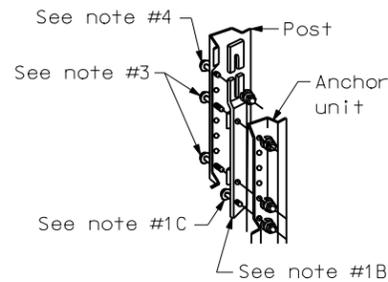
FLANGED CHANNEL



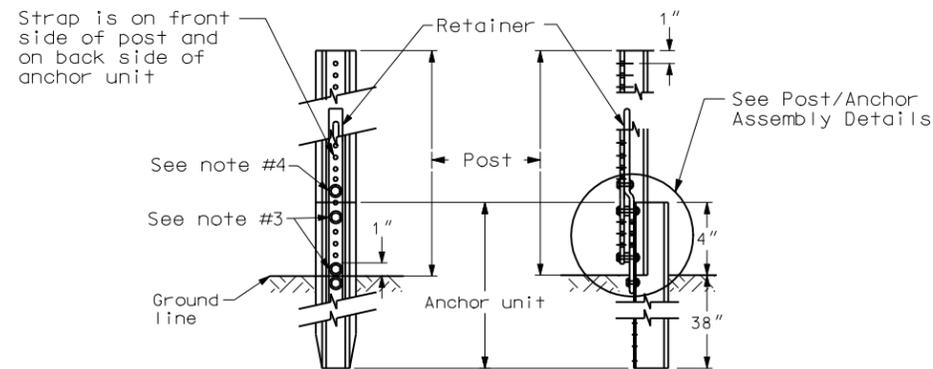
Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

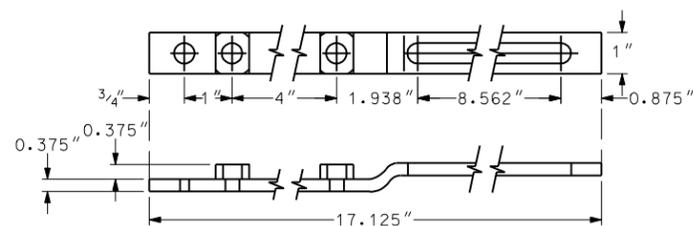
1. A) Drive anchor unit to within 12" of ground level.
B) Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C) Assemble strap to back of anchor unit using 3/8"-16 UNC x 2.0" long bolt, lock washer and nut.
D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4" dimension.
B) Rotate strap to vertical position.
3. A) Place 3/8"-16 UNC x 2" bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4" slot in the strap).
B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8"-16 UNC x 2" long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap and sign post at the bolts have full contact across the entire width.



Post/Anchor Assembly Details



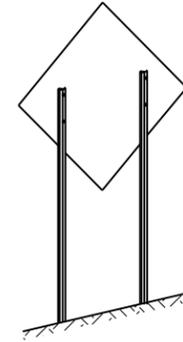
Front View Side View Sign Post Assembly Detail



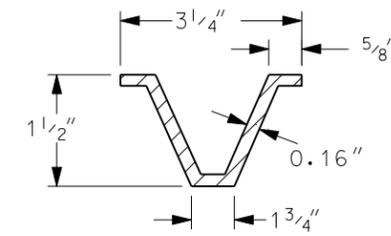
Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560

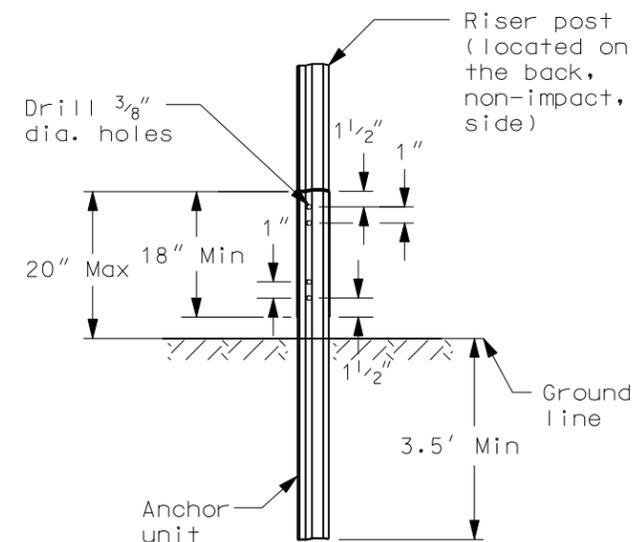
3 LB/FT U POSTS



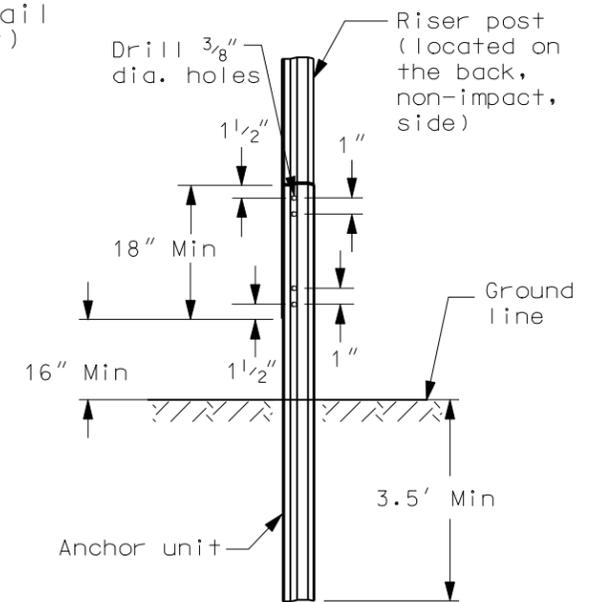
Typical Installation



U-Post Detail (3 lb/ft)



U-Channel Splice Option 1



U-Channel Splice Option 2

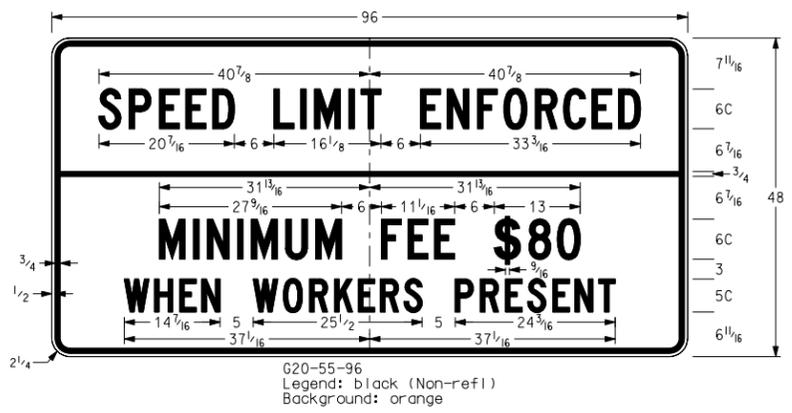
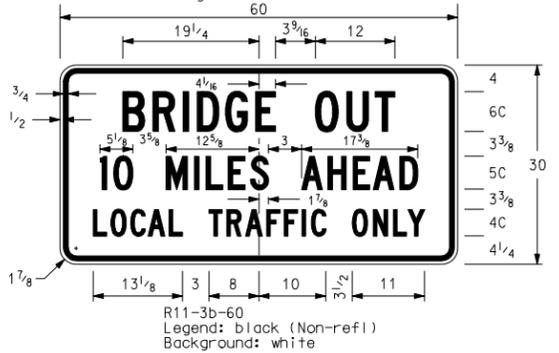
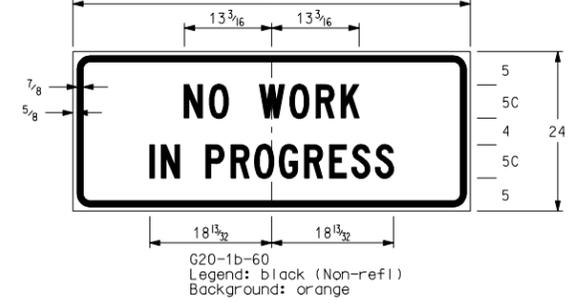
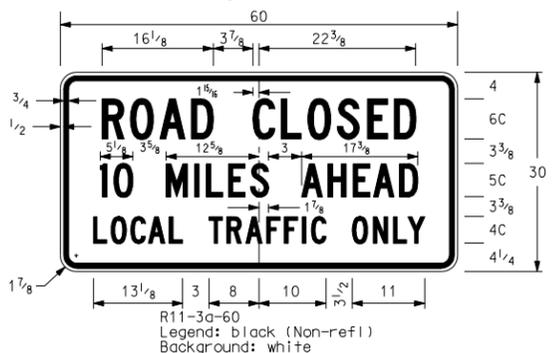
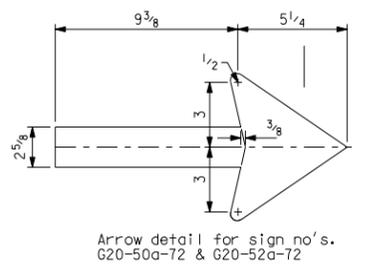
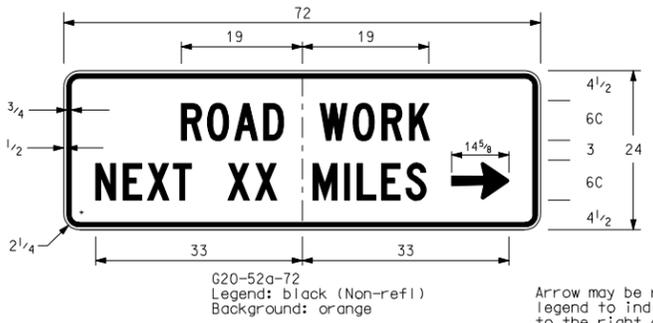
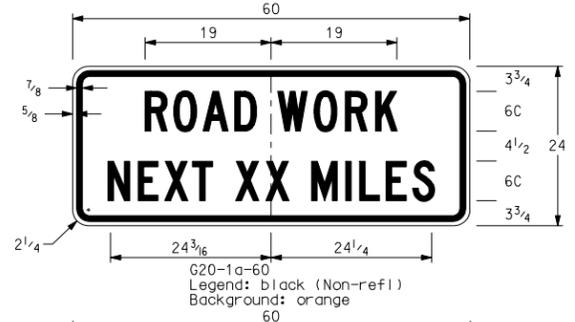
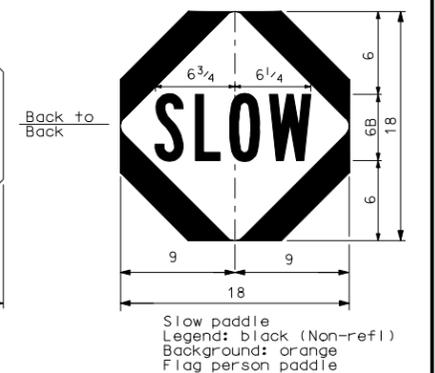
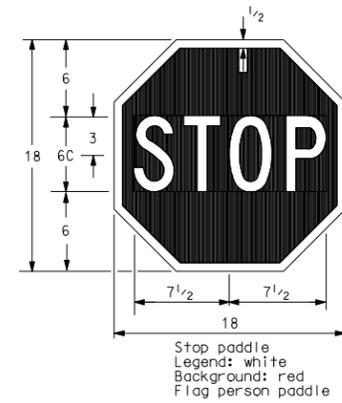
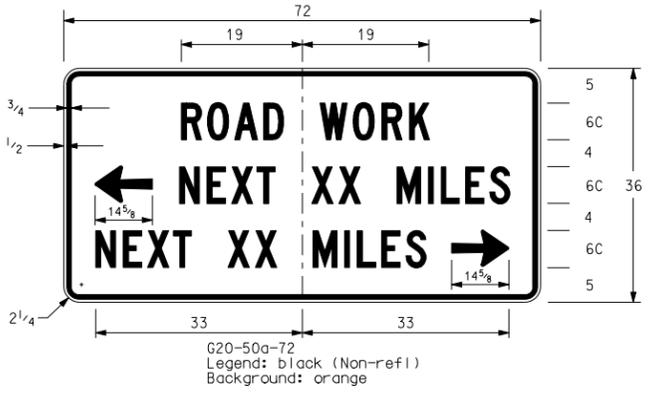
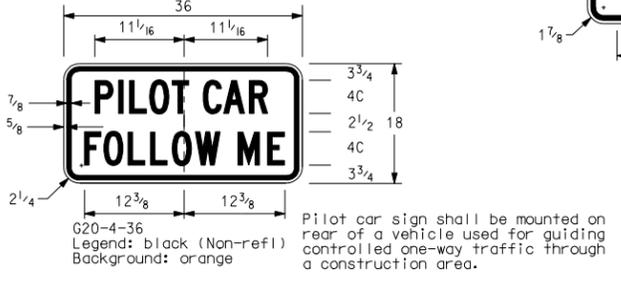
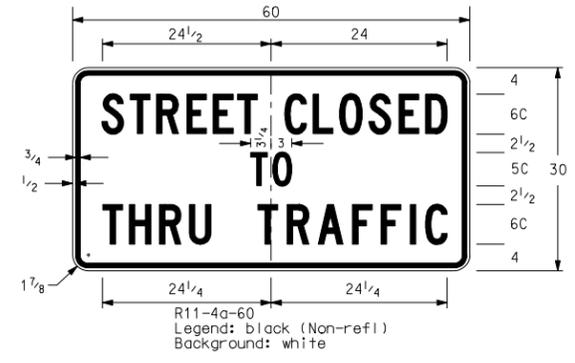
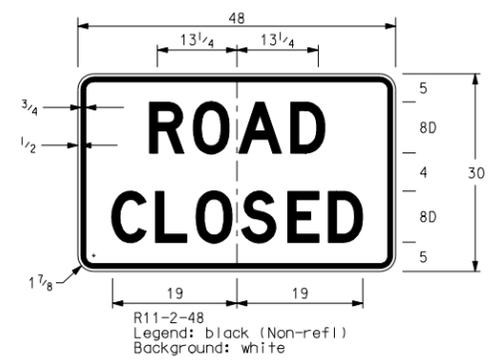
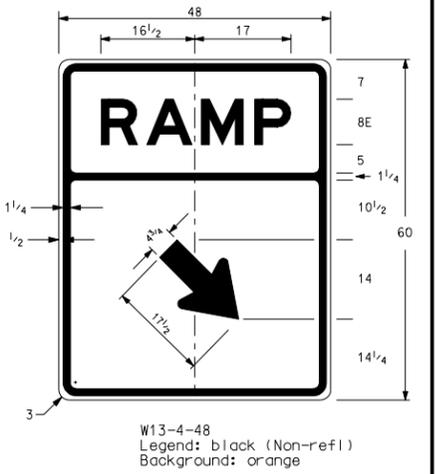
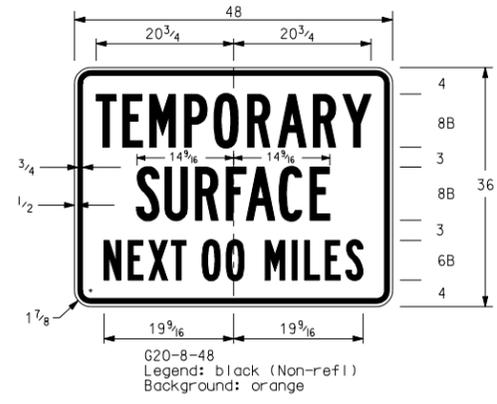
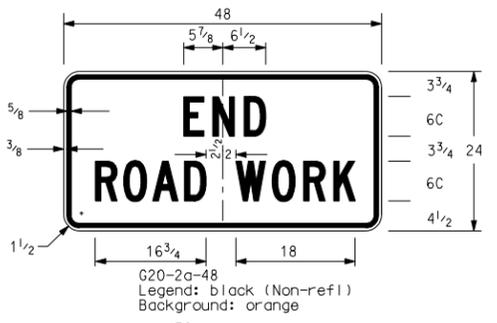
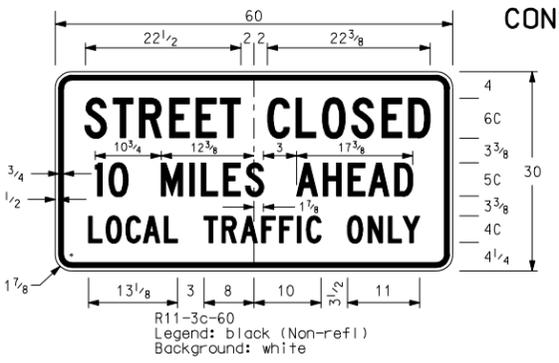
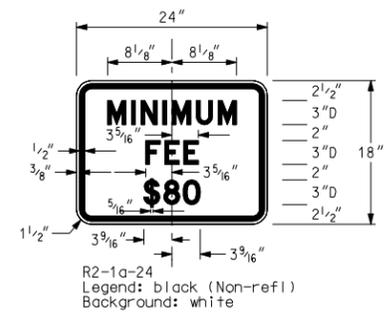
Notes

1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7' long and embedded at least 3.5'.
3. A splice shall overlap a minimum of 18".
4. Use 4 bolts 5/16" diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4" above ground and embedded at least 3.5'.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

This document was originally issued and sealed by MARK S GAYDOS Registration Number PE-4518, on 06/29/05 and the original document is stored at the North Dakota Department of Transportation

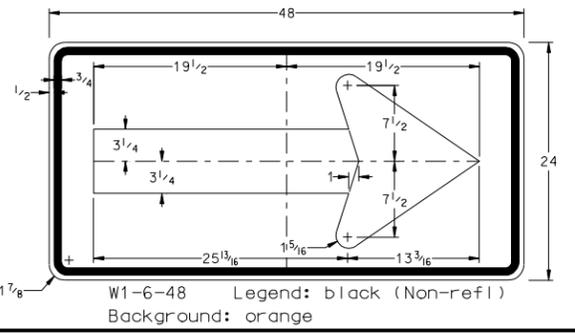
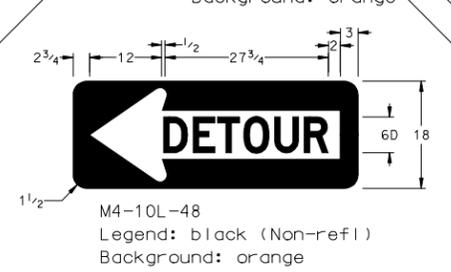
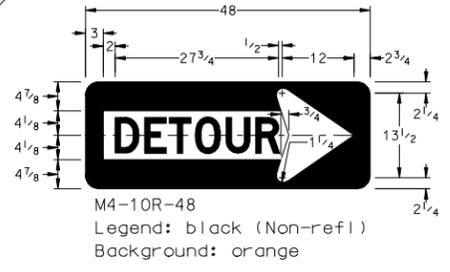
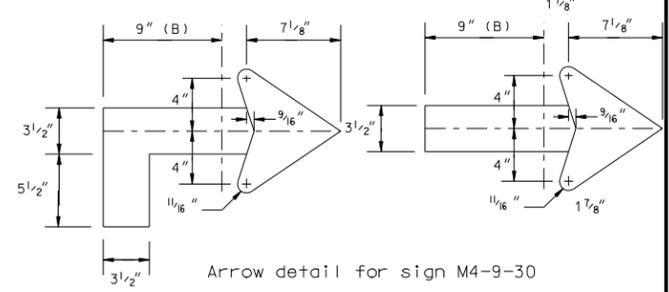
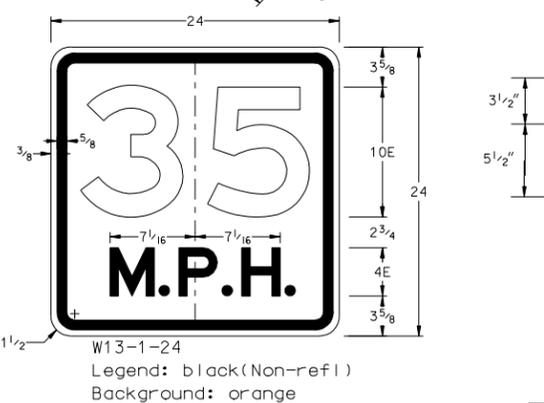
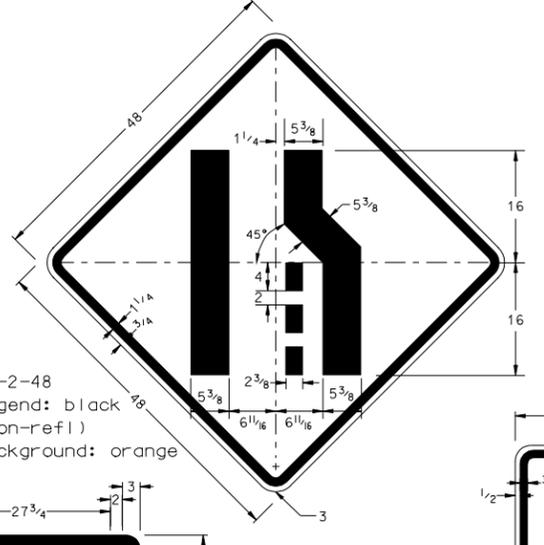
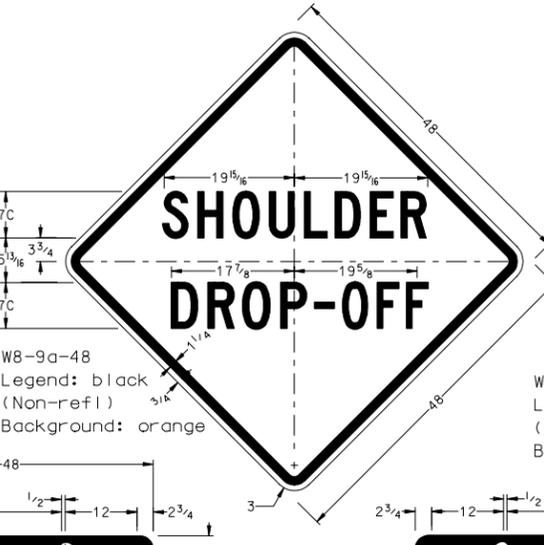
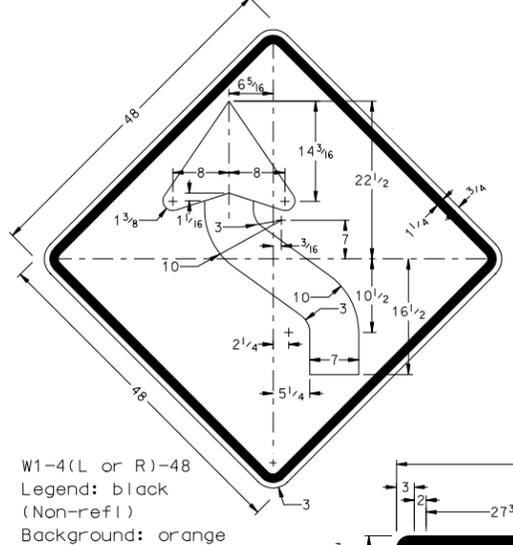
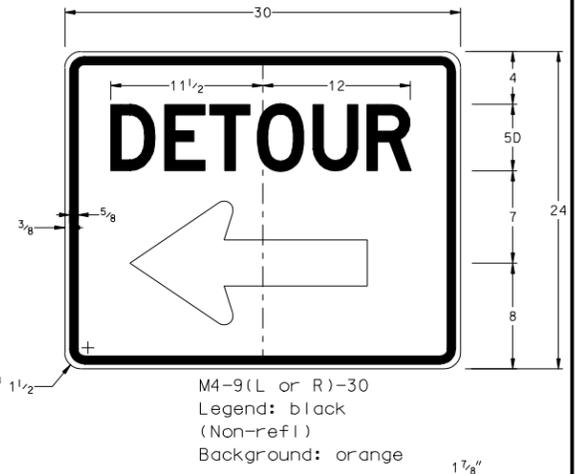
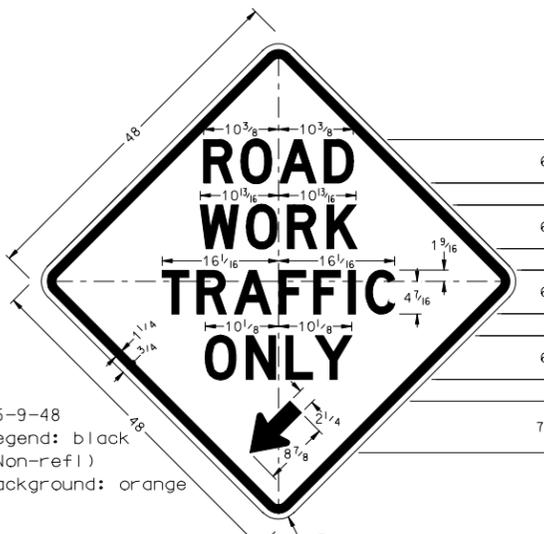
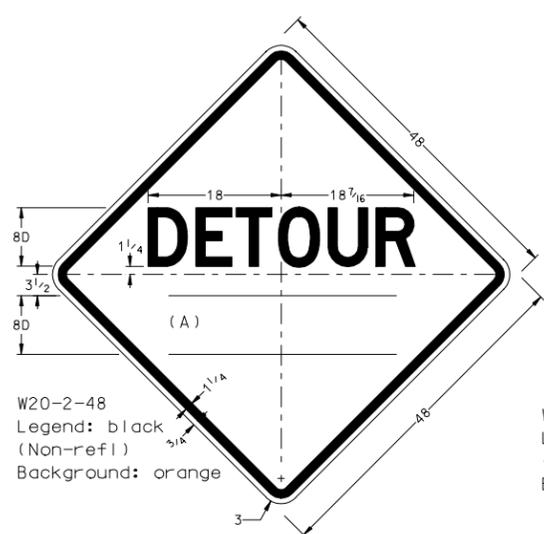
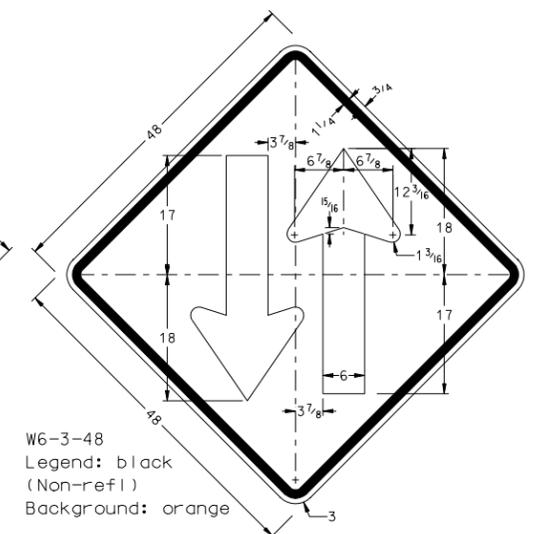
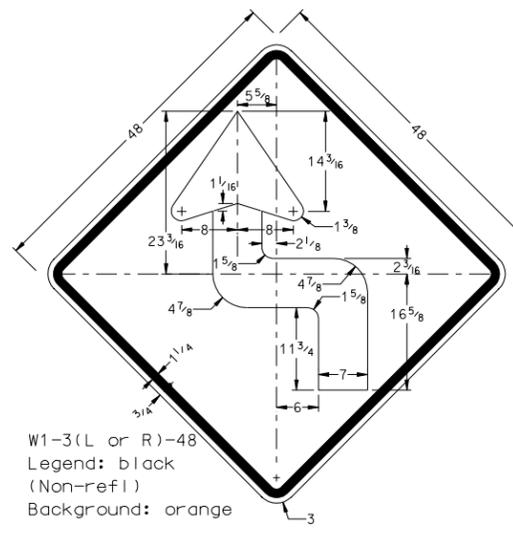
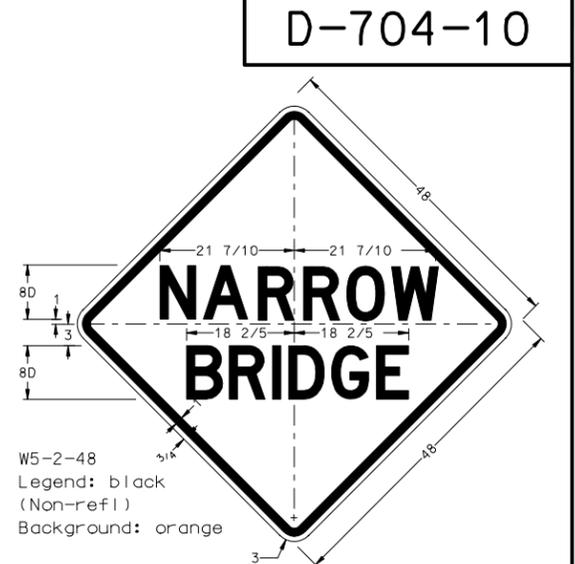
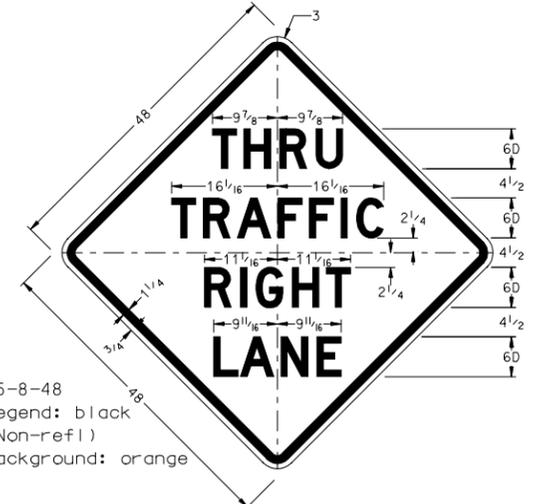
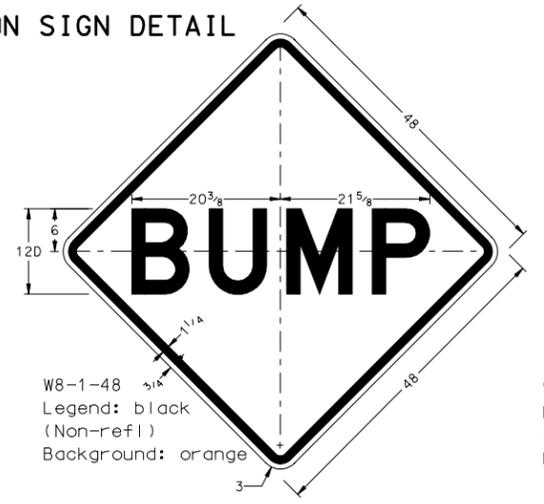
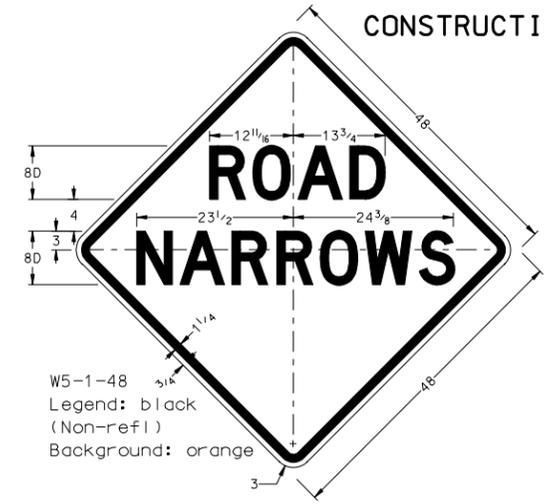
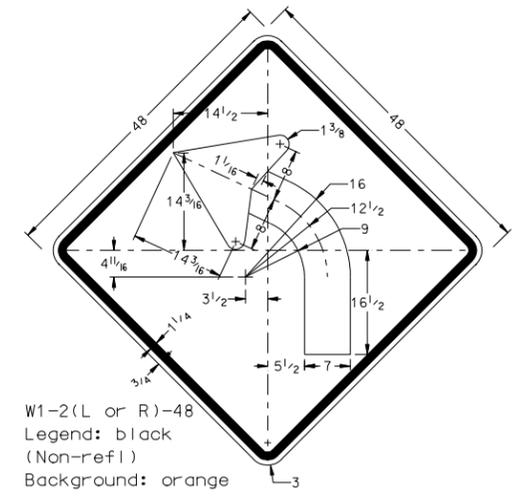
CONSTRUCTION SIGN DETAILS



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
05-01-92	General revision
07-26-95	Added signs G20-1a, G20-50a, R2-1a
03-04-96	Remove G20-2-60
10-18-01	G20-1b-60
01-30-03	Pavement end sign
07-25-04	Revised Fee Sign
04-01-04	Revised G20-55-96 sign
08-04-04	Deleted W8-3-48, Added Slow paddle
12-01-04	PE stamp added
07-11-05	Revised G20-4

This document was originally issued and sealed by Mark S Gaydos, Registration Number PE-4518, on 07/11/05 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAIL

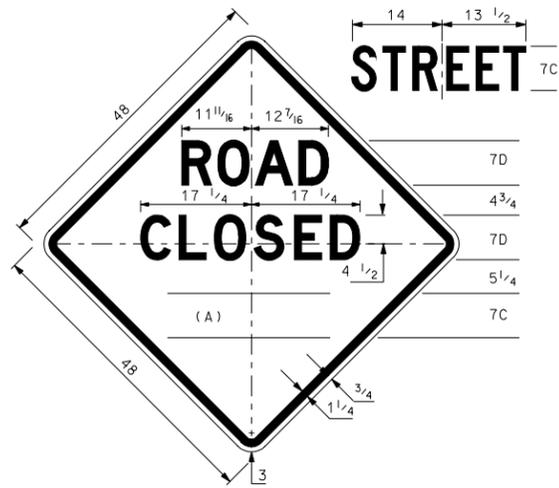


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Detour no.
12-01-88	Shoulder drop off
05-01-88	General revisions
02-03-95	W8-9a-48
03-04-96	Remove W20-1-48
05-01-00	W5-8-48, W5-9-48
11-07-00	Add W5-2-48
01-06-04	W4-9-30 to M4-9-30
08-04-04	add arrow detail
12-01-04	General revisions
07-11-05	PE stamp added
	Revised W8-9a and W4-2

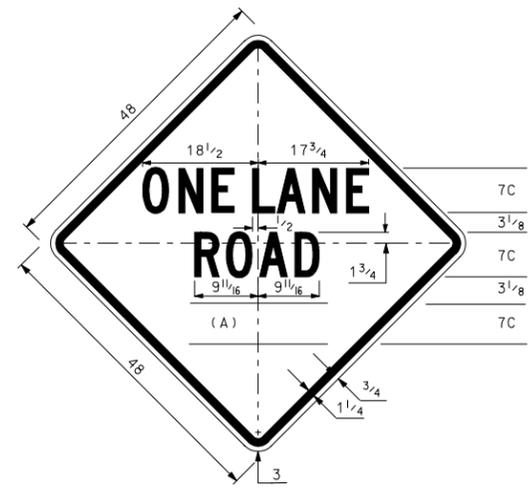
This document was originally issued and sealed by Mark S Gaydos, Registration Number PE-4518, on 07/11/05 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAIL

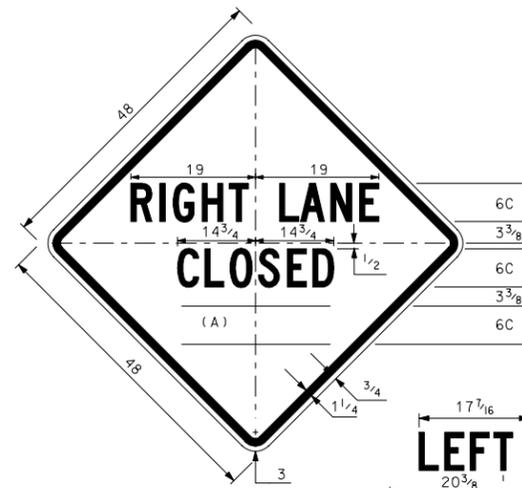
D-704-11



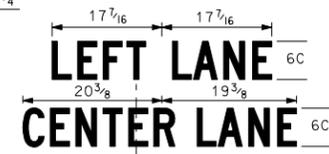
W20-3-48
Legend: black
(Non-refl)
Background: orange



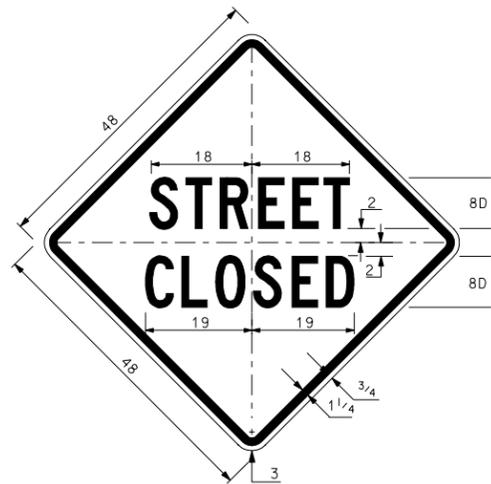
W20-4-48
Legend: black
(Non-refl)
Background: orange



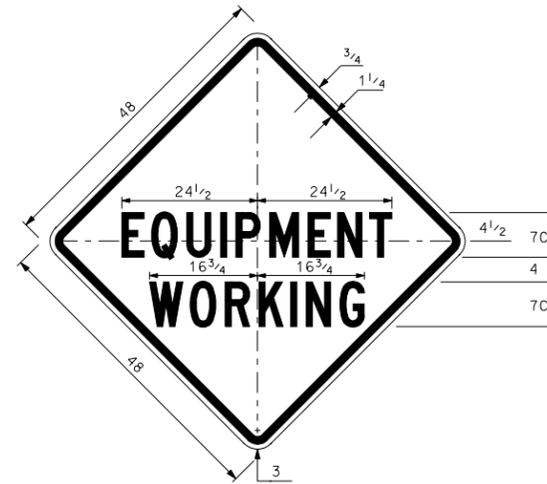
W20-5-48
Legend: black
(Non-refl)
Background: orange



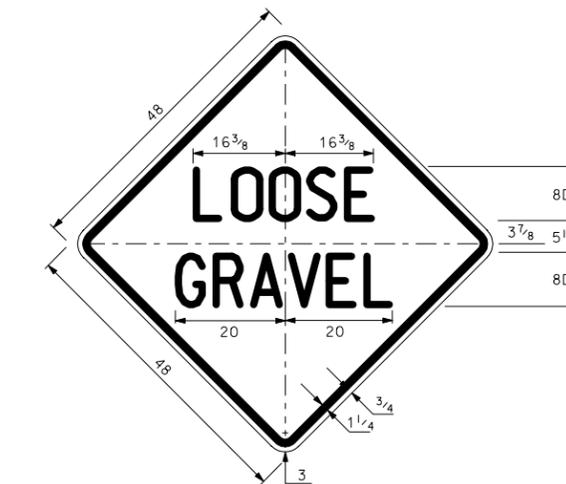
W20-7a-48
Legend: black
(Non-refl)
Background: orange



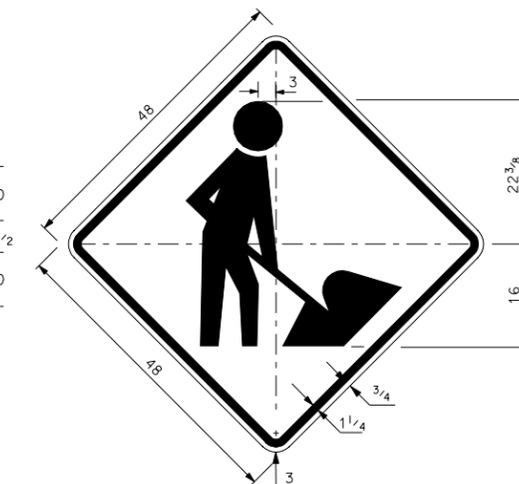
W20-8-48
Legend: black
(Non-refl)
Background: orange



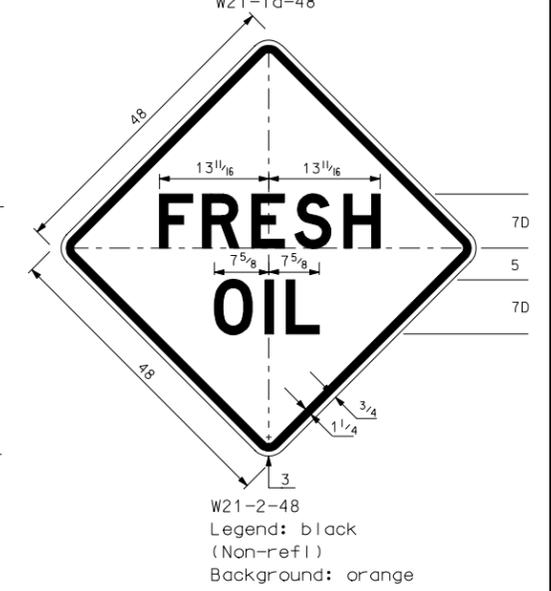
W20-51-48
Legend: black
(Non-refl)
Background: orange



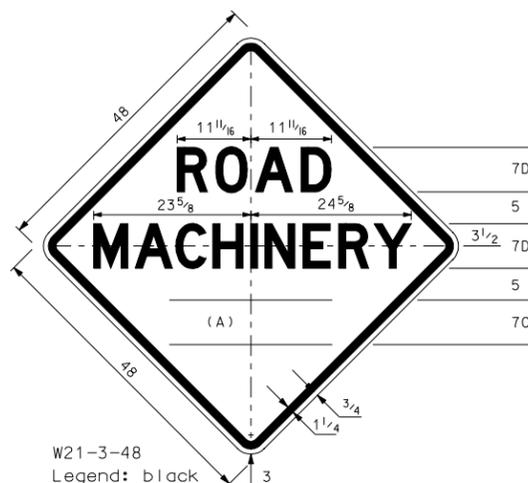
W8-7-48
Legend: black
(Non-refl)
Background: orange



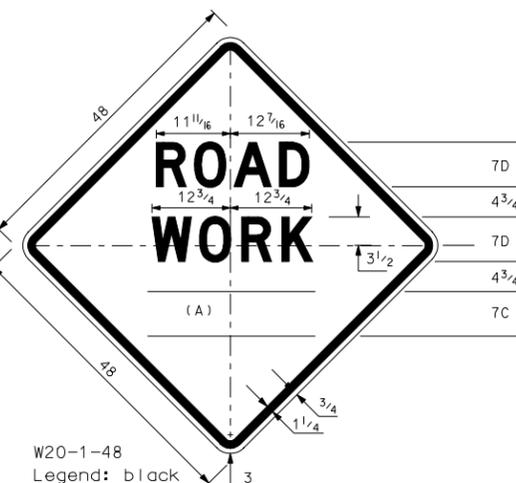
W21-1a-48
Legend: black
(Non-refl)
Background: orange



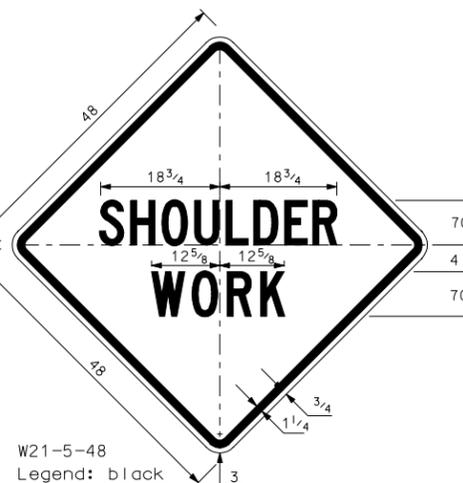
W21-2-48
Legend: black
(Non-refl)
Background: orange



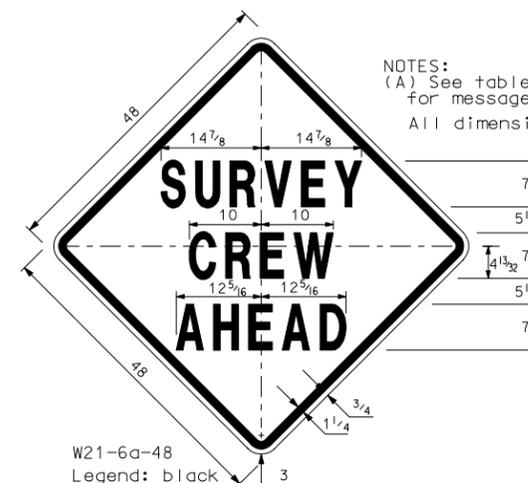
W21-3-48
Legend: black
(Non-refl)
Background: orange



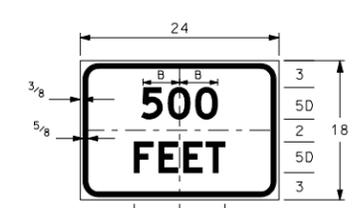
W20-1-48
Legend: black
(Non-refl)
Background: orange



W21-5-48
Legend: black
(Non-refl)
Background: orange



W21-6a-48
Legend: black
(Non-refl)
Background: orange



W20-7k-24
Legend: black
(Non-refl)
Background: orange

SIGN	DIMENSION B (INCHES)
500'	6
1000'	7 3/8
1500'	7 3/8

For use with
W20-7a-48 &
W21-1a-48



W20-52-54
Legend: black
(Non-refl)
Background: orange

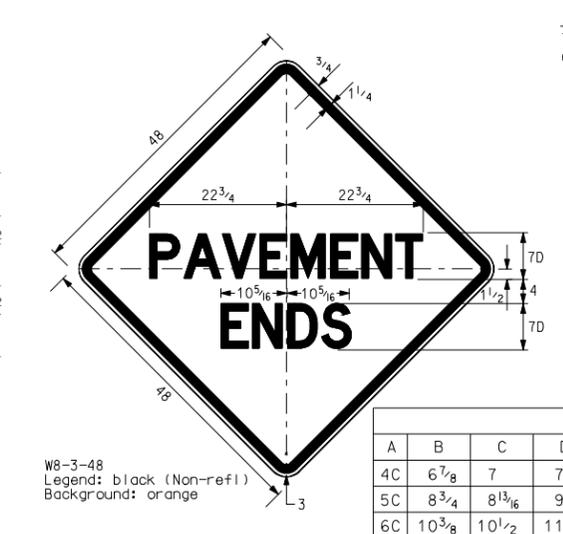
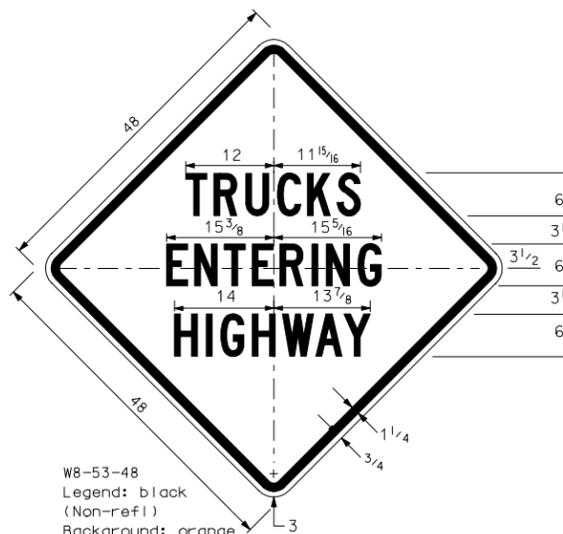
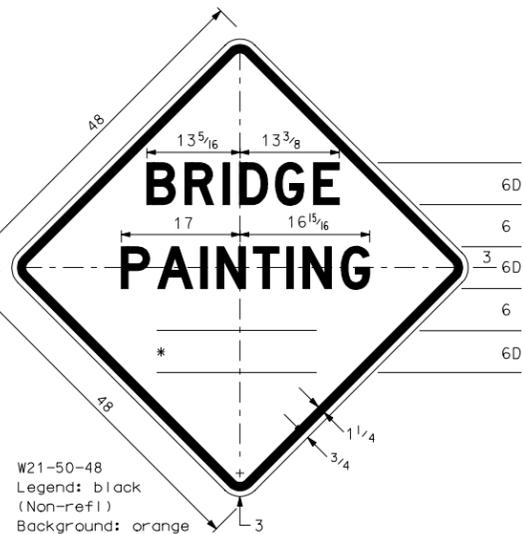
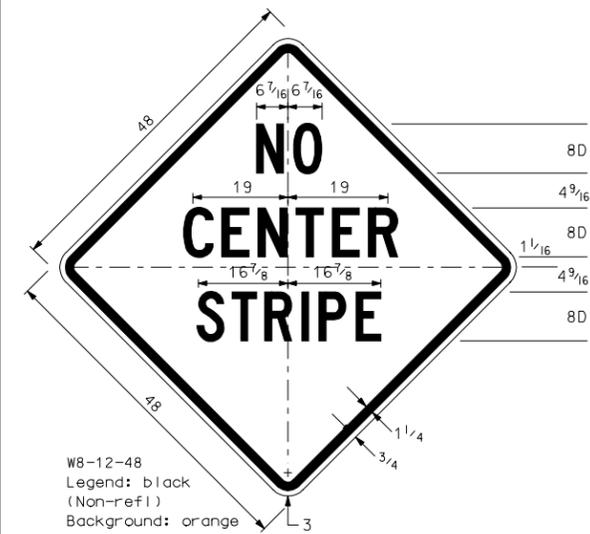
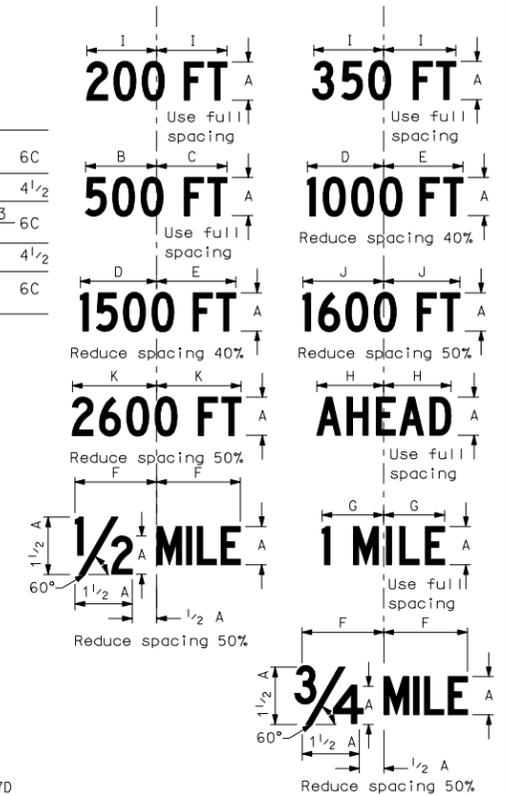
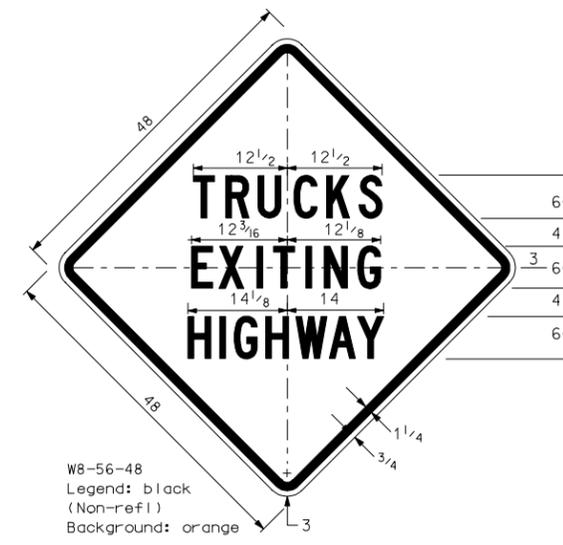
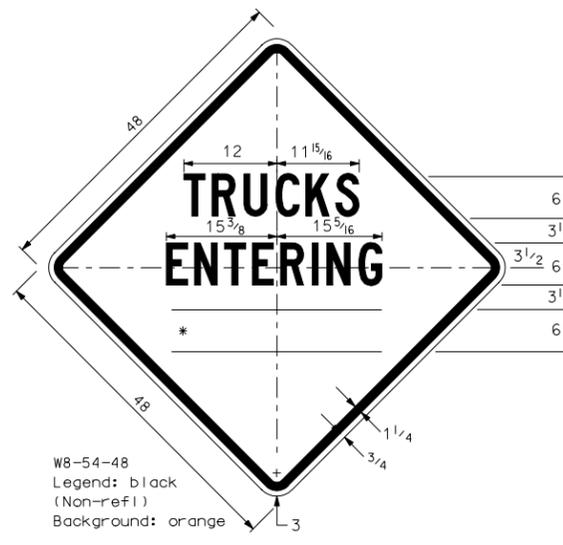
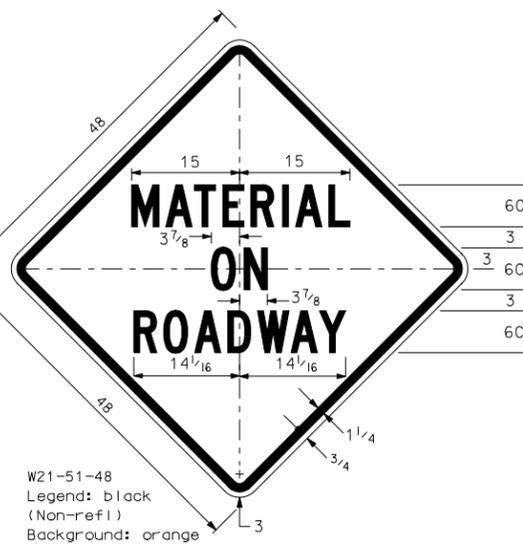
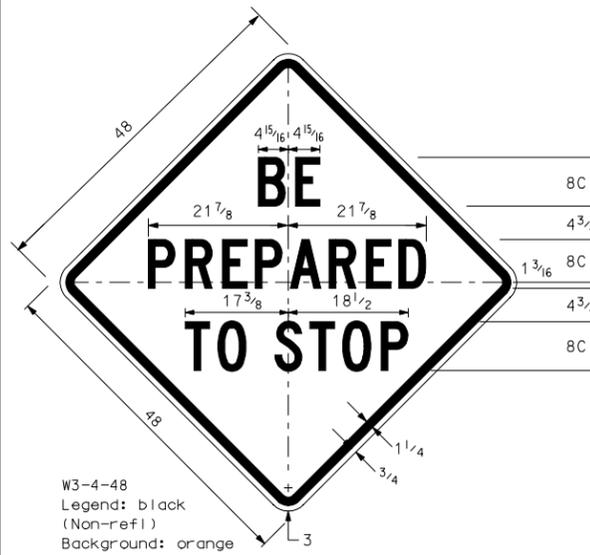
NOTES:
(A) See table on standard D-704-12
for messages and dimensions.
All dimensions are in inches

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 10-1-86	
REVISIONS	
DATE	CHANGE
05-01-92	General revisions
06-09-95	Chg 7D to 7C(Dwg W20-3, W21-3 & W21-4 Add W7-7-48 Rev W20-52-54 W21-6a-48
05-26-98	Rev W20-52-54
11-06-00	W21-6a-48
01-25-01	Rev W21-4 to W20-1
07-25-03	General revisions
08-05-04	PE stamp added
12-01-04	Revised W21-3, W20-1, W20-7a, W21-1a and W20-7k
07-11-05	

This document was originally issued and sealed by Mark S Gaydos, Registration Number PE-4518, on 07/11/05 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN DETAIL

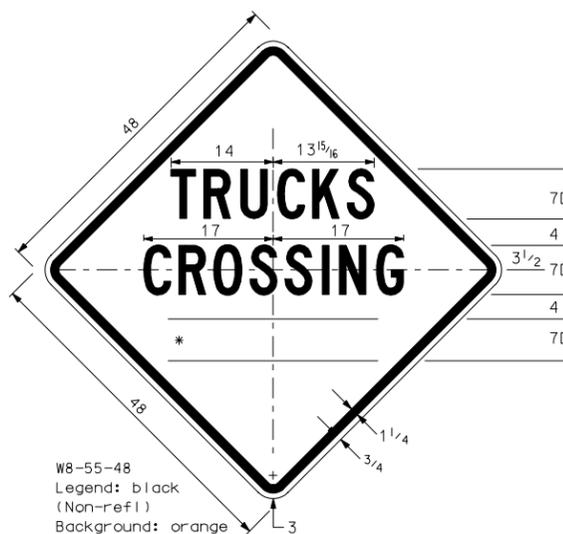
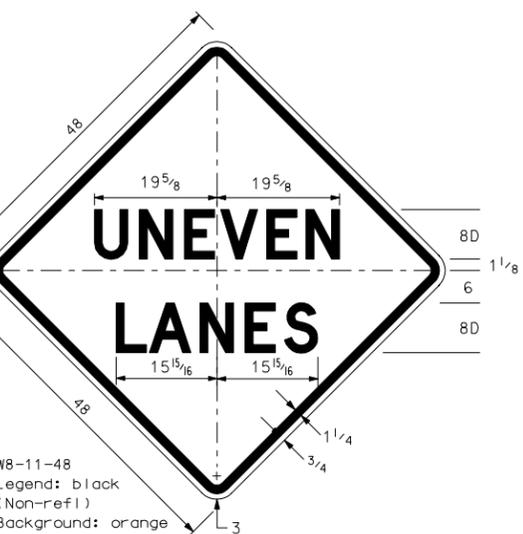
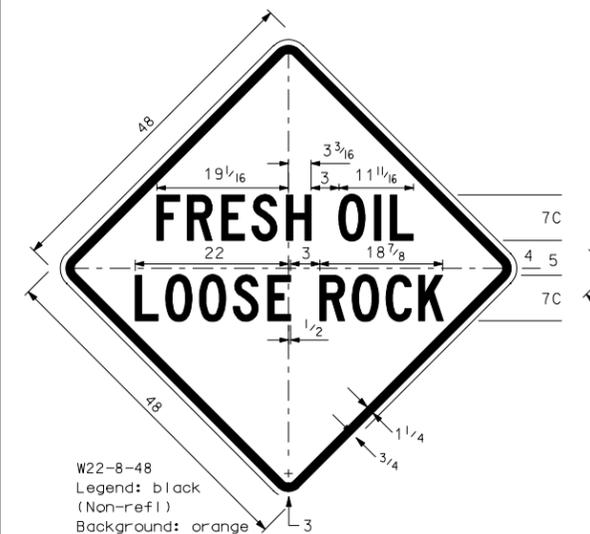
D-704-12



* DIMENSIONS (INCHES)

	A	B	C	D	E	F	G	H	I	J	K
4C	6 7/8	7	7 1/2	8	8 5/16	6 1/16	7	8 5/16	9 1/8	9 3/4	
5C	8 3/4	8 13/16	9 3/8	10	10 7/16	7 5/8	8 3/4	10 1/16	11 1/16	12 3/16	
6C	10 3/8	10 1/2	11 1/4	12	12 1/2	9 1/8	10 1/2	12 1/2	13 3/4	14 5/8	
7C	12	12 3/16	13 1/8	14	14 9/16	10 5/8	12 1/4	14 9/16	15	15 5/8	
8C	13 3/4	14	15	16	16 5/8	12 1/8	14	16 3/4	18 1/4	19 1/2	
4D	8 1/8	8 5/8	8 1/2	9	9	7 3/16	8 1/16	9 3/4	10 3/4	11 3/8	
5D	10 3/16	10 13/16	11 5/8	11 1/4	11 1/4	9 1/2	10 7/8	12 1/8	13 1/4	14 1/4	
6D	12 3/16	12 15/16	13 3/4	13 1/2	13 1/2	11 13/16	13 1/8	14 9/16	14 7/8	15 1/2	
7D	14 1/4	15 1/8	14 7/8	15 3/4	15 3/4	13 1/16	15 1/2	15 1/8	15 1/2	16 1/8	
8D	16 1/4	17 1/4	17	18	18	14 3/8	17 7/16	19 1/4	17 3/4	19 5/16	

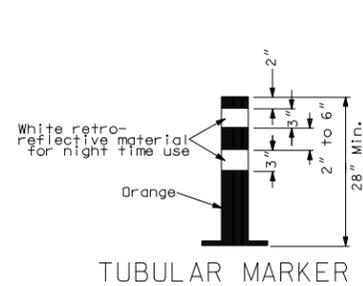
Standard signs that are shown in the construction sign and barricade location details shall be fabricated in the shape, color, and dimensions as shown in the standard signs layout booklet.



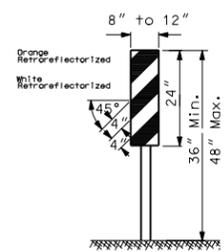
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
12-01-88	Uneven pavement
05-01-92	General revisions
01-24-95	W8-12-48
02-03-95	W8-11-48
06-15-95	General revisions
05-19-98	Added 3/4 mile
05-26-99	Added W8-56-48
08-05-04	Deleted slow paddle added W8-3-48
12-01-04	PE stamp added
07-11-05	Changed W20-7b to W3-4, Revised W8-11 and W8-12

This document was originally issued and sealed by Mark S Gaydos, Registration Number PE-4518, on 07/11/05 and the original document is stored at the North Dakota Department of Transportation

BARRICADE DETAILS AND CHANNELIZING DEVICES



TUBULAR MARKER



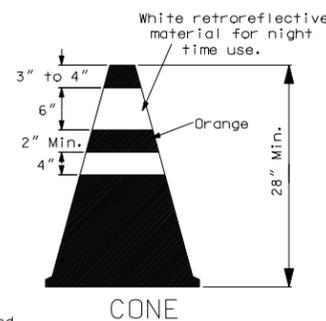
VERTICAL PANEL

(Retro-reflective sheeting shall be placed on both sides)
NOTE: Vertical panels used on the expressways or other high speed roadways shall be 12" by 24"

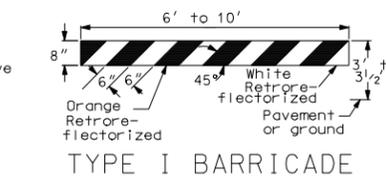


DELINEATOR DRUM
36" Min. height

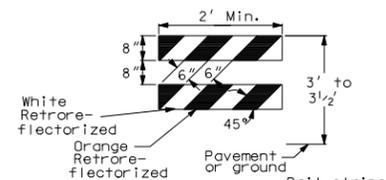
The markings on drums shall be orange and white stripes 4 to 6 inches wide. There shall be at least two orange and two white stripes. Where drums have ribs or indentations, there shall be no retro-reflective sheeting in this area. This space shall be no more than 2 inches wide. The drum surface shall be prepared as recommended by the sheeting manufacturer before retro-reflective sheeting is applied.



CONE

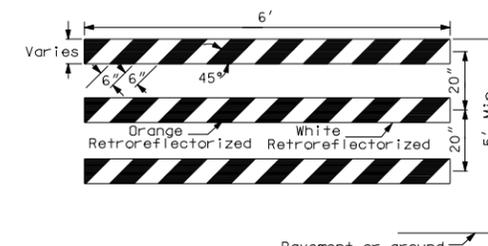


TYPE I BARRICADE



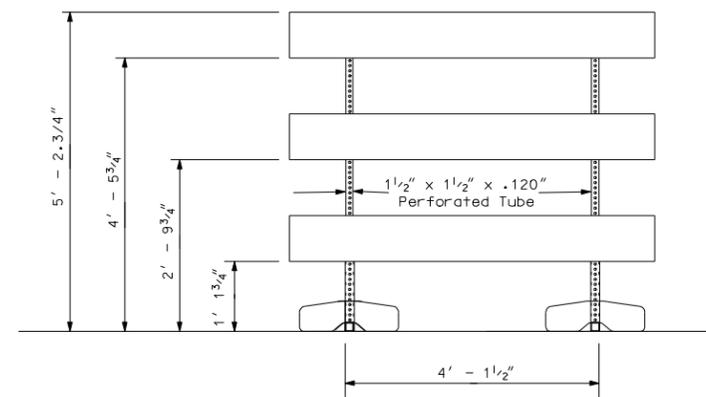
TYPE II BARRICADE

Rail stripe width shall be 4" if barricade length is less than 36".

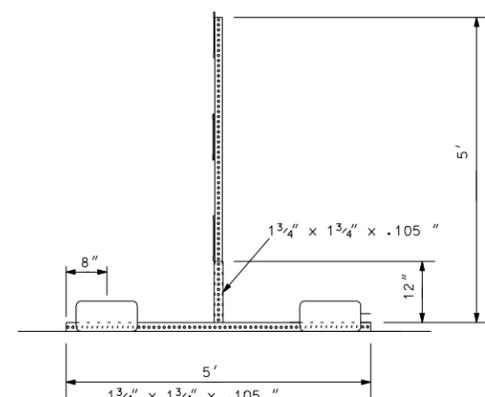


TYPE III BARRICADE

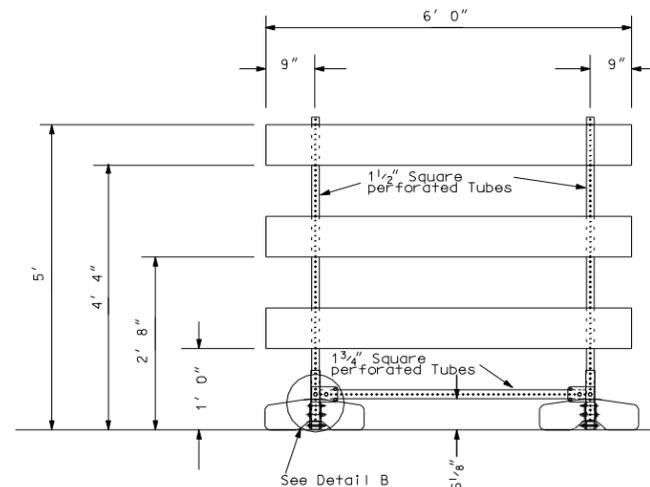
BARRICADES:
Number of retro-reflective rail faces:
Type I - 2 (One each direction)
Type II - 4 (Two each direction)
Type III - 6 (Three in each direction)



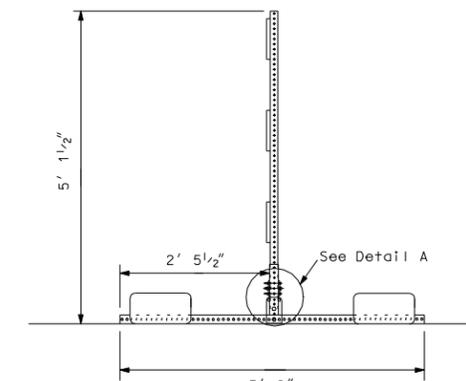
FRONT VIEW



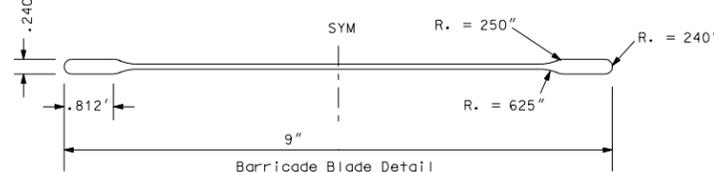
END VIEW



See Detail B



See Detail A



Barricade Blade Detail

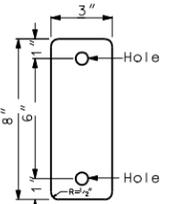
Ballast = 45lb sandbag at the end of each leg.
Barricade blade fastened to vertical supports with 2" corner bolts.
Vertical portion of leg is welded to horizontal portion on all four sides.
Masts slide inside vertical portion of legs. No bolts or fastenings devices used.

BARRICADE ASSEMBLY DETAIL
(Use when aluminum blade as detailed above)



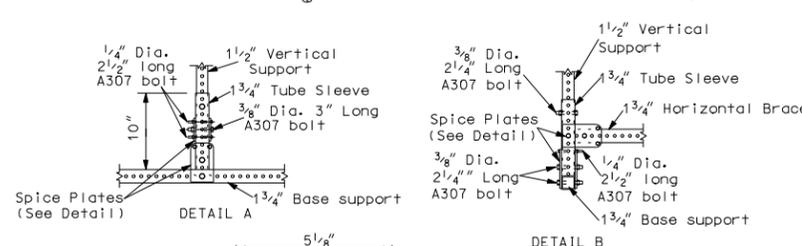
ACRYLIC PLASTIC REFLECTOR

Delineator reflector shall meet the requirements of section 894



DELINEATOR REFLECTOR

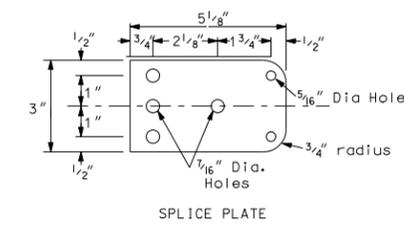
3"x8"- 18 Gauge galvanized steel sheet or 0.080" aluminum plate with white retro-reflective sheeting (Type 3A or 3B) as specified in section 894 of the Standard Specifications.



Splice Plates (See Detail)

DETAIL A

DETAIL B



SPLICE PLATE

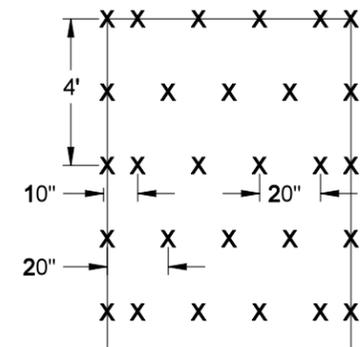
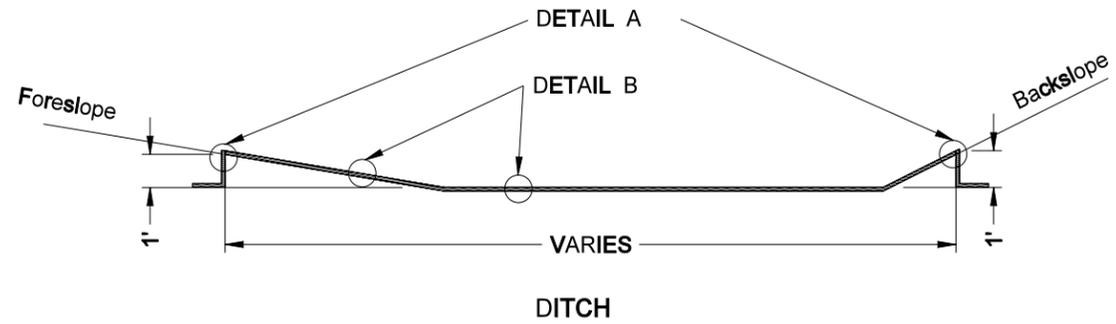
BARRICADE ASSEMBLY DETAIL
(Use when Plastic I-Beam w/ 1 1/2" Hollow Core Flanges or 1" x 8" x72" wood boards.)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Type sheeting
10-01-87	Delineator drum note
06-08-88	Barricade type III
06-01-92	General revision
06-10-93	General revision
09-23-93	Vertical panel
06-09-95	Reflective sheeting
03-01-02	Barricade type III assembly details
04-01-02	Type III barricade
12-01-04	PE stamp added
06-29-05	Revised Type II barricade stripe

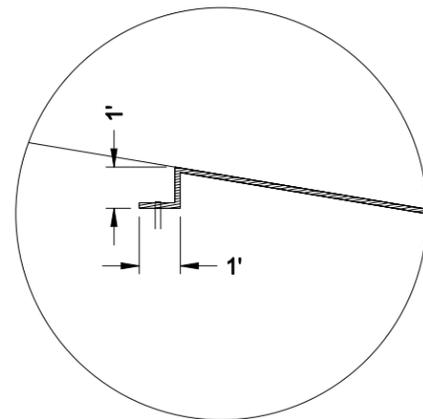
This document was originally issued and sealed by MARK S GAYDOS Registration Number PE-4518, on 06/29/05 and the original document is stored at the North Dakota Department of Transportation

EROSION AND SILTATION CONTROL BLANKET INSTALLATION

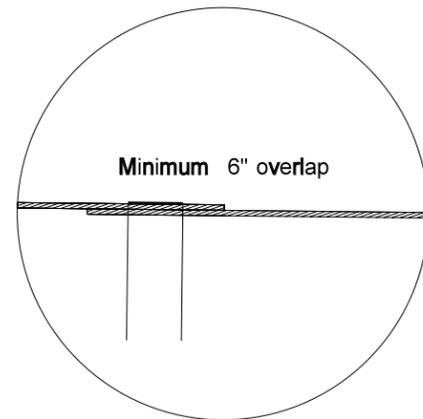
D-708-5



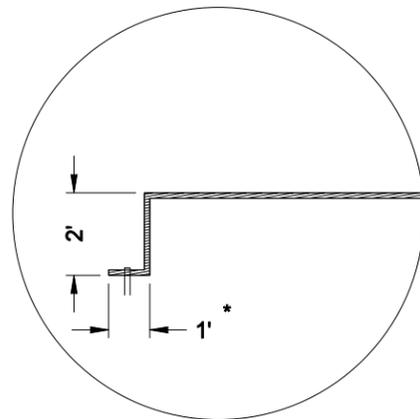
STAPLE PATTERN: 3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



DETAIL A

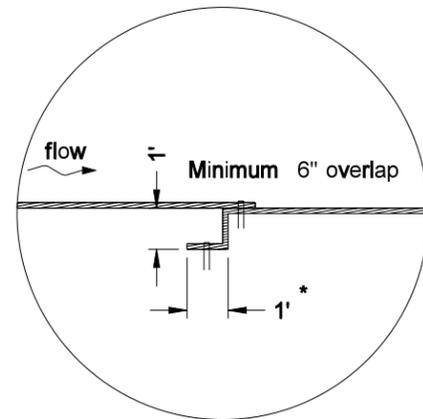


DETAIL B

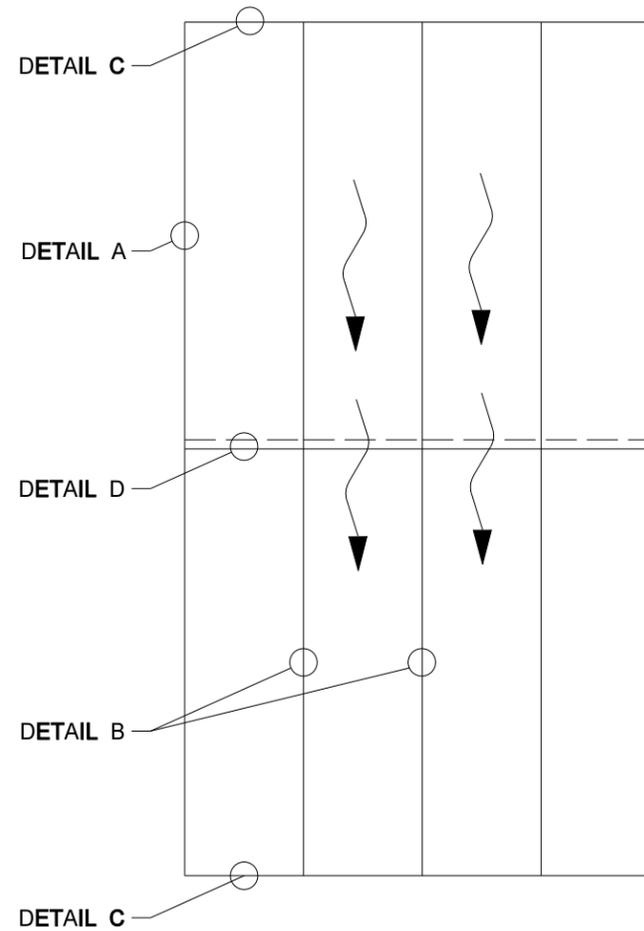


DETAIL C

* This tie may be placed ahead or back.

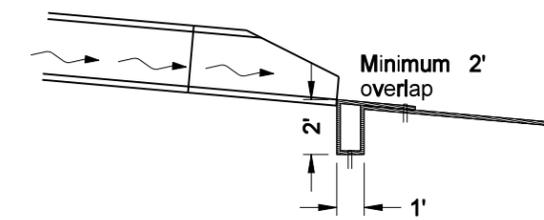


DETAIL D

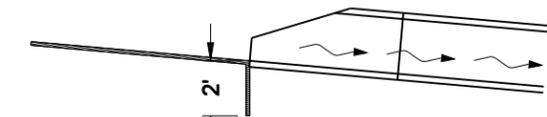


BLANKET LAYOUT

Note: Beginning and ending of erosion control blanket areas shall be installed as DETAIL C.



PIPE OUTLETS



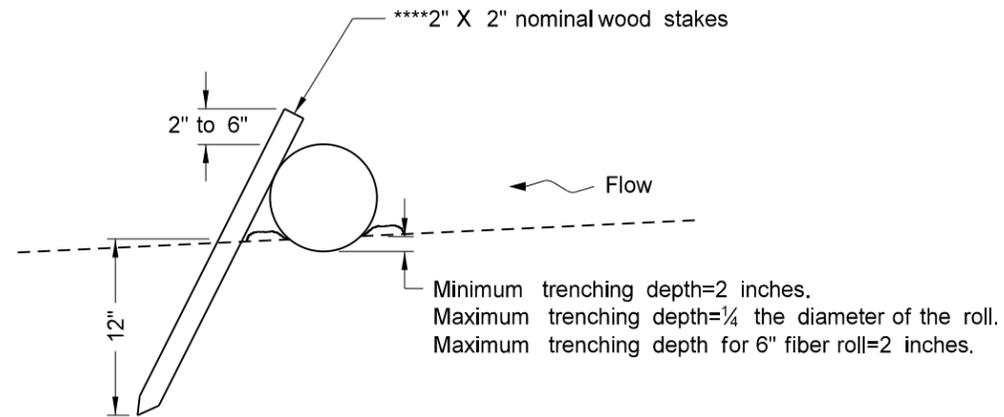
PIPE INLETS
INSTALLATION AT PIPE ENDS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-13-06	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by **MARK S. GAYDOS** Registration Number PE- 4518 , on 12/13/06 and the original document is stored at the North Dakota Department of Transportation

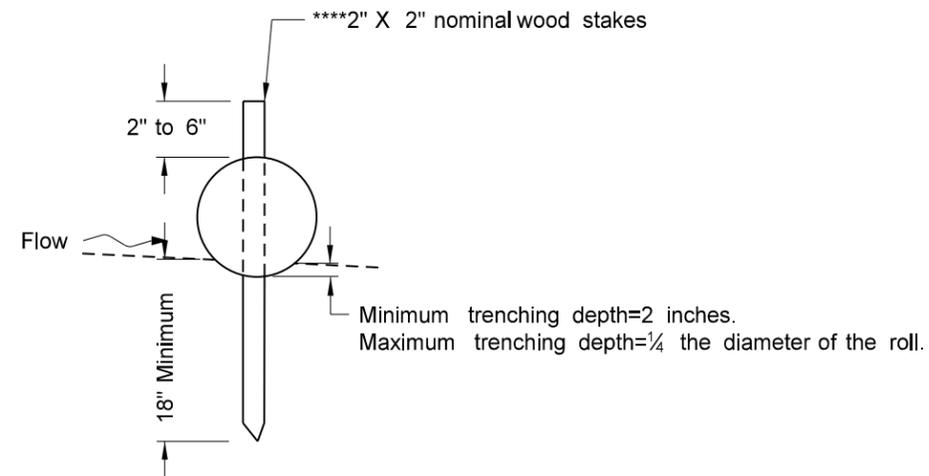
EROSION CONTROL
FIBER ROLL STAKING DETAILS

D-708-7



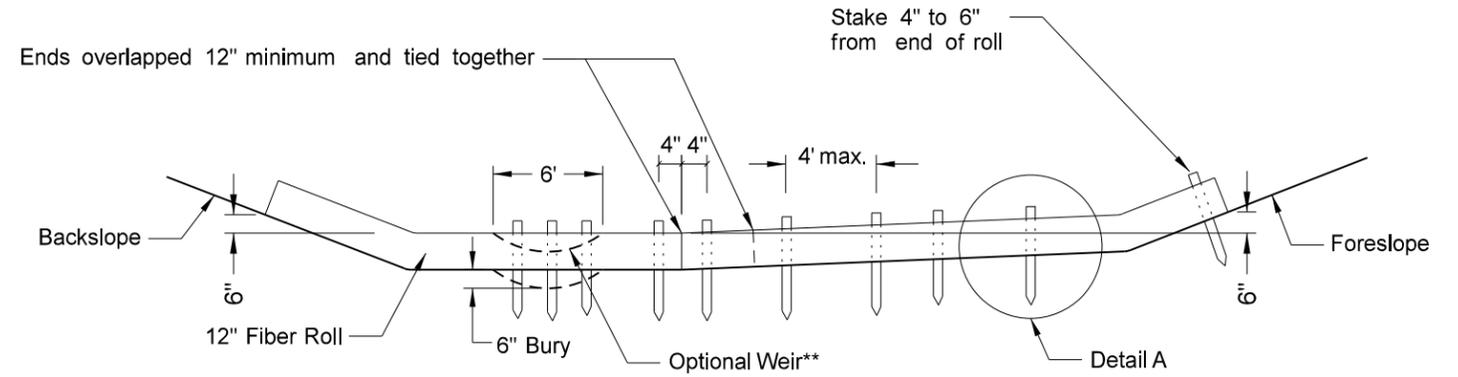
***DETAIL A**
6" or 12" Fiber Roll Staking Detail

*Manufacturer may require stake through center of fiber roll.
****Stakes spaced every 3-4 feet.



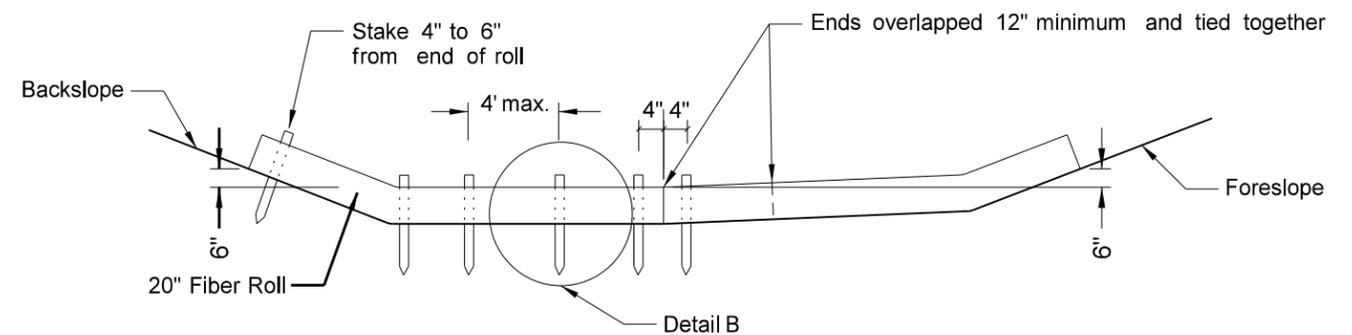
DETAIL B
20" Fiber Roll Staking Detail

NOTE: Runoff must not be allowed to run under or around roll.



**Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property.

12 INCH FIBER ROLL - DITCH BOTTOM



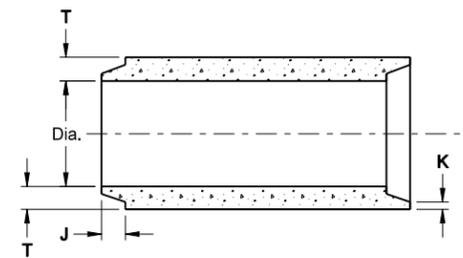
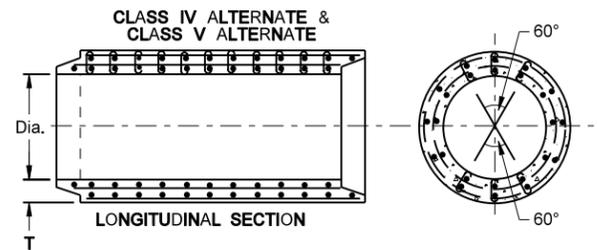
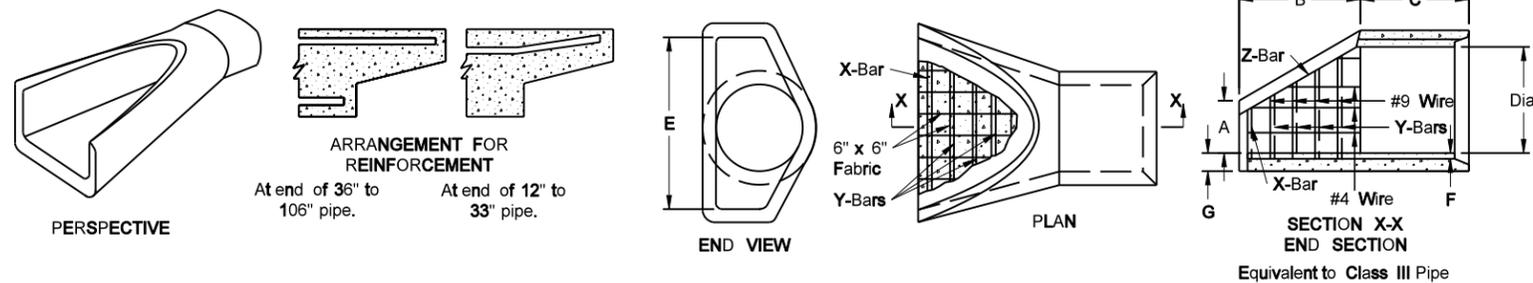
*****20 INCH FIBER ROLL - DITCH BOTTOM**

***Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE

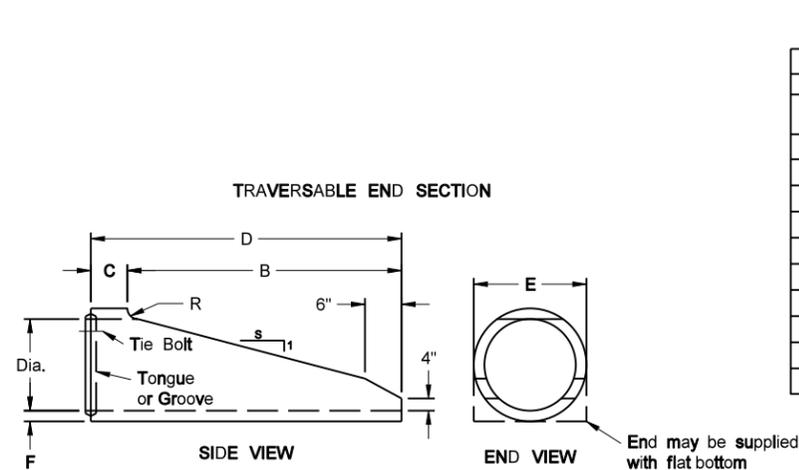
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 11/18/10 and the original document is stored at the North Dakota Department of Transportation

REINFORCED CONCRETE PIPE CULVERT AND END SECTIONS

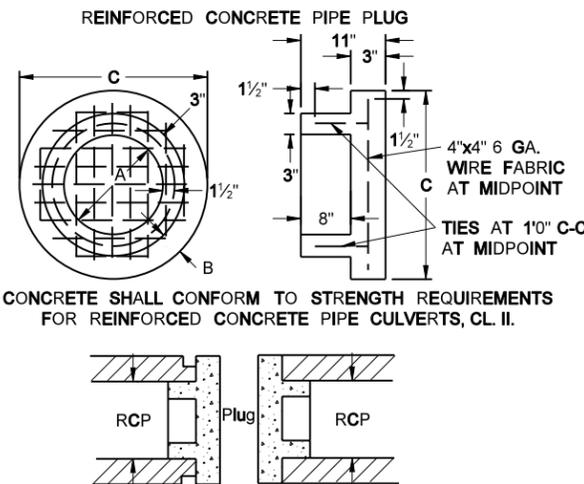


END SECTION										
TERMINAL DIMENSIONS							REINFORCING STEEL			
DIA	A	B	C	D	E	F	G	X	Y	Z
12	0'-4"	2'-0"	4'-0 1/2"	6'-0 1/2"	2'-0"	2"	2"	2-1/4" x 2'	6-1/4" x 2' @ 6" c.c.	2-1/4" x 4'
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 1/2"	2 1/2"	2-1/4" x 2 1/2'	6-1/4" x 2 1/2' @ 6" c.c.	2-3/8" x 4'
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2 1/2"	2 1/2"	2-3/8" x 3'	6-1/4" x 3' @ 6" c.c.	2-3/8" x 4'
21	0'-9"	3'-0"	3'-4 1/2"	6'-1 1/2"	3'-6"	2 1/2"	2 1/2"	2-3/8" x 3 1/2'	8-1/4" x 3 1/2' @ 6" c.c.	2-3/8" x 5'
24	0'-9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	3"	3"	2-1/2" x 4'	8-3/8" x 4' @ 8" c.c.	2-3/8" x 6'
27	0'-10 1/2"	4'-1 1/2"	2'-0"	6'-1 1/2"	4'-6"	3 1/2"	3 1/2"	2-1/2" x 5'	8-3/8" x 5' @ 9" c.c.	2-3/8" x 6'
30	1'-0"	4'-6"	1'-7 1/2"	6'-1 1/2"	5'-0"	3 1/2"	3 1/2"	2-1/2" x 5'	12-3/8" x 5' @ 8" c.c.	2-1/2" x 6'
36	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	4"	4"	2-1/2" x 6'	12-3/8" x 6' @ 6" c.c.	2-1/2" x 8'
42	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	4 1/2"	4 1/2"	2-1/2" x 7'	12-1/2" x 7' @ 9" c.c.	2-1/2" x 8'
48	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	5"	5"	2-1/2" x 8'	16-1/2" x 8' @ 8" c.c.	2-1/2" x 8'
54	2'-3"	6'-6"	2'-9 1/4"	8'-2 1/4"	7'-6"	5 1/2"	5 1/2"	2-1/2" x 8'	16-1/2" x 8' @ 7" c.c.	2-1/2" x 8'
60	2'-11"	6'-0"	3'-3"	8'-3"	8'-0"	6"	5"	2-1/2" x 9'	16-1/2" x 9' @ 6" c.c.	2-1/2" x 9'
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	6 1/2"	5 1/2"	2-1/2" x 9'	22-1/2" x 9' @ 6" c.c.	2-1/2" x 9'
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"	6"	2-1/2" x 10'	24-1/2" x 10' @ 6" c.c.	2-1/2" x 9'
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	7 1/2"	6 1/2"	2-1/2" x 10'	28-1/2" x 10' @ 6" c.c.	2-1/2" x 10'
84	3'-0"	7'-6 1/2"	1'-9"	9'-3 1/2"	10'-0"	8"	6 1/2"	4-1/2" x 10'	28-1/2" x 10' @ 6" c.c.	4-1/2" x 10'
90	3'-5"	7'-3 1/2"	2'-0"	9'-3 1/2"	11'-0"	8 1/2"	6 1/2"	4-1/2" x 11'	28-1/2" x 11' @ 6" c.c.	4-1/2" x 10'

Internal Dia. of pipe in inches	Cross-Sectional Water Area	Weight per lin. foot of pipe, lbs.	Joint J Groove, Min. Max.	Joint K Tongue, Min.	Minimum Wall Thickness (T)	CLASS IV ALTERNATE						CLASS V ALTERNATE							
						D-LOAD TO PRODUCE A 0.01 INCH CRACK													
						2000						3000							
						D-LOAD TO PRODUCE ULTIMATE LOAD													
3000						3750													
5000 P.S.I.												5000 P.S.I.							
			Inner Cage			Ellip Cage			Outer Cage			Shear Steel			Height of Fill Normal Backfill				
			Ai	Ae	Ao	N	S	Ar											
			Sq. in	Sq. in	Sq. in	No.	In.	Sq. in											
Dia	Sq. ft.	Lbs.	In.	In.	In.	Sq. in	Sq. in	Sq. in	No.	In.	Sq. in	Ft.	Sq. in	Sq. in	Sq. in	No.	In.	Sq. in	Ft.
12	0.79	92	1 1/2-2 3/4	3/4	2														
15	1.23	127	1 1/2-2 1/4	7/8	2 1/4														
18	1.77	168	1 1/2-2 1/2	1	2 1/2														
21	2.40	214	1 1/2-3 1/8	1 1/8	2 1/2														
24	3.14	265	2 1/2-3 3/4	1 1/8	3														
27	3.98	322	2 3/4-4	1 1/4	3 1/4														
30	4.91	384	3 1/4-4 1/4	1 1/4	3 1/2														
33	5.94	452	3 3/4-4 1/4	1 1/2	3 3/4														
36	7.07	524	3 3/4-4 1/4	1 1/2	4														
42	9.62	685	3 3/4-4 1/4	1 1/2	4 1/2														
48	12.57	885	3 3/4-4 3/8	1 1/2	5								.66	.33	.50	8	4	.22	24-35
54	15.90	1070	4 1/2-5 1/4	2	5 1/2								.74	.37	.56	9	4	.22	24-35
60	19.63	1296	4 1/2-5 1/2	2 1/4	6	.54	.27	.41	7	6	.22	16-24	.82	.41	.62	7	6	.22	24-35
66	23.76	1542	5-6	2 1/2	6 1/2	.60	.30	.45	8	6	.22	16-24	.88	.44	.66	8	6	.22	24-35
72	28.27	1810	5 1/2-6 3/4	2 1/2	7	.64	.32	.48	8	6	.23	16-24	.96	.48	.72	8	6	.23	24-35
78	33.18	2098	6 1/4-7 1/4	2 1/2	7 1/2	.70	.35	.53	9	6	.25	16-24	1.04	.52	.78	9	6	.25	24-35
84	38.48	2410	6 1/2-7 3/4	3 1/8	8	.76	.38	.57	10	6	.28	16-24	1.12	.56	.84	10	6	.28	24-35
90	44.18	2793	6 3/4-8 1/2	3 1/8	8 1/2	.82	.43	.62	11	6	.31	16-24	1.20	.60	.90	11	6	.31	24-35
96	50.27	3092	7-8 1/4	3 1/2	9	.88	.46	.66	11	6	.34	16-24	1.32	.66	.99	11	8	.34	24-35
102	56.75	3466	7-8 1/4	3 1/2	9 1/2	.94	.52	.71	12	6	.37	16-24	1.42	.71	1.07	12	8	.37	24-35
108	63.62	3864	7 1/2-8 1/2	3 3/4	10	1.02	.57	.76	12	6	.40	16-24							



CONCRETE PIPE PLUG			
DIMENSIONS (in inches)			
PIPE DIAMETER	A	B	C
15	8	2.25	19.5
18	11	3.0	23.0
21	14	3.25	26.5
24	17	3.50	30.0
27	20	3.75	33.5
30	23	4.0	37.0
33	26	4.25	40.5
36	29	4.50	44.0
42	35	5.0	51.0
48	41	5.50	58.0



- NOTES:
- All reinforcement shall be electrically welded cold drawn steel wire fabric.
 - Circular reinforcement shall lap in accordance to AASHTO M170.
 - All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
 - Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
66" to 108" (incl.) = not less than 6 feet
 - Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
 - Welded steel wire fabric may be substituted for the reinforcing steel bars but must match the area of steel provided by the bars and the lap of the fabric must be in accordance with AASHTO specifications
 - All Reinforcing Steel shall meet AASHTO M170 requirements.

TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4"	9"	4'-9"	1'-7 1/2"	2 1/4"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	2 1/2"	3"	6
24"	6"	1'	7'	2'-6"	3"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 1/2"	3 1/2"	4
36"	7'-6"	15"	7'-3"	3'-8"	4"	3"	4

- NOTES (Traversable End Section):
- Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
 - Reinforcement per class II RCP with double reinforcement in the upper 120° of the full barrel portion.

Ai, Ae, Ao = Minimum circumferential reinforcement required in square inches per lineal foot of pipe.
Ar = Minimum radial reinforcement required in square inches per square foot of pipe.
N = Minimum number of rows of radial reinforcement at top and bottom of pipe.
S = Maximum circumferential spacing of rows of radial reinforcing.

SEE STANDARD D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
11-05-86	Note added
07-17-87	Added pipe plug detail
05-14-88	Reinforcement cage
03-10-88	General revisions
12-23-88	Note # 6, 30" FES
12-01-04	PE stamp added
12-08-08	Major Revisions

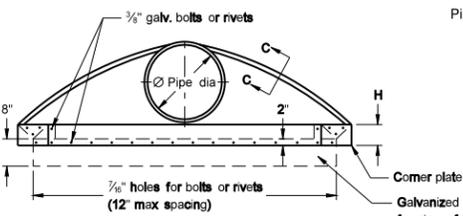
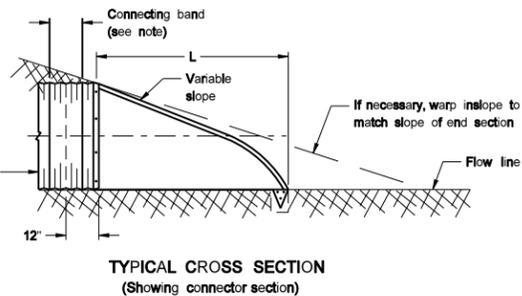
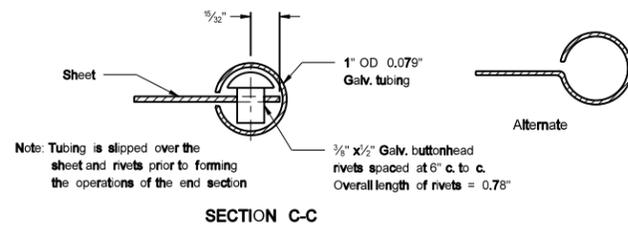
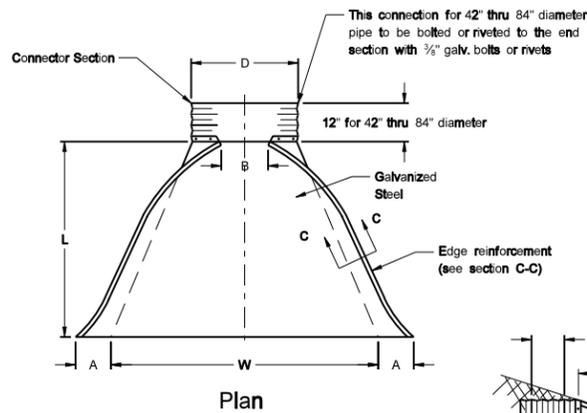
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 12/18/2008 and the original document is stored at the North Dakota Department of Transportation

CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS (Round pipe)

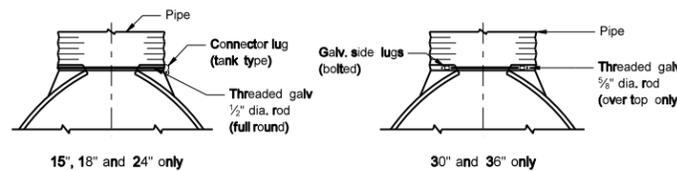
PIPE DIA, IN	WATERWAY AREA, SQ FT			
	2 2/3" x 1/2"	3" x 1" (5' x 1')	3/4" x 3/4" Rib @ 7 1/2"	3/4" x 1" Rib @ 11 1/2"
15	1.2		1.2	1.2
18	1.8		1.8	1.8
24	3.1		3.1	3.1
30	4.9		4.9	4.9
36	7.1	7.1	7.1	7.1
42	9.6	9.6	9.6	9.6
48	12.6	12.6	12.6	12.6
54	15.9	15.9	15.9	15.9
60	19.6	19.6	19.6	19.6
66	23.8	23.8	23.8	23.8
72	28.3	28.3	28.1	28.1
78	33.2	33.2	33.2	33.2
84	38.5	38.5	38.5	38.5
90		44.2	44.2	
96		50.3		
102		56.7		
108		63.6		
114		70.9		
120		78.5		

NOTES:

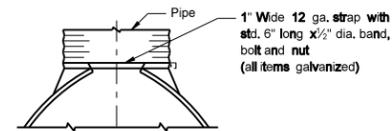
- Pipe and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- Top edge of all end sections to have tubing reinforcement or rolled tube reinforcement (See section C-C). The tubing is to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- Elongated pipe shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.



Galvanized toe plate required on end sections for pipe of 30" diameter or larger. Thickness of toe plate to be same as end section. Where toe plate is needed, the toe plate, bolts and nuts are to be included in price bid for end sections.



ROD CONNECTION DETAILS



STRAP CONNECTION DETAIL

PIPE DIA. IN	GALV. THICK. IN	END SECTION DIMENSIONS					APPROX. SLOPE RATE	BODY PIECE
		A IN	B IN	H IN	L IN	W IN		
15	0.064	7	8	6	26	30	2 1/2:1	1
18	0.064	8	10	6	31	36	2 1/2:1	1
24	0.064	10	13	6	41	48	2 1/2:1	1
30	0.079	12	16	8	51	60	2 1/2:1	1 or 2
36	0.079	14	19	9	60	72	2 1/2:1	2
42	0.109	16	22	11	69	84	2 1/2:1	2
48	0.109	18	27	12	78	90	2 1/2:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1 1/2:1	3
* 66	0.109	18	36	12	87	120	1 1/2:1	3
* 72	0.109	18	39	12	87	126	1 1/3:1	3
* 78	0.109	18	42	12	87	132	1 1/4:1	3
* 84	0.109	18	45	12	87	138	1 1/5:1	3

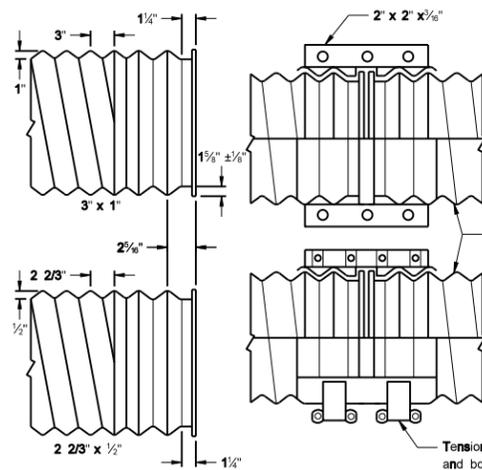
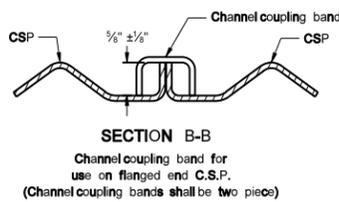
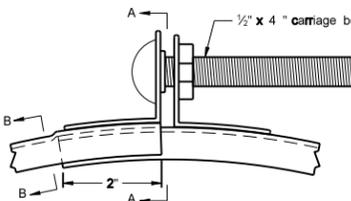
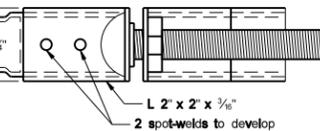
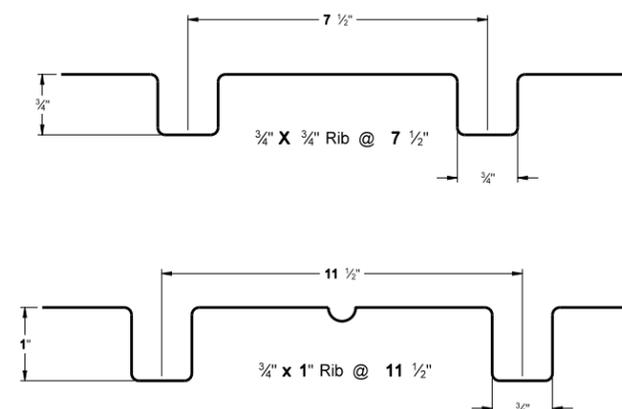
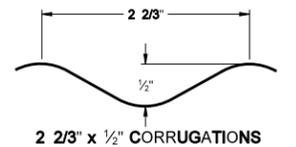
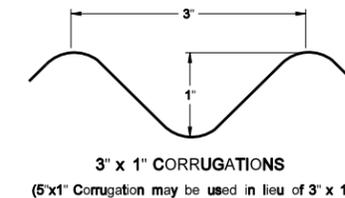
* These sizes have 0.138" center panels.

** Pipe diameter is equal to dimension "D" of end section.

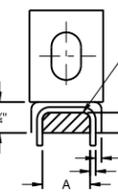
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

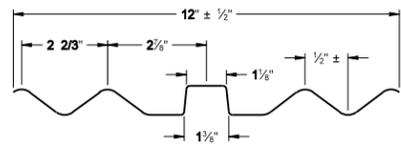


SPIRAL C.S.P. and WING CHANNEL COUPLING BAND

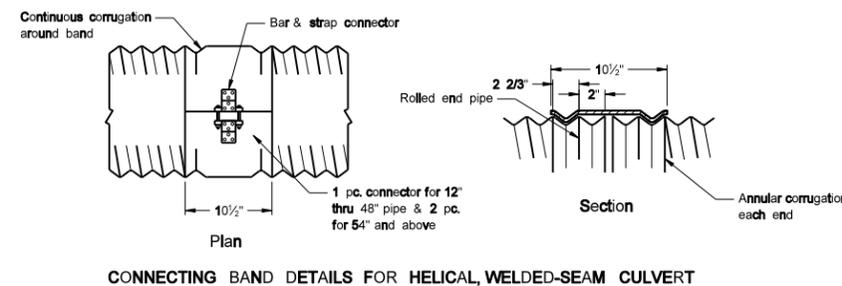


SECTION A-A
CORRUGATED STEEL PIPE
FLANGE BAND DETAILS

NOMINAL DIMENSIONS		
THICKNESS	A	FOR USE WITH C.S.P.
0.079"	3/8"	0.09" Thick or lighter
0.109"	1"	0.138" Thick or heavier



CROSS SECTION OF WING CHANNEL COUPLING BAND FOR ANNULAR C.S.P. OR REFORMED H.C.S.P.



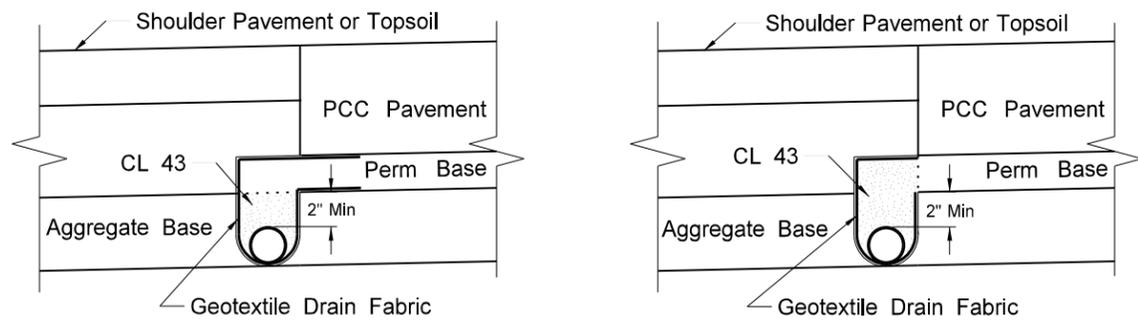
CONNECTING BAND DETAILS FOR HELICAL, WELDED-SEAM CULVERT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
04-28-89	Toe plate note
12-06-95	Corrugation
07-02-03	Revised note
12-01-04	PE Stamp added
12-08-08	Removed min/max fill info and added 2 rib types

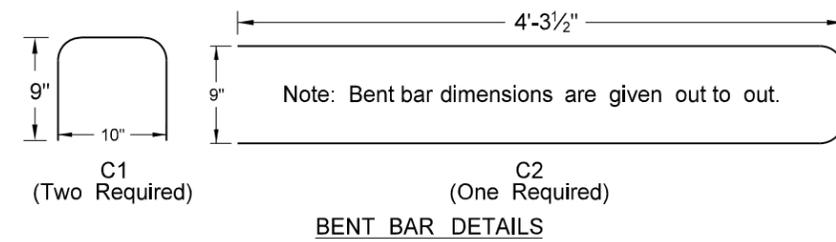
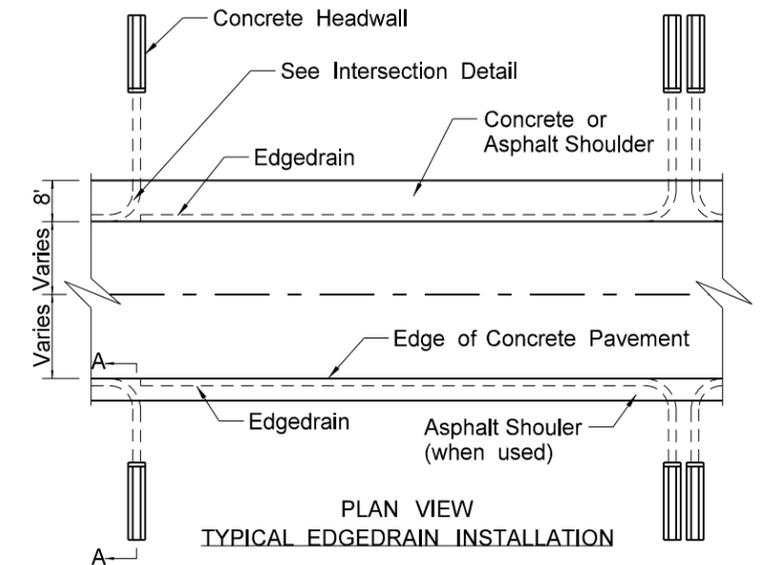
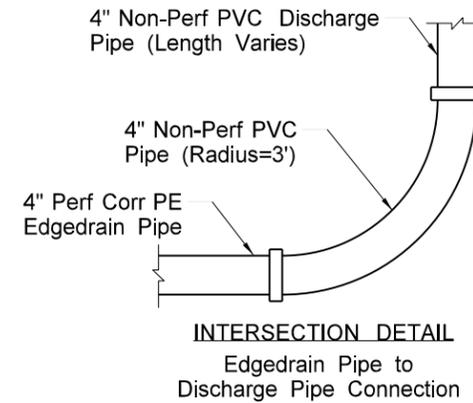
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674, on 12/18/2008 and the original document is stored at the North Dakota Department of Transportation

EDGEDRAIN DETAILS

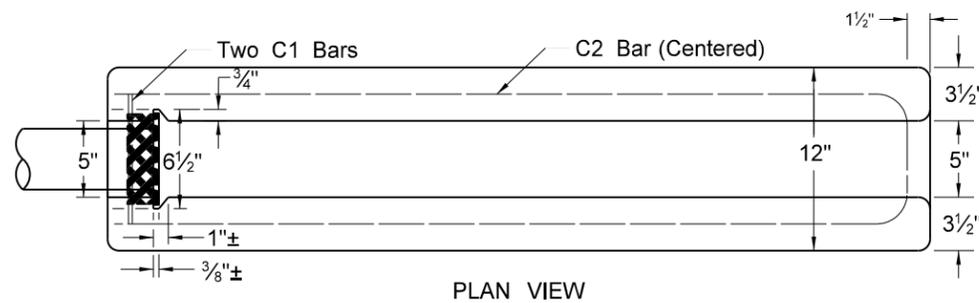
D-714-18



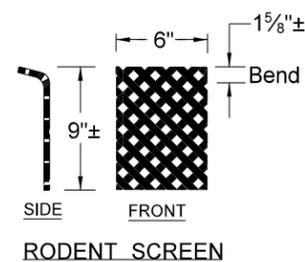
Option #1: Trench before permeable base is placed
Option #2: Trench after permeable base is placed
TRENCH WRAP DETAILS



BENT BAR DETAILS

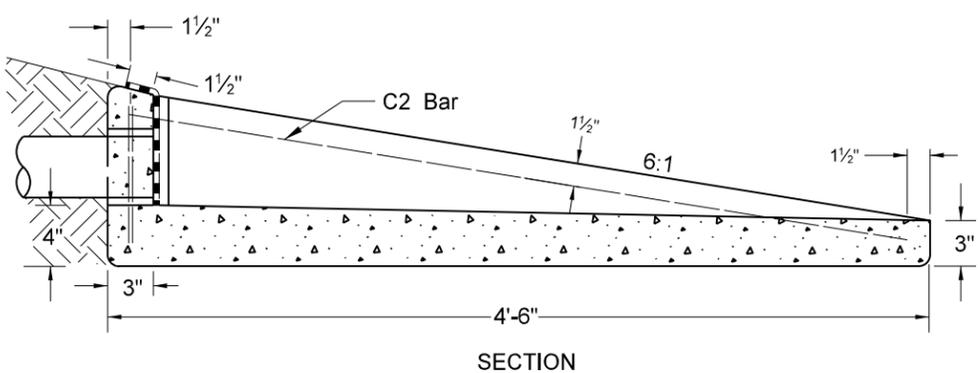


PLAN VIEW

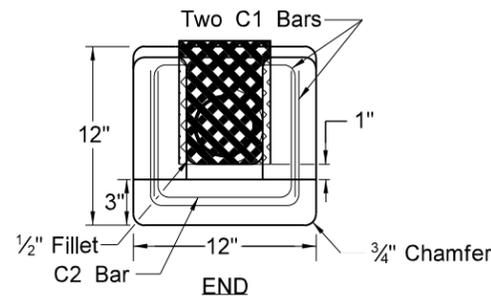


RODENT SCREEN

Dimensions are approximate to allow bend and a snug fit in headwall slot



SECTION PRECAST CONCRETE HEADWALL

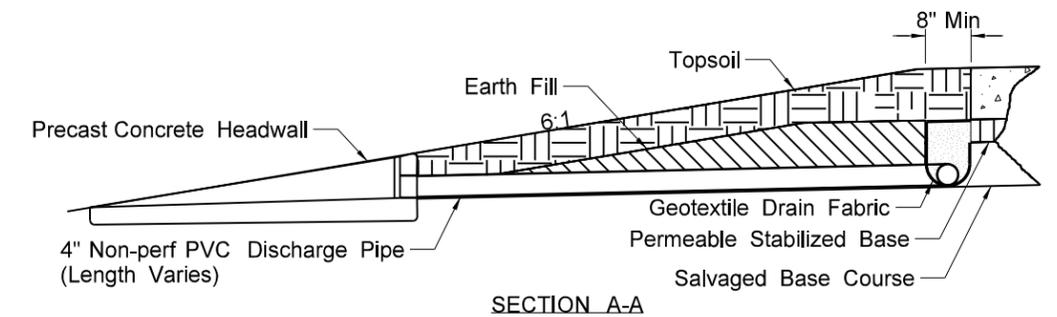


END

SUPERELEVATED CURVES: The edgeline, outlets, and headwalls shall be omitted from the high side of superelevated curves.

RODENT SCREEN: The rodent screen shall be fabricated from flattened expanded metal with screen openings of approximately 0.25 square inches. The screen shall be 16 ga metal, hot dip galvanized after fabrication.

REINFORCING BARS: Reinforcing bars shall be No. 4 deformed steel bars.



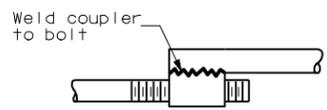
SECTION A-A

Section A-A shows edgeline location for median concrete shoulder installations on Interstate highways. For installations where asphalt shoulders will be constructed, or the outside shoulder is to be concrete, the edgeline is to be trenched adjacent to the roadway concrete pavement, and will be located beneath the shoulder pavement.

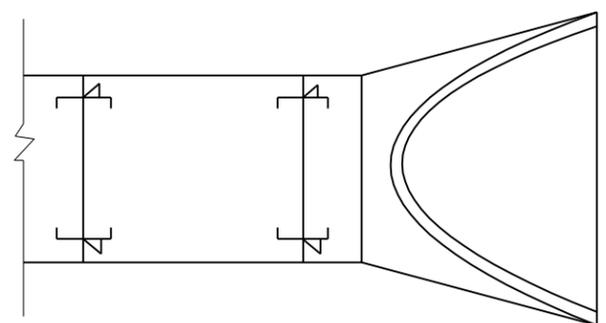
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-27-2010	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 10/27/2010 and the original document is stored at the North Dakota Department of Transportation

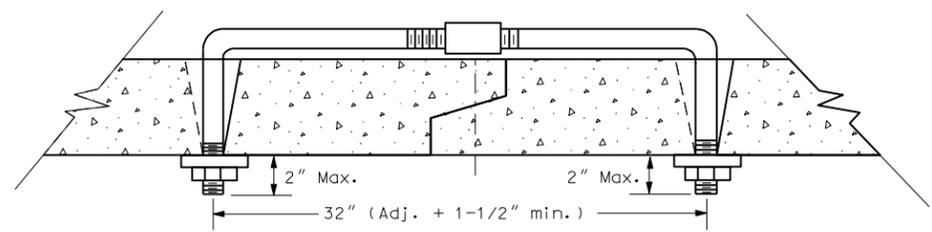
CONCRETE PIPE TIES



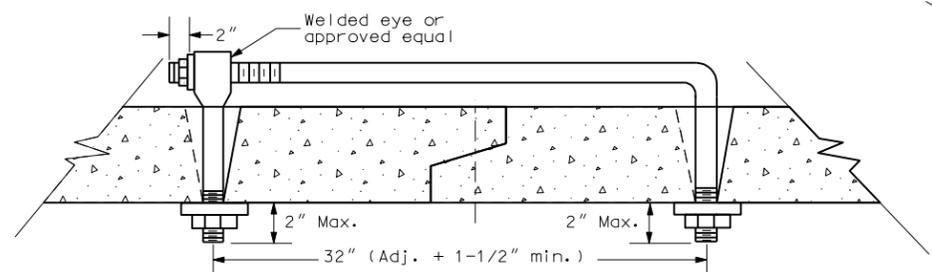
TOP VIEW



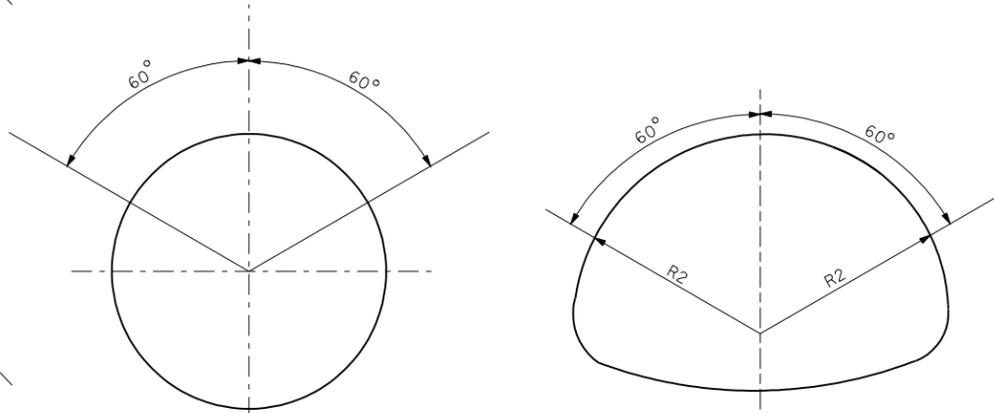
REQUIRED SIZE OF TIE BOLTS					
Pipe Size (Inches)	Thread Dia.	Pipe Size (Inches)	Thread Dia.	Pipe Size (Inches)	Thread Dia.
12	5/8" (See note 2)	30	3/4"	72	1"
15		33		78	
18		36		84	
21		42		90	
24		48		96	
27		54		102	
		60		108	
		66		120	
			132		



ADJUSTABLE TIE



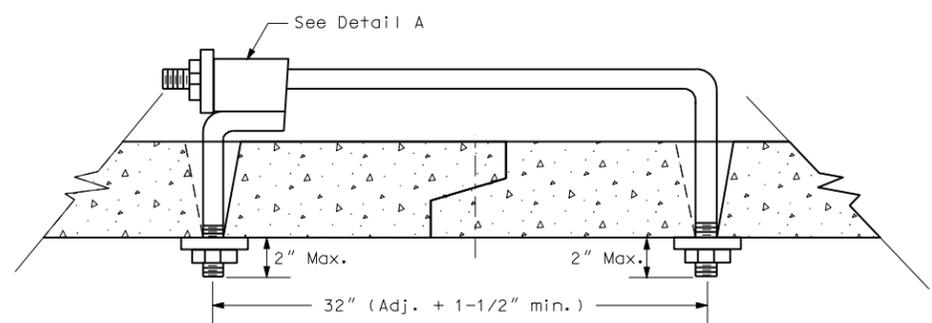
EYE BOLT TIE



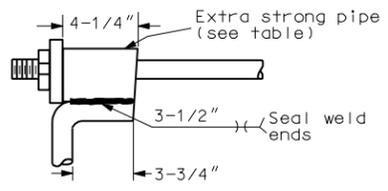
PLACEMENT OF HOLES

NOTES:

1. Pipe size listed is inside diameter of round pipe or equivalent diameter of pipe arch.
2. Nuts and washers are not required on inside of 21" diameter pipe or less.
3. Ties to be used only to hold pipe sections together, not for pulling sections tight.
4. Tie bolts shall be painted after fabrication with one coat of zinc chromate iron oxide paint. Threaded portion of rods do not have to be painted.
5. Holes in pipe to accommodate the tie bolts can be precast or drilled. Tapered holes will be permitted when precast. When existing pipe are extended or salvaged and relayed, the contractor will be required to drill the necessary holes.
6. The contractor has the option of selecting the type of tie bolt to be used. The type selected shall be approved by the engineer.
7. The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for reinforced concrete pipe culverts.
8. All concrete pipe joints will be tied including the end section joints. Tie bolts are not required on storm sewer pipe unless specifically noted in the plans.

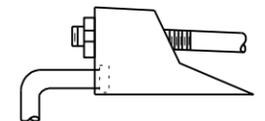


WELDED PIPE TIE

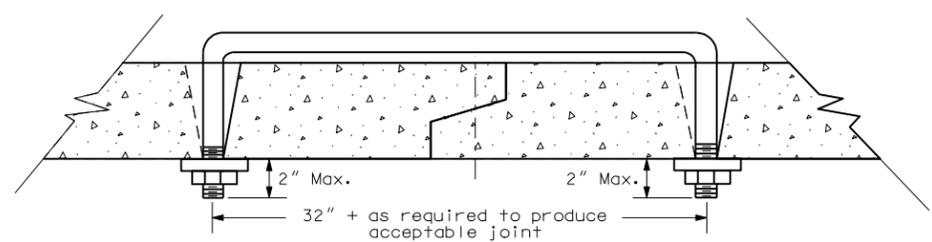


DETAIL A

Thread Dia.	E.S. Pipe I.D.
5/8"	3/4"
3/4"	1"
1"	1-1/4"



OPTIONAL CANOPY TIE



U BOLT TIE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 10-1-86	
REVISIONS	
DATE	CHANGE
12-09-94	Notes
06-26-03	Layout revisions
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE CENTERLINE PIPE BACKFILL FOR PIPES
4 FEET OR LESS BELOW THE PROPOSED BASE

Included in Pipe Pay Item

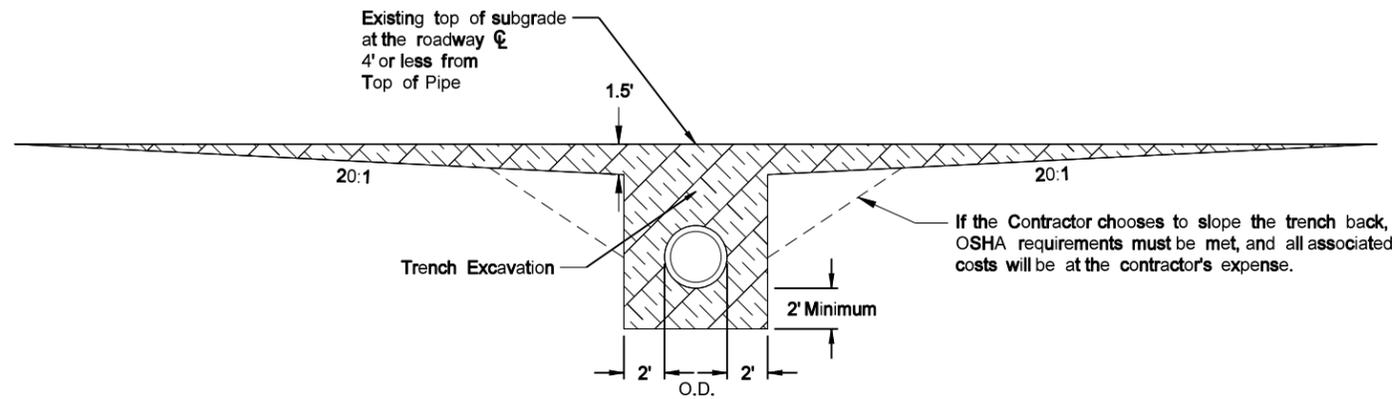
- 1) Pipe
- 2) Trench excavation
- 3) Disposal of unsuitable excavated material and placement of suitable excavated material on inslope.
- 4) Aggregate Base Course CI3 or CI5
- 5) Approved Backfill

Pay Items

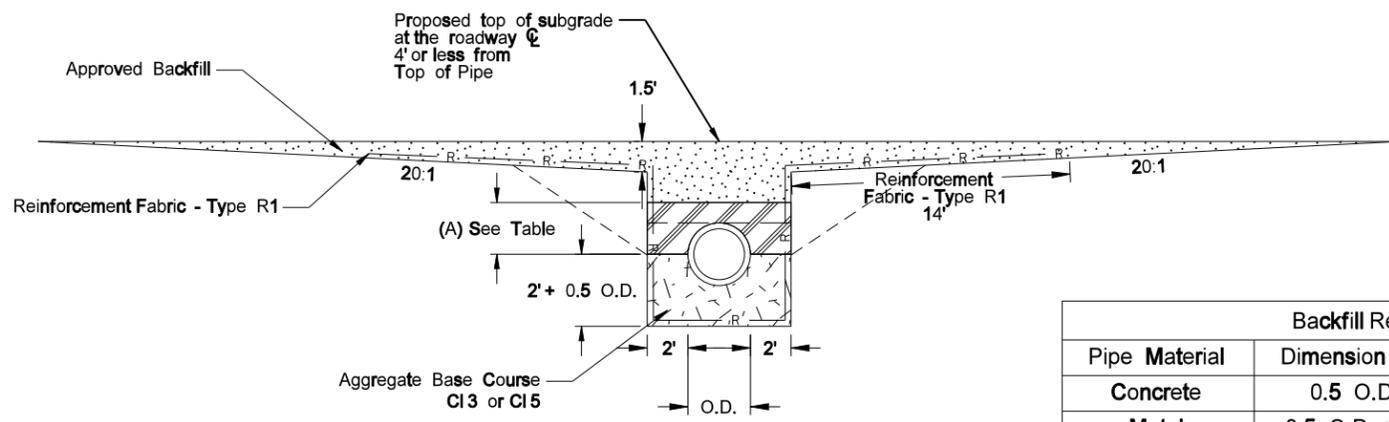
- 1) Pipe
- 2) Reinforcement Fabric - Type R1
- 3) Surfacing Removal

NOTES:

1. This drawing corresponds to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2. Approved Backfill shall meet the requirements of AASHTO M 145 for A-1, A-2, and A-3 soils.
3. Compaction requirements for all materials associated with the trench installation shall meet 90% of AASHTO T-180. Maximum thickness of any one lift shall not exceed 6 inches.

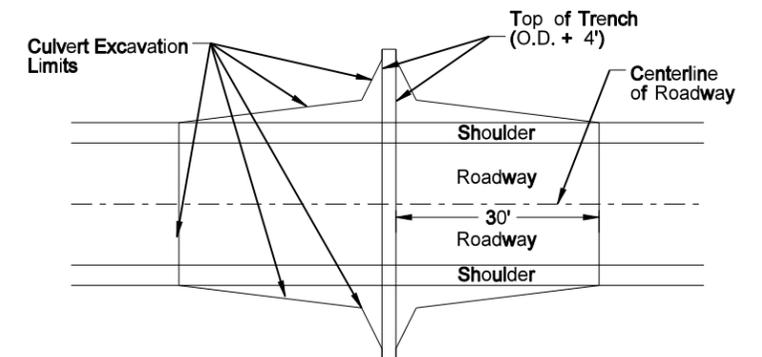


Removal Detail

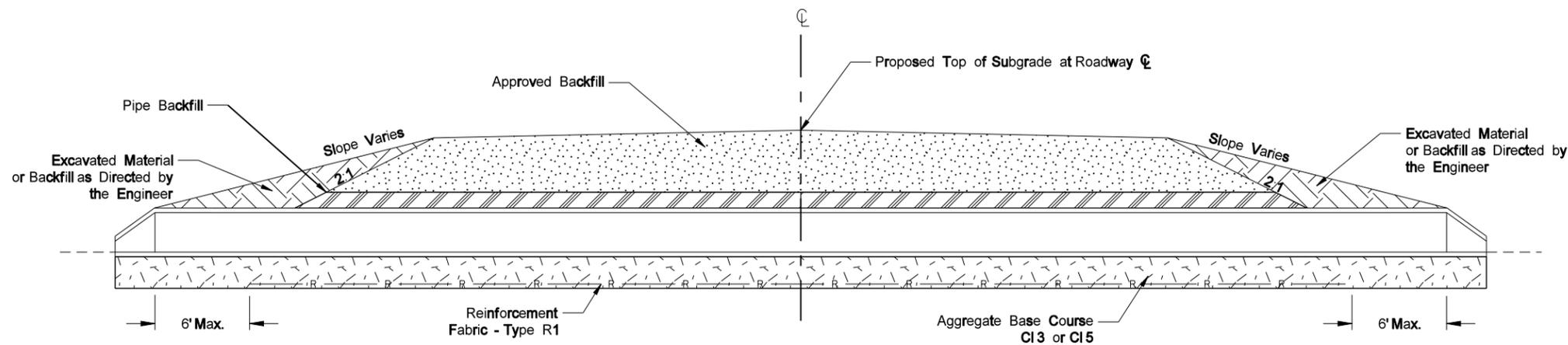


Backfill Detail

Backfill Requirements		
Pipe Material	Dimension (A)	Backfill
Concrete	0.5 O.D.	Approved Backfill (Note 2)
Metal	0.5 O.D. + 1'	CI3 or CI5



Plan View of Culvert (Not to Scale)

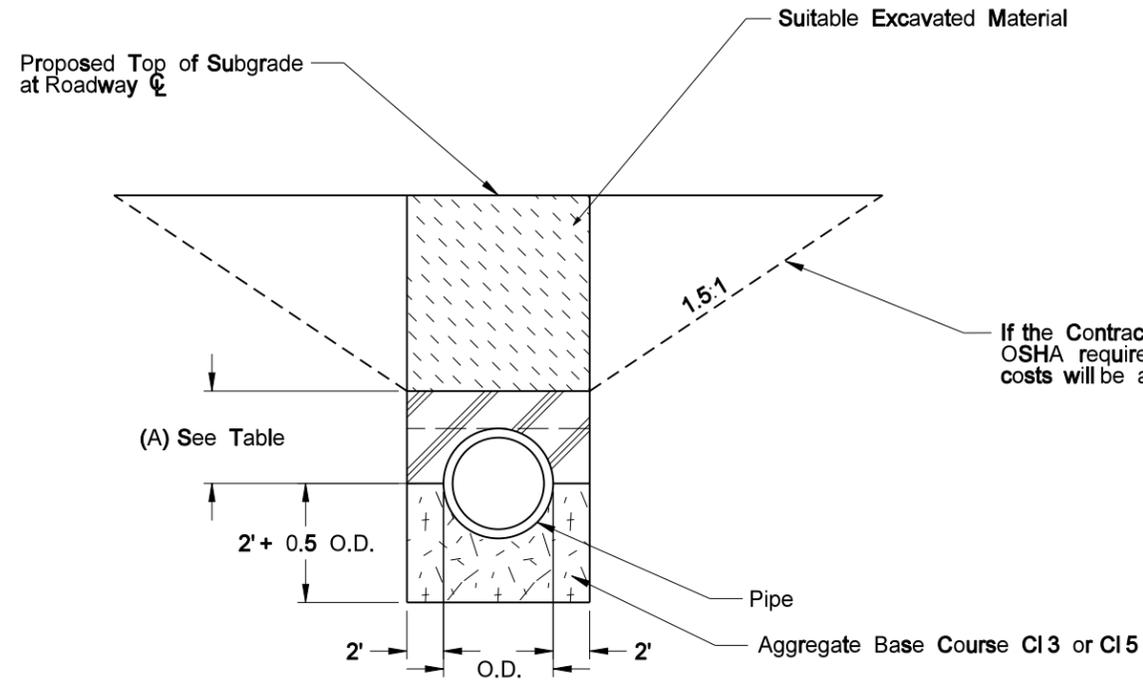


Cross Section View - Proposed Section

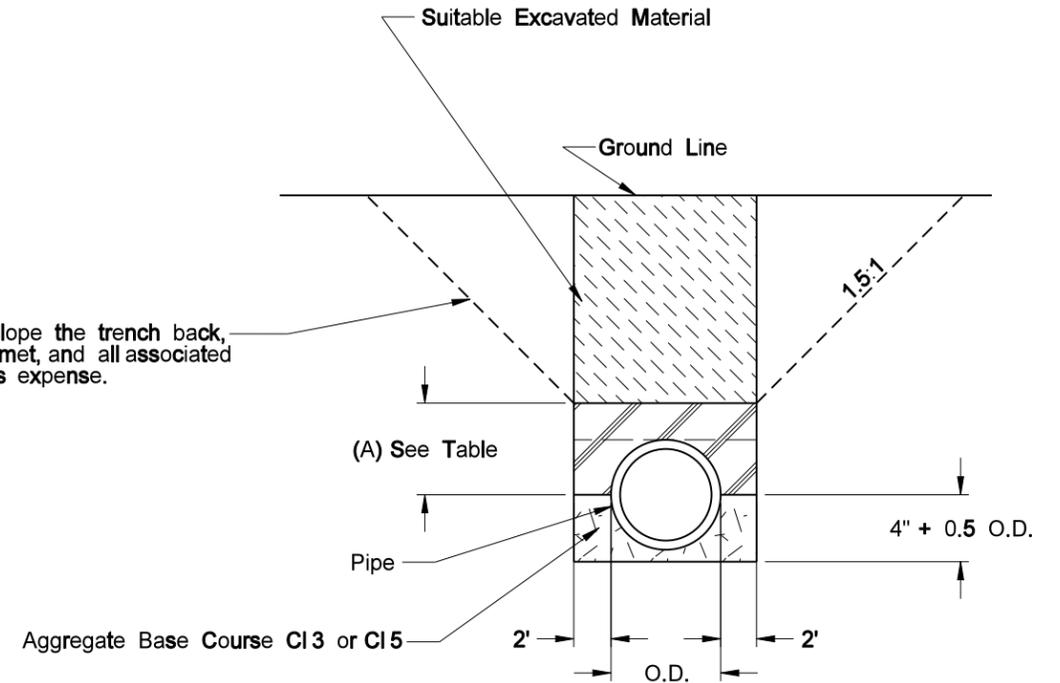
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-08-08	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 12/08/2008 and the original document is stored at the North Dakota Department of Transportation

PIPE BACKFILL FOR STORM DRAIN UNDER ROADWAYS OF 40 MPH OR LESS AND PIPE NOT UNDER ROADWAY



BEDDING AND BACKFILL FOR STORM DRAIN UNDER ROADWAY



BEDDING AND BACKFILL FOR STORM DRAIN NOT UNDER ROADWAY

If the Contractor chooses to slope the trench back, OSHA requirements must be met, and all associated costs will be at the contractor's expense.

Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Disposal of unsuitable excavated material and placement of suitable excavated material.
- 4) Backfill of suitable excavated material
- 5) Aggregate Base Course CI3 or CI5

Pay Items

- 1) Pipe
- 2) Surfacing removal

Backfill Requirements		
Pipe Material	Dimension (A)	Backfill
Concrete	0.5 O.D.	Approved Backfill (Note 2)
Metal	0.5 O.D. + 1'	CI3 or CI5
PVC/HDPE	0.5 O.D. + 1'	CI3 or CI5

NOTES:

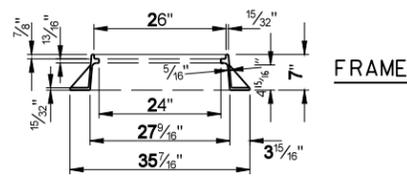
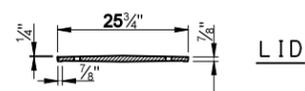
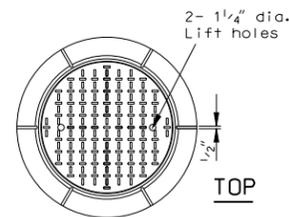
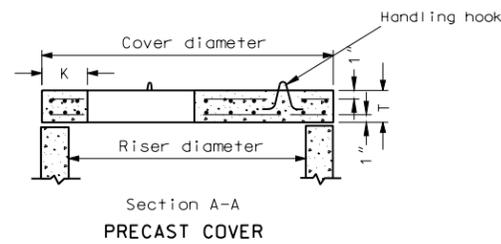
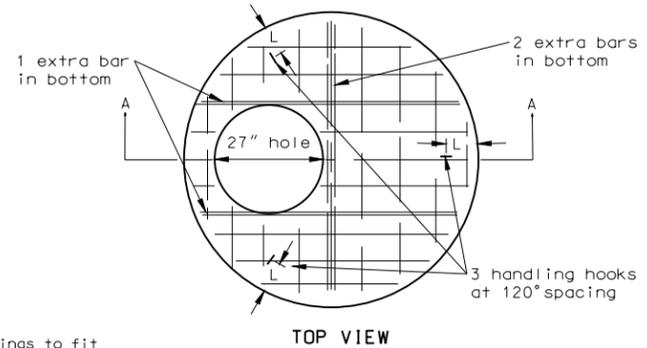
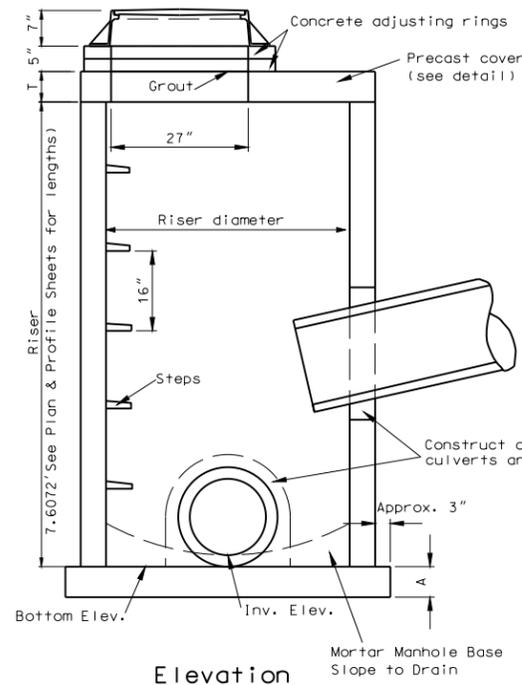
1. This drawing corresponds to Storm Drain Pipe only. It does not include pipes in approaches.
2. Approved backfill shall meet the requirements of AASHTO M 145 for A-1, A-2, and A-3 soils.
3. Compaction requirements for all materials associated with the trench installation shall meet 90% of AASHTO T-180. Maximum thickness of any one lift shall not exceed 6 inches.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-08-08	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 12/08/2008 and the original document is stored at the North Dakota Department of Transportation

MANHOLE DETAILS

D-722-5



MANHOLE CAST IRON RING & COVER

Lid - Wt. 118 Lbs.
Frame - Wt. 131 Lbs.

PRECAST MANHOLE COVERS

PIPE DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM BARS	TOP BARS
42"	51"	800#	6"	6"	7"	#4 at 6"	---
48"	58"	1110#	6"	6"	8"	#4 at 6"	---
54"	65"	1950#	8"	6"	8"	#4 at 6"	---
60"	72"	2470#	8"	7"	9"	#4 at 6"	#3 at 6"
66"	79"	3050#	8"	7"	9"	#4 at 6"	#3 at 6"
72"	86"	3680#	8"	8"	10"	#4 at 6"	#3 at 6"
78"	93"	4360#	8"	8"	10"	#4 at 4"	#3 at 4"
84"	100"	5100#	8"	9"	11"	#4 at 4"	#3 at 4"
90"	107"	5890#	8"	9"	11"	#4 at 4"	#3 at 4"
96"	114"	6730#	8"	9"	11"	#4 at 4"	#3 at 4"
102"	121"	7630#	8"	9"	12"	#4 at 4"	#3 at 4"
108"	128"	12460#	12"	10"	12"	#4 at 4"	#3 at 4"
120"	140"	15500#	12"	11"	13"	#4 at 4"	#3 at 4"

Top and bottom bars run in both directions.

Note: Method of measurement for manholes shall be as follows: The contract unit price bid for manholes shall include the furnishing and installing the following:

1. Cast iron ring and cover or beehive casting & cover
2. Precast cover
3. Concrete base
4. Concrete adjusting rings

The item "Manhole Riser" shall include the furnishing & installing of the required length of riser & cast iron steps.

Mortar to be included in the price bid for manholes.

Notes:

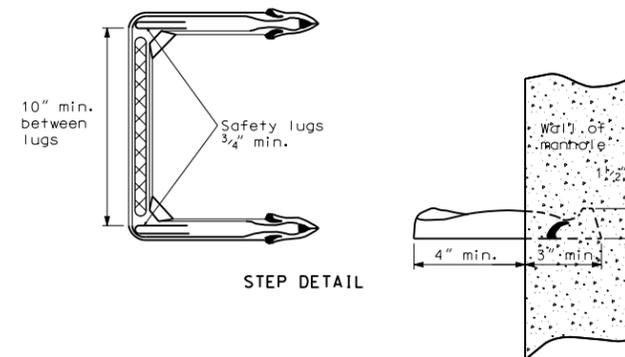
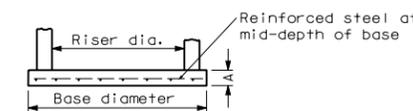
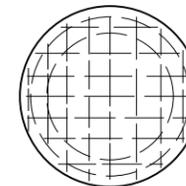
Bottoms of manholes shall be cut or precast square to fit the base grout joint between base and wall with cement mortar. The contractor may, if he so desires, construct the manholes lower than plan grade and bring the casting to grade using precast adjusting rings in a manner satisfactory to the engineer in the field.

The contractor shall have the option of using precast or poured in place bases.

Precast bases shall be reinforced as shown in listing for each size base.

The aggregate size shall be approved by the engineer.

Precast barrels and risers shall be constructed in accordance with AASHTO M-199.



Manhole steps shall be corrosion resistant and shall have a minimum vertical load resistance of 400 pounds and a pull-out resistance of up to 1000 pounds. Configuration of the steps shall be approved by the engineer.

The contractor may, if he so elects, construct manholes of solid concrete block or brick. The materials shall be approved by the engineer in writing. The type of construction shall be as specified in section 722 of the Standard Specifications.

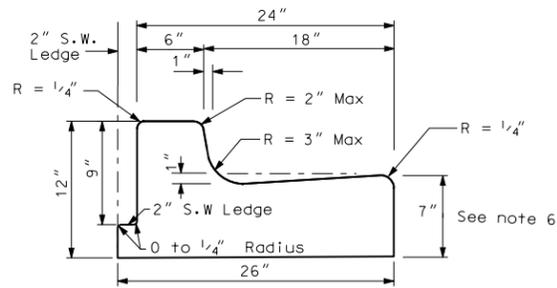
Other castings, similar in dimension and of equal or greater weight than that shown may be used if accepted by the engineer in writing.

Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35 B.

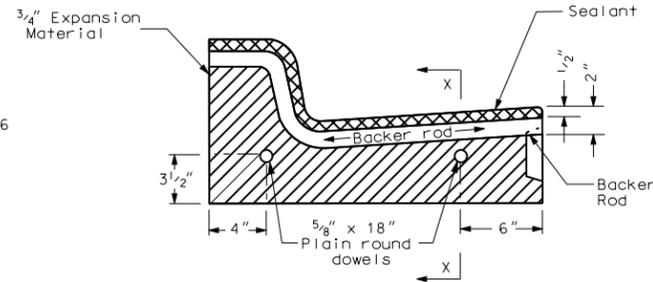
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Note
06-10-93	Manhole frame & cover
06-26-03	Layout revision
12-01-04	PE stamp added
06-13-06	Revised manhole frame & cover

This document was originally issued and sealed by
MARK S. GAYDOS
Registration Number
PE- 4518 ,
on 06/13/06 and the original document is stored at the
North Dakota Department
of Transportation

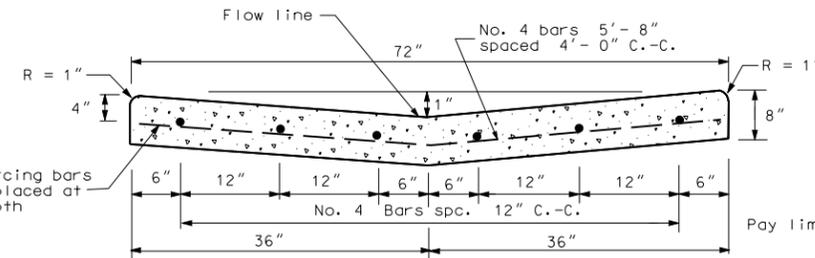
VALLEY GUTTER AND CURB & GUTTER



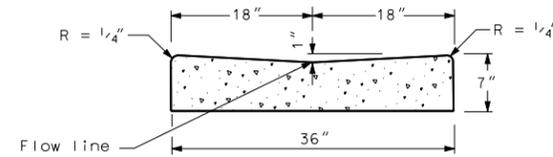
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk,
Median, or Parking Lot
(Sec. A shown. See Sec. B
for additional details.)



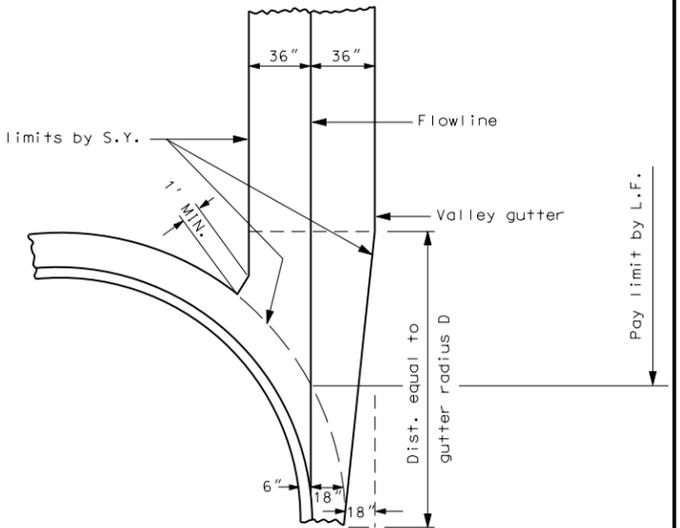
Isolation Joint Detail



72" Concrete Valley Gutter

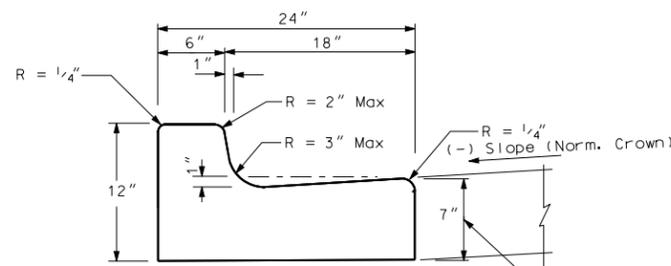


36" Concrete Valley Gutter

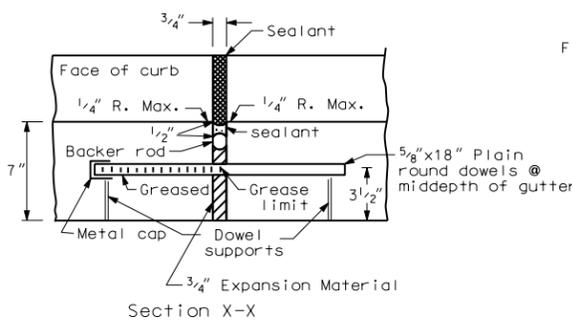


72" Concrete Valley Gutter

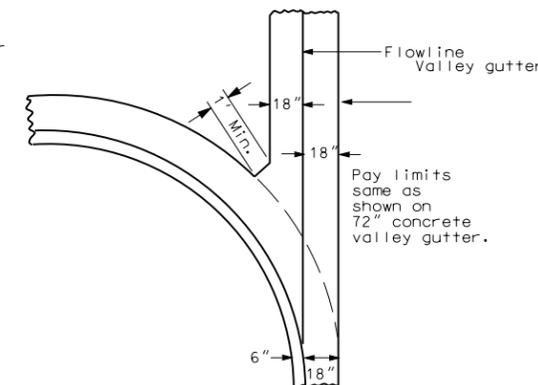
- NOTES:
- Curb and Gutter Type 1 to be used. Section "A" to be used with (-) pavement slopes and section "B" to be used with (+) pavement slopes.
 - Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
 - Isolation Joints: Isolation joint material shall be 3/4" pre molded conforming to section 826.02C or D of the standard specifications. The opening for the backer rod and joint sealant shall be formed by a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour of a cold joint. Metal caps and greased dowels shall be installed in the cold joint for the second pour.
 - Joint Spacing: For hot bituminous pavements the joint spacing for the curb and gutter shall be 10' max. with the panels on each side of the inlets. For concrete pavements the joint spacing for the curb and gutter shall match the pavement joint on PCC Pavements.
 - Joint sealing: All contraction and isolation joints shall be sealed as shown in the details. The joint sealant for contraction joints shall conform to section 826.02B. The sealant for expansion joints shall be as specified in note 3 above. The sealant shall be tooled and installed in accordance with the manufacturer's recommendations.
 - Depth of Face of Gutter: For hot bituminous pavement the depth of gutter shall be as shown. For PCC pavements the depth of gutter shall match the adjacent PCC pavement.
 - The cost for all labor, equipment, and material necessary to construct contraction & isolation joints shall be included in the price bid for curb and gutter.
 - On street returns and other locations where the new curb and gutter ends and does not abut existing curb and gutter, the end two (2) feet of the curb shall be tapered from 6" in height to 0". A 1/2" pre-molded isolation joint which is full depth and the same shape as the curb and gutter shall be installed just ahead of the taper. An 18" tie bar shall be installed across the joint.



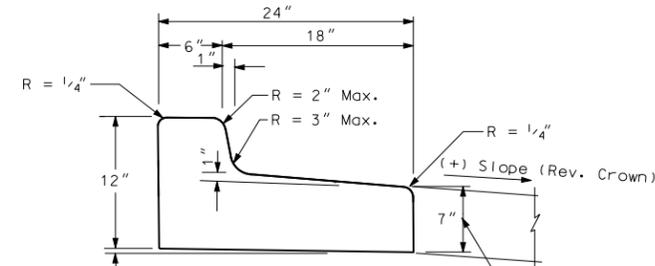
Curb & Gutter Type 1 (Sec. A)



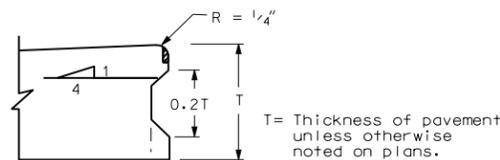
Section X-X



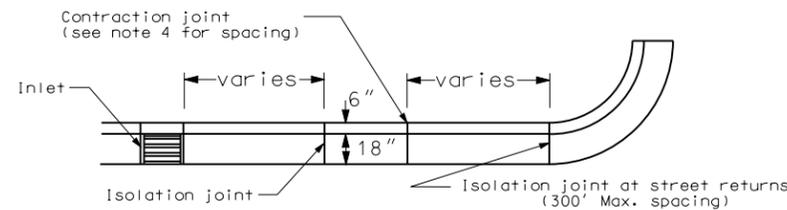
36" Concrete Valley Gutter



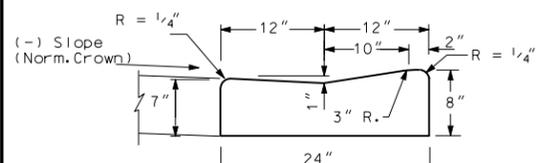
Curb & Gutter Type 1 (Sec. B)



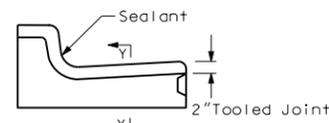
Keyway Detail For
Curb & Gutter
(To be used with P.C.C.
Pavement and Drives.)



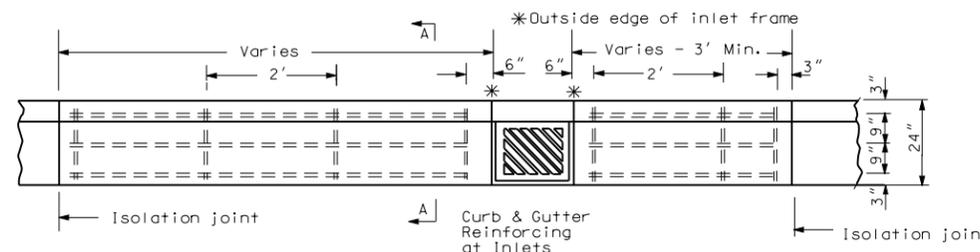
Joint Location Detail



Mountable Curb & Gutter
Type 1 (Sec. A)

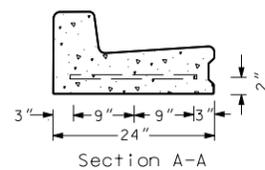


Contraction
Joint Detail
(10' Max. Spacing)

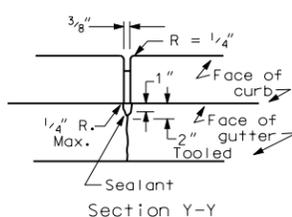


NOTE: All bars shall be #4 deformed reinforcing bars. Splices will not be permitted. Reinforcing bars at inlet locations will not be paid for separately, but shall be included in the price bid for "Curb and Gutter - Type 1."

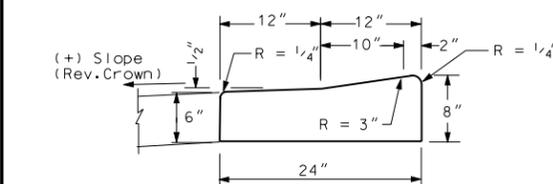
This includes inlets located on radii. The reinforcement shall be extended to the second joint (rebar placed through the first joint) in cases where the 3' min. panel length cannot be obtained.



Section A-A



Section Y-Y

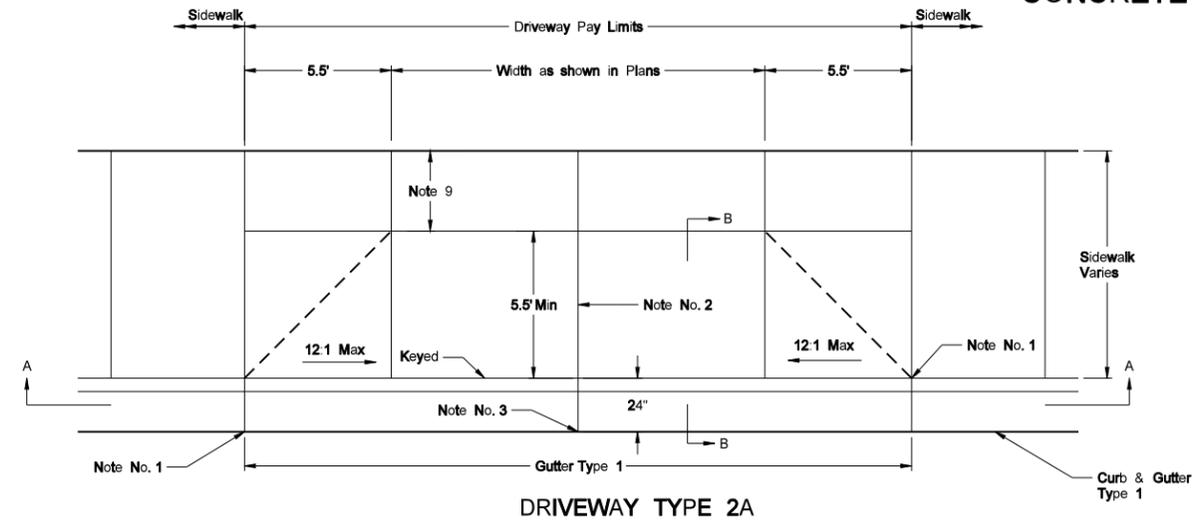


Mountable Curb & Gutter
Type 1 (Sec. B)

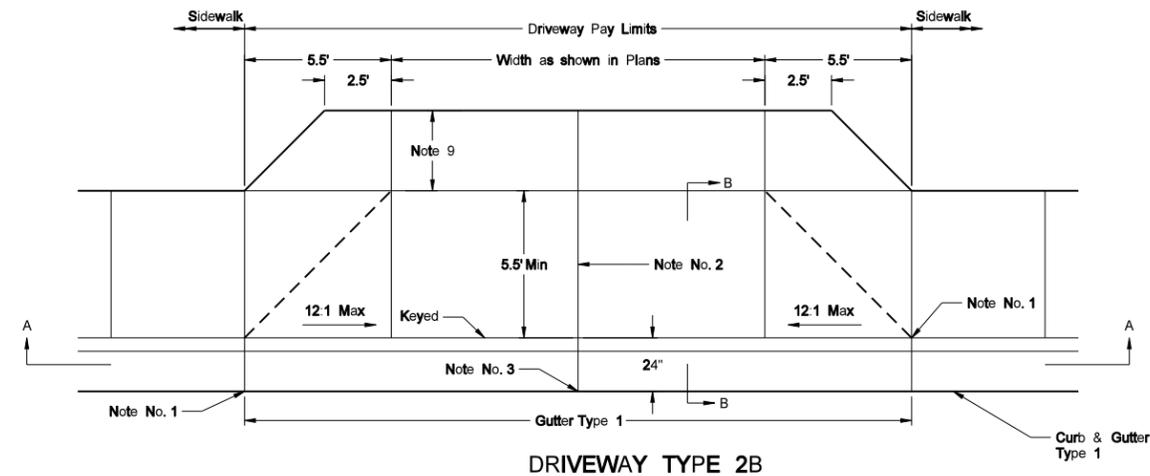
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
10-17-97	General revisions
12-01-04	PE Stamp added
10-31-06	Added note 8
11-02-07	2" ledge, Section A&B

This document was originally issued and sealed by
MARK S. GAYDOS
Registration Number
PE- 4518 ,
on 11/02/07 and the original document is stored at the
North Dakota Department
of Transportation

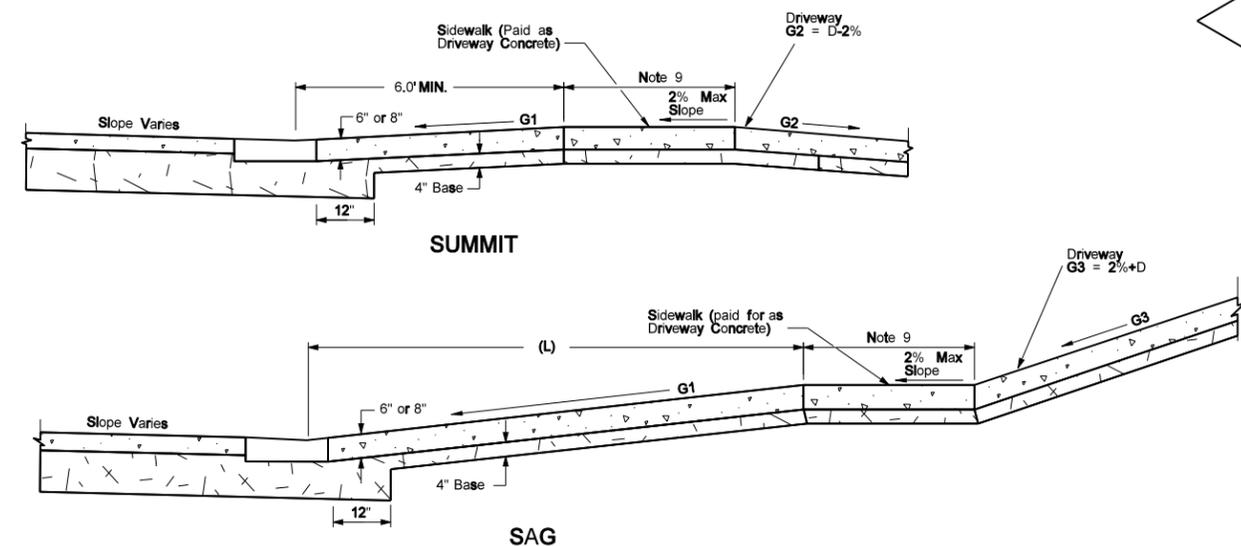
CONCRETE DRIVEWAY TYPE 2 and 3 (URBAN)



DRIVEWAY TYPE 2A

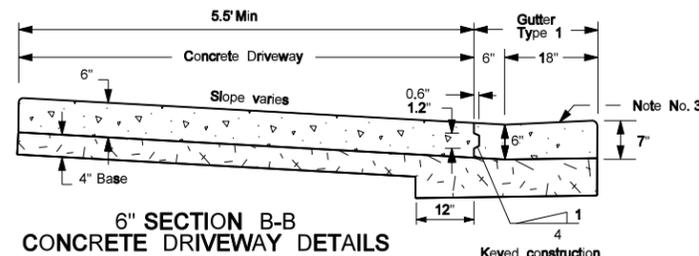


DRIVEWAY TYPE 2B

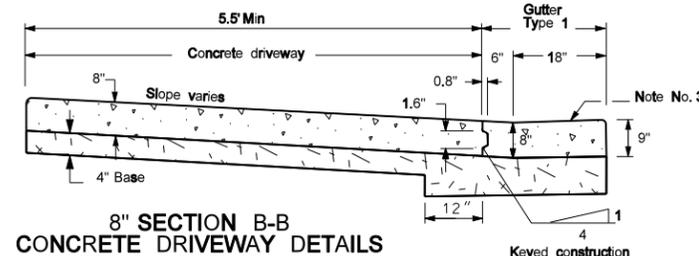


SUMMIT

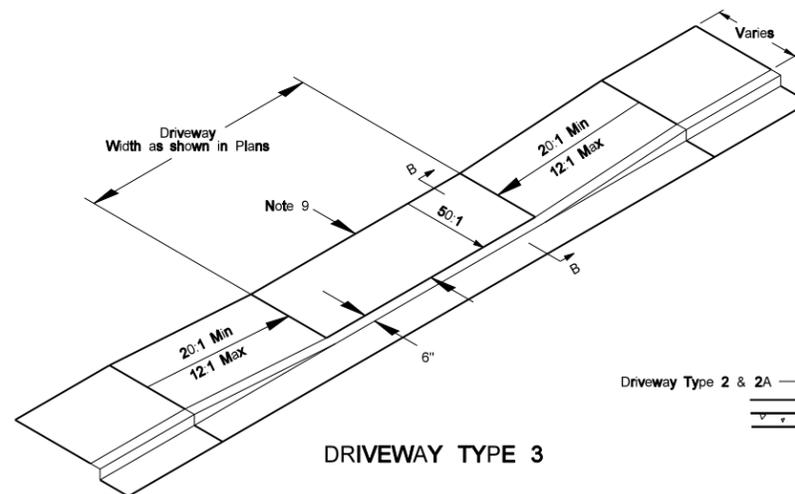
SAG



6" SECTION B-B CONCRETE DRIVEWAY DETAILS



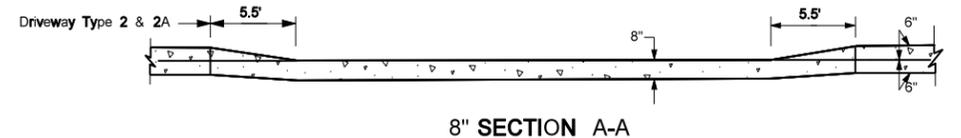
8" SECTION B-B CONCRETE DRIVEWAY DETAILS



DRIVEWAY TYPE 3



6" SECTION A-A



8" SECTION A-A

NOTES:

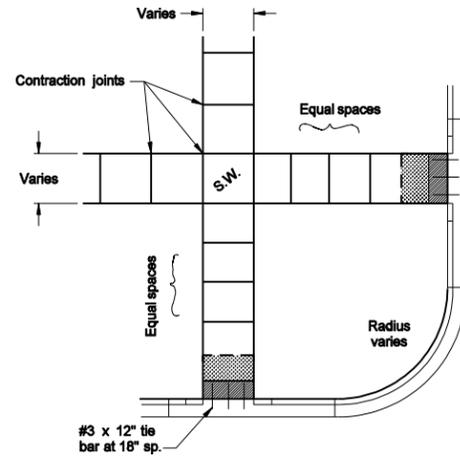
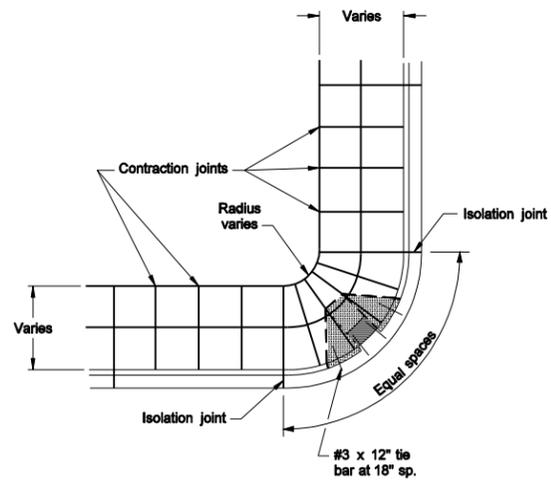
1. On bituminous pavements place a 3/4" isolation joint full depth and the same shape as the curb and gutter. On P.C.C. Pavements the curb and gutter joints match those of the pavement.
2. Joint spacing: The driveway joint spacing shall match the curb and gutter or P.C.C. Pavement joint spacing. (See Standard Drawing D-748-1). The joint may be a keyed construction joint, a sawed, or a grooved joint. The joint depth shall be a minimum of 1/3 the depth of the concrete.
3. Gutter-Type 1 shall be paid for at the unit price bid for "Curb and Gutter-Type 1".
4. 6" Driveway to be used unless otherwise specified.
5. All joints shall be sealed. The joint sealant shall be low modulus silicone. The sealant shall be installed and tooled in accordance with the manufacturer's recommendations.
6. All costs for labor, equipment, and material necessary to construct and seal joints shall be included in the price bid for the driveway.
7. 4" base material shall be placed under the concrete driveway. All labor and materials necessary to place the base material shall be included in the price bid for Salvage Base Course or Aggregate Base Course CL 5.
8. Sidewalk that falls behind a driveway shall be constructed to the same thickness as the driveway and shall be paid for as driveway concrete.
9. 5' is desirable but if 5' cannot be used, 4' is the minimum allowable width.

Driveway ADT	Grade G1		Dimension (L) ft		Grade Changes (D)	
	Desirable	Maximum	Desirable	Minimum	Desirable	Maximum
(0-500)	5%	12% or controlled by vehicle clearance	12	6	+6%	15% or controlled by vehicle clearance
(500-1500)	3%	8%	20	20	± 3%	± 6%
(> 1500)	2%	5%	40	40	0%	± 3%

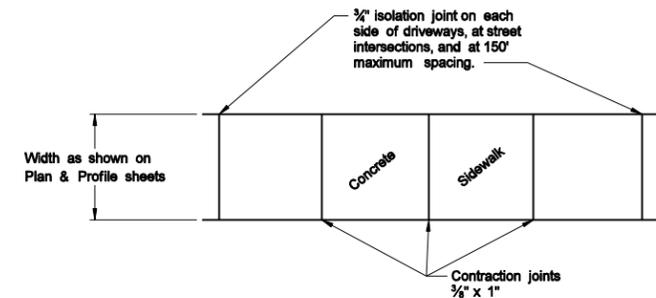
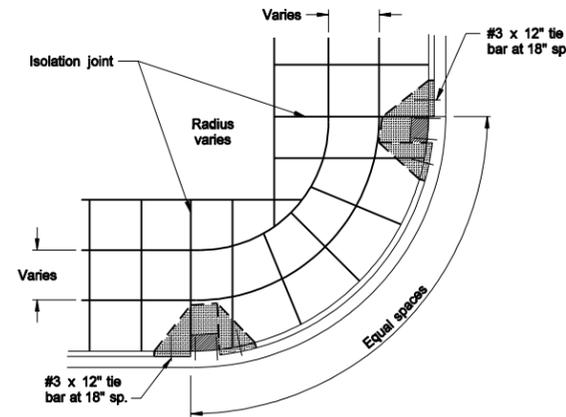
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09-12-07	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Mark S. Gaydos Registration Number PE- 4518 , on 09/12/07 and the original document is stored at the North Dakota Department of Transportation

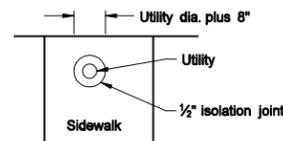
SIDEWALK



TYPICAL JOINT LAYOUTS



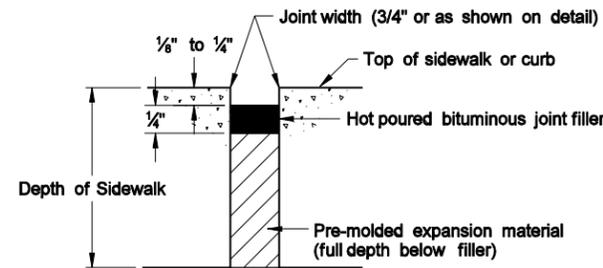
CONCRETE SIDEWALK DETAILS



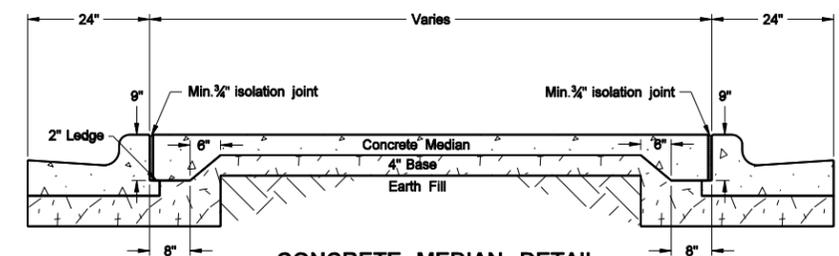
UTILITY BLOCKOUT



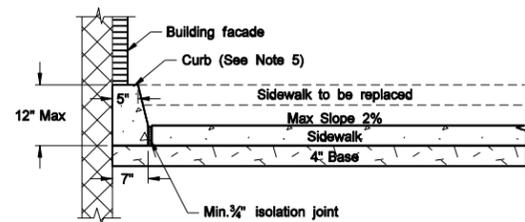
"L"BAR DETAIL
#3 BAR



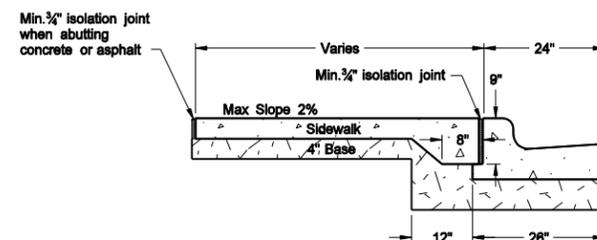
TYPICAL ISOLATION JOINT SEAL
(longitudinal and transverse)



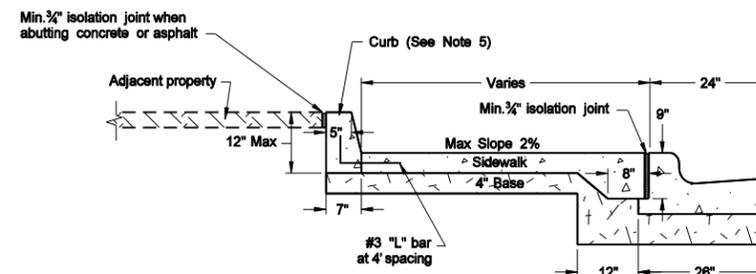
CONCRETE MEDIAN DETAIL



SIDEWALK WITH CURB DETAIL
(Building face application)



SIDEWALK DETAIL
(Installed adjacent to curb and gutter)



SIDEWALK WITH CURB DETAIL
(Adjacent property application)

Notes:

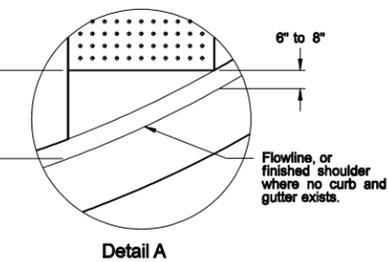
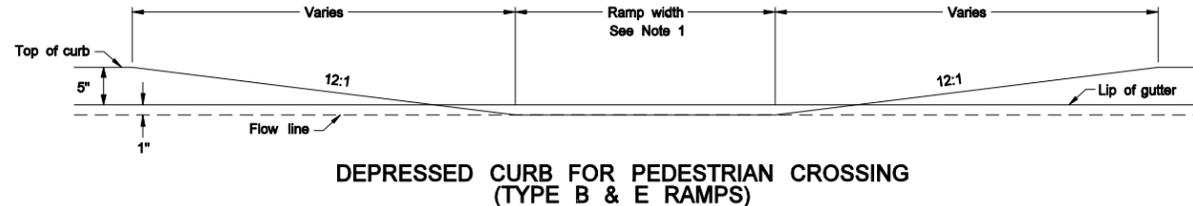
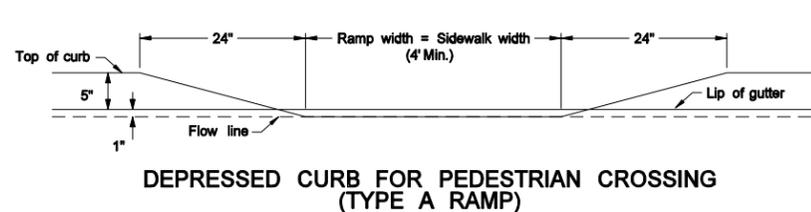
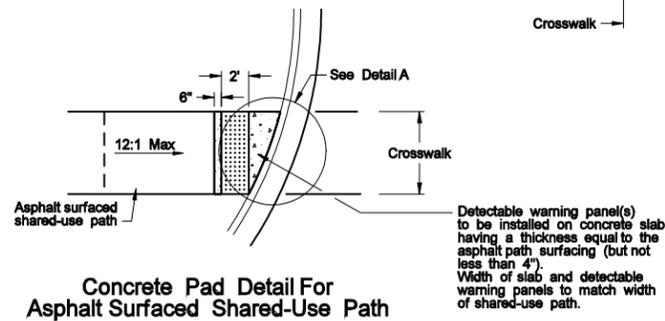
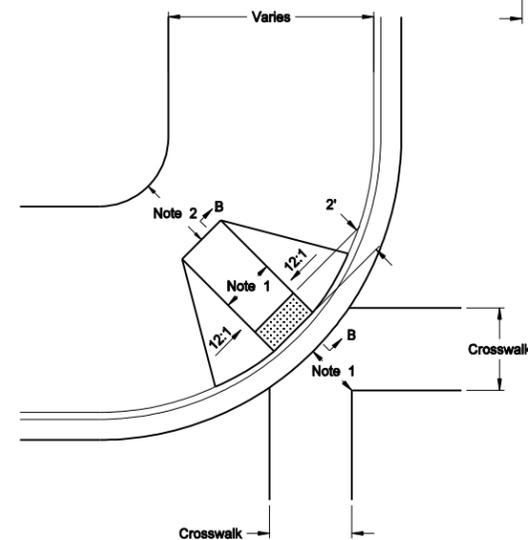
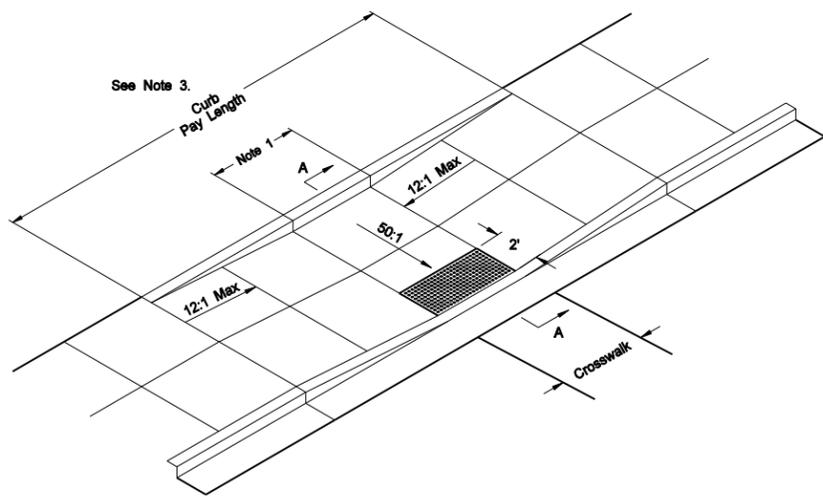
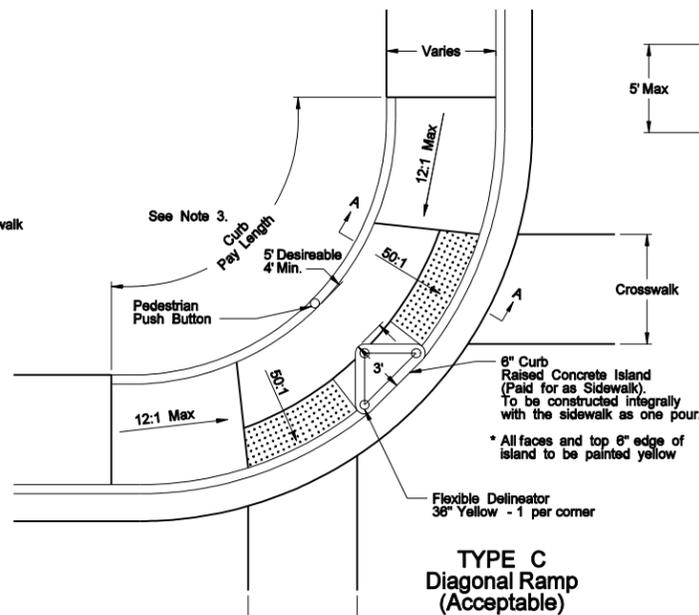
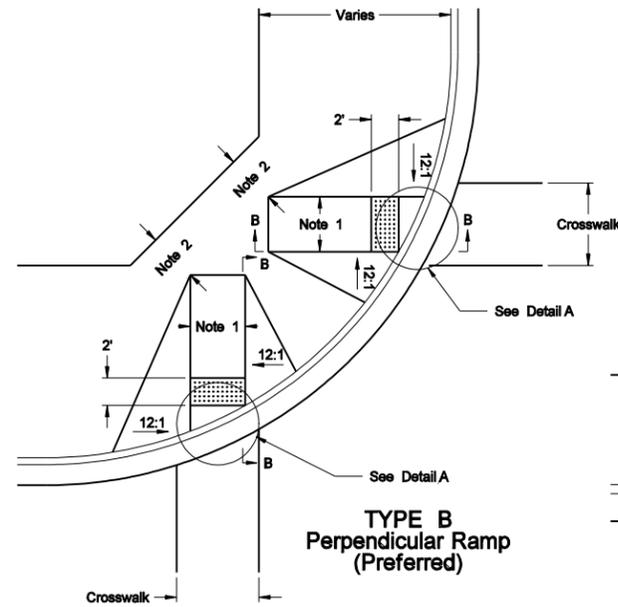
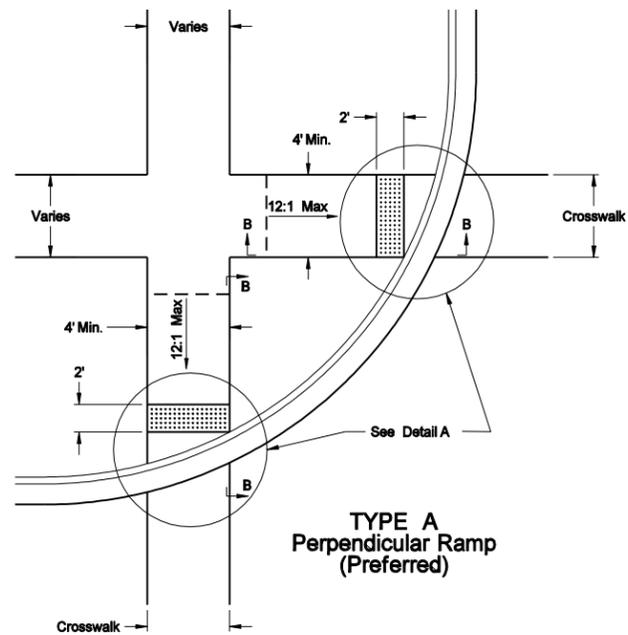
1. Method of payment: The curb ramp will not be paid for separately, but shall be included in the quantities & paid for at the unit price for concrete sidewalk and curb & gutter.
2. The cost for all labor, equipment, and material (pre-molded expansion material & hot bituminous joint filler) necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk.
3. 4" base material shall be placed under the concrete sidewalk. All labor and materials necessary to place the base material shall be included in the price bid for Salvage Base Course or Aggregate Base Course CL 5.
4. Details showing curb ramps and detectable warning panels on this drawing are for joint and reinforcing layout purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
5. As shown in the plans or as directed by the engineer, a curb shall be constructed where the existing sidewalk is to be lowered, or abuts a building or adjacent property. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.
6. Transverse sidewalk joint spacing shall vary from 4'-6" to create approximate square panels. When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied so that the sidewalk joints match up with the curb & gutter joints.
7. Longitudinal joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 10-1-88	
REVISIONS	
DATE	CHANGE
09-01-82	Remove Detectable Warning
09-23-82	Revised Expansion Joint
12-05-83	Isolation Joint
02-16-84	General Revisions
07-18-01	Revised Joints
03-11-02	Revised Section A-A
10-23-03	Added detectable warning
01-15-04	Added Maximum Slopes
01-24-04	Rev notes - Added base
12-01-04	PE Stamp added
09-12-07	Major Revisions
11-02-07	Thickened sidewalk abutting curb & gutter, added concrete median detail

This document was originally issued and sealed by Mark S Gaydos, Registration Number PE- 4518 , on 11/02/07 and the original document is stored at the North Dakota Department of Transportation

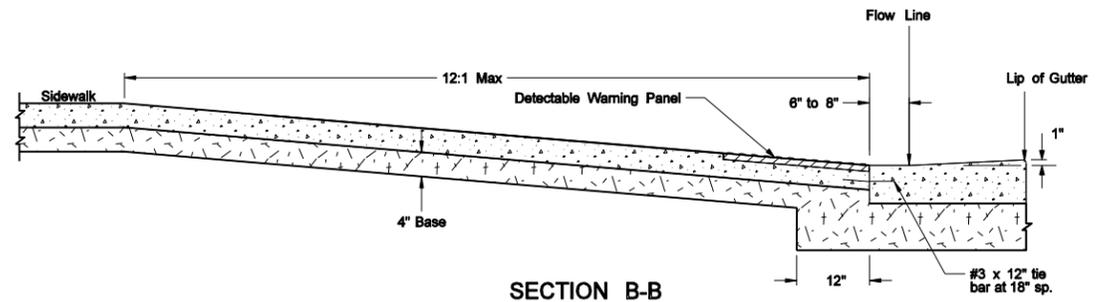
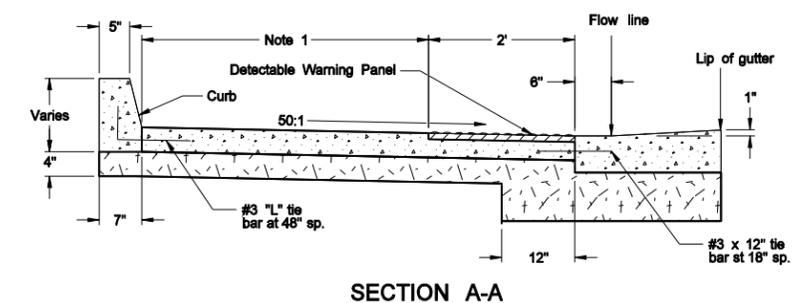
CURB RAMP DETAILS

D-750-3



- Notes:**
- For sidewalk installations, a 5' ramp width should be used. Where site conditions do not allow a 5' ramp width, a 4' ramp width may be used. Detectable warning panels shall be installed to match the ramp width (Ramp width is defined as the useable portion of ramp, excluding flared aprons if used).
 - 5' is desirable but 4' is the minimum allowable distance. If the 4' minimum distance cannot be provided, Ramp Type C shall be used.
 - The curb shown in the details for Type C and D curb ramps shall be measured by the lineal foot, and paid for at the unit price bid for the item "Curb - Type I."

Detectable Warning Panel(s)

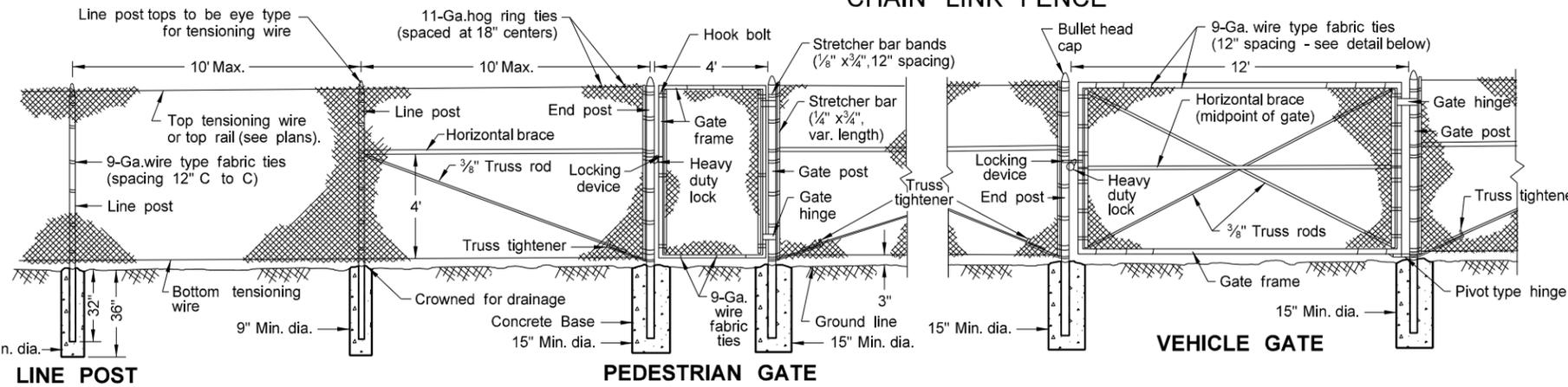
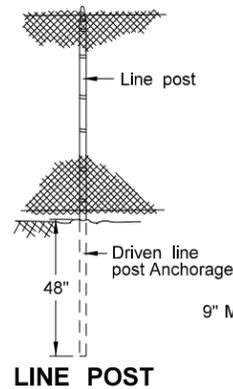


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09-13-07	
REVISIONS	
DATE	CHANGE
09-20-07	Revised detail A
10-26-07	Revised Section B-B, detail C, misc. labeling, Notes, and added concrete pad detail.
12-18-07	Revised Note 1.

This document was originally issued and sealed by
Mark S Gaydos,
 Registration Number
PE- 4518 ,
 on 12/18/07 and the original document is stored at the North Dakota Department of Transportation

CHAIN LINK FENCE

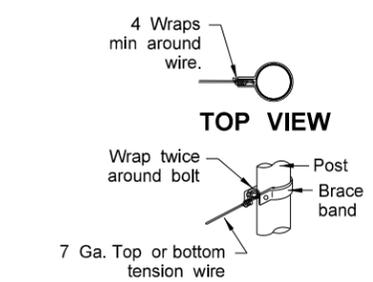
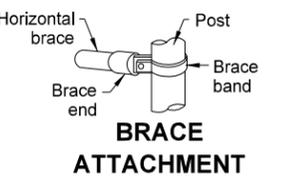
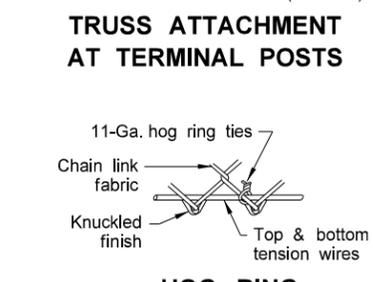
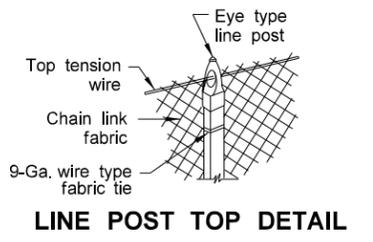
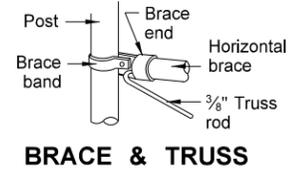
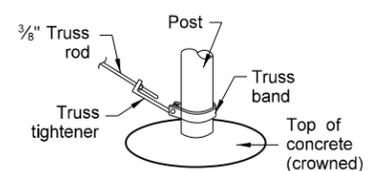
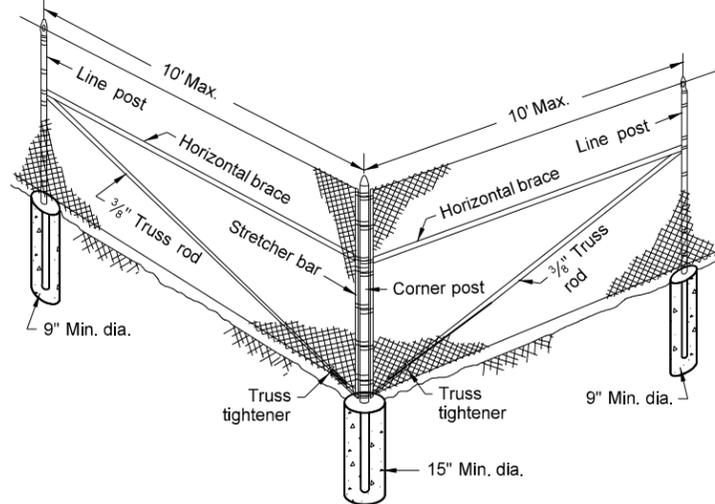
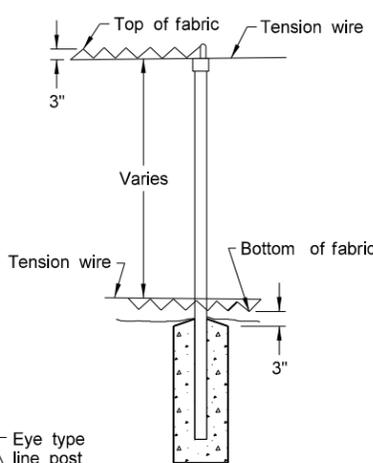
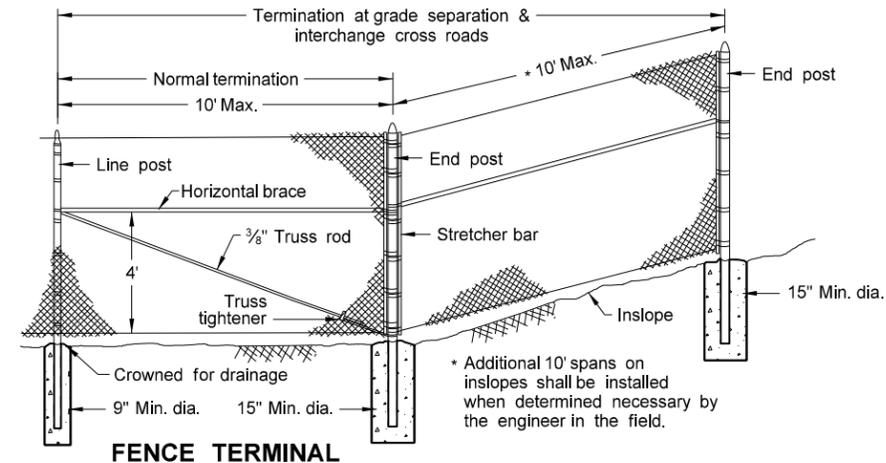
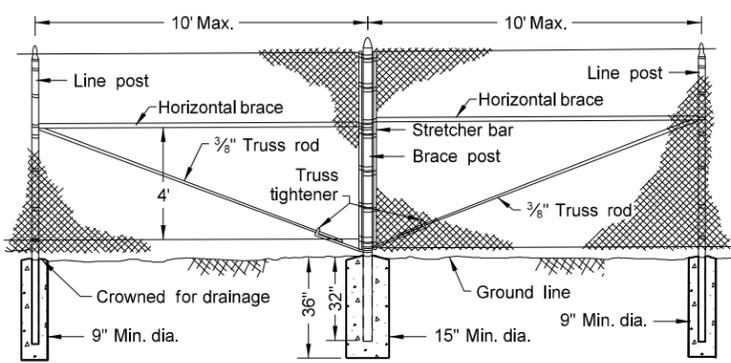
ALTERNATE LINE POST ANCHORAGE



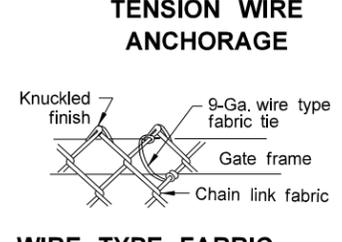
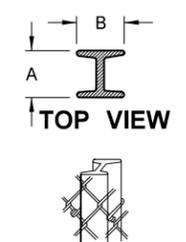
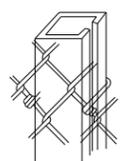
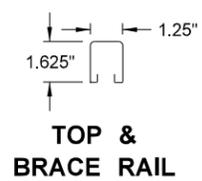
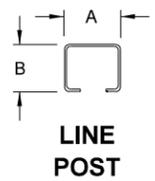
NOTES:

1. Double brace assemblies shall be installed at locations shown on the plans or established by the engineer. The distance between adjacent fence terminals, corner assemblies, or double brace assemblies shall not exceed 1000 feet. No deduction in measured pay length of chain link fence will be made for gates, corner assemblies, double brace assemblies, or fence terminals.
2. All miscellaneous fittings shall be of the type and size recommended by the manufacturer of the fence and approved by the engineer.
3. Height of fabric shall be 6' unless otherwise shown on the plans.
4. Concrete for the post bases shall be Class YE in accordance with Sec. 802 of the Standard Specifications. Course aggregate for concrete mix shall be size No. 4 or 5 at the option of the contractor but shall not be changed during the work except by written permission of the engineer.
5. The contractor shall have the option of using any of the types of posts shown in the table of equivalent post sizes and weights for the specified use.
6. Private fences shall not be connected to the highway right-of-way fence, but may be abutted next to the right-of-way fence.
7. A concrete anchorage shall be used for all end, corner, and brace posts, and for the first line post(s) adjacent to the terminal posts.

LINE POST



EQUIVALENT POST SIZES AND WEIGHTS										
USE OF POST	FABRIC HEIGHT	ROUND STEEL			ROLL FORMED			"H" COLUMN STEEL		
		Size	Weight - Lbs./Ft.		Size	Weight	Size		Weight	
		Out. Dia.	Grade 1	Grade 2	A	B	Lbs./Ft.	A	B	Lbs./Ft.
LINE POST	6' or less	1.900"	2.72	2.28	1.875"	1.625"	2.40	2.25"	1.70"	3.26
	Over 6'	2.375"	3.65	3.12	2.25"	1.70"	2.78	2.25"	1.70"	3.26
END or CORNER	6' or less	2.375"	3.65	3.12	ROLL FORMED STEEL POSTS NOT PERMITTED	"H" COLUMN STEEL POSTS NOT PERMITTED				
	Over 6'	2.875"	5.79	4.64						
BRACE POST	6' or less	2.375"	3.65	3.12	ROLL FORMED STEEL POSTS NOT PERMITTED	"H" COLUMN STEEL POSTS NOT PERMITTED				
	Over 6'	2.875"	5.79	4.64						
GATE POST	6' or less	3.500"	7.58	5.71	ROLL FORMED STEEL POSTS NOT PERMITTED	"H" COLUMN STEEL POSTS NOT PERMITTED				
	Over 6'	4.000"	9.11	6.56						
EXTERIOR FRAME FOR GATE	Gate width 6' or less	1.660"	2.27	1.84	ROLL FORMED STEEL POSTS NOT PERMITTED	"H" COLUMN STEEL POSTS NOT PERMITTED				
	Gate width over 6'	1.900"	2.72	2.28						
HORIZONTAL BRACE	All	1.660"	2.27	1.84	1.625" x 1.25"		1.35			



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-5-09	
REVISIONS	
DATE	CHANGE
9-28-10	Revised Equivalent Post Sizes and Weights, details, & notes

This document was originally issued and sealed by Roger Weigel
Registration Number PE- 2930 ,
on 9/28/10 and the original document is stored at the North Dakota Department of Transportation

NOTES:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

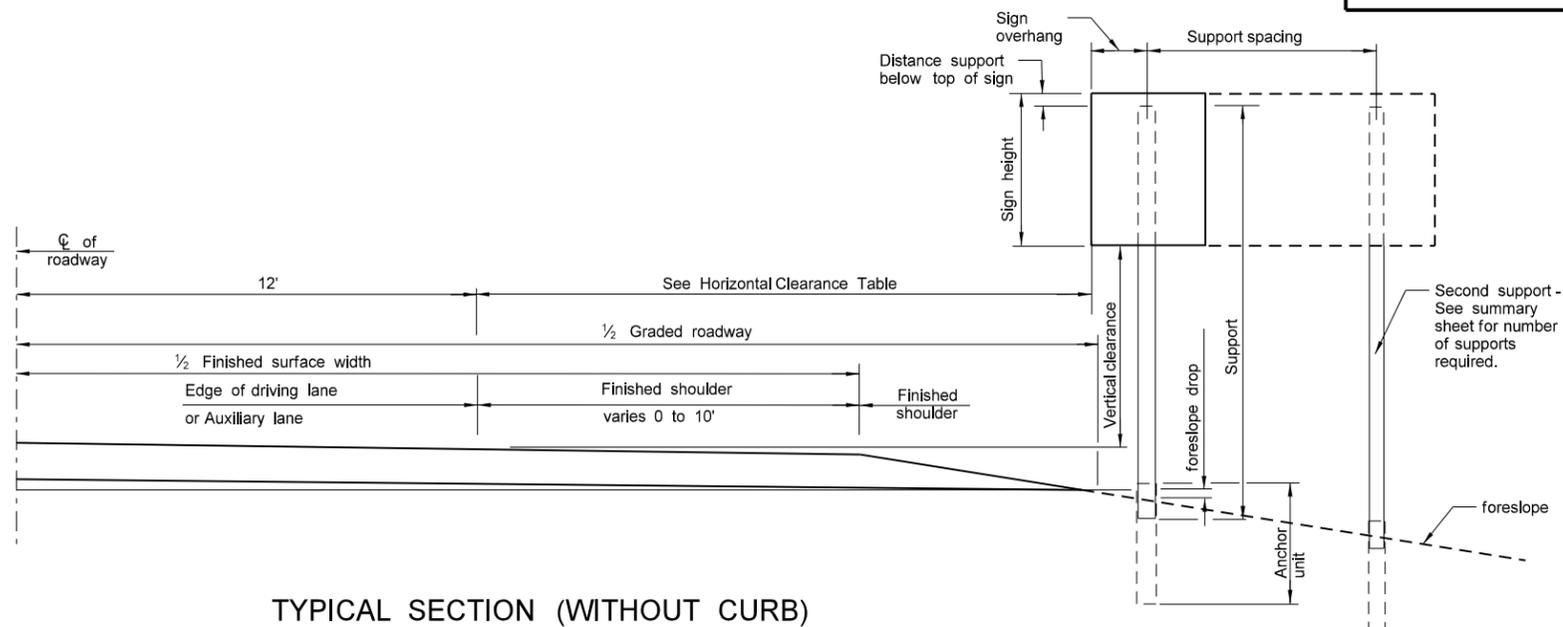
2. Minimum Vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.

Directional signs on expressways and freeways shall be installed with a minimum height of 7'. If the secondary sign is mounted below another sign, the major sign shall be installed at least 8' and the secondary sign shall be installed at least 5' above the edge of the driving lane. All route signs, warning signs, and regulatory signs on expressways and freeways shall be at least 7' above the edge of the driving lane. Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.

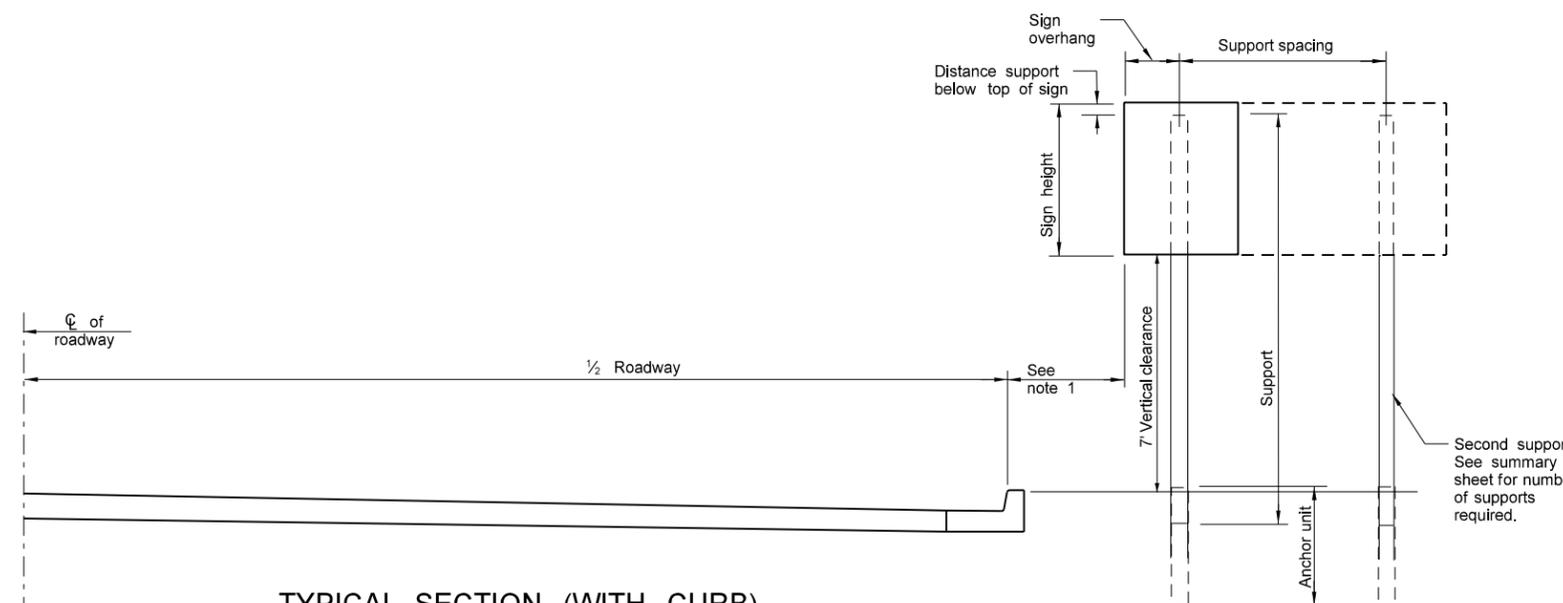
The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.

HORIZONTAL CLEARANCE TABLE	
SHOULDER WIDTH ft	OFFSET ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24

ASSEMBLY DETAILS

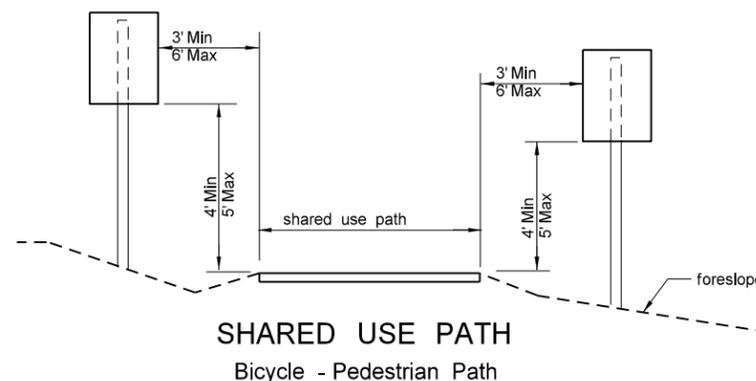


TYPICAL SECTION (WITHOUT CURB)



TYPICAL SECTION (WITH CURB)

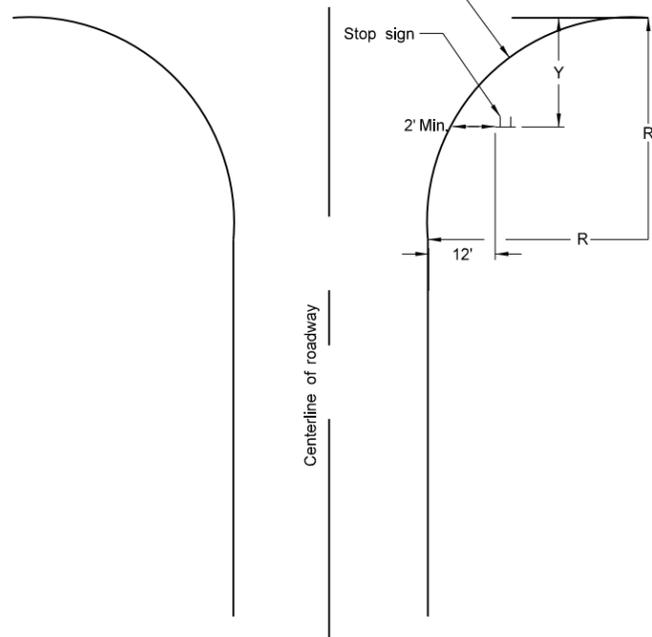
Residential or Business District



SHARED USE PATH

Bicycle - Pedestrian Path

Face of curb or edge of driving lane



STOP SIGN LOCATION WIDE THROAT INTERSECTION

Note: This layout is to be used for the placement of "Stop" signs.

R=Radius	Y-Max	Y-Min
40'	50'	15'
45'	50'	18'
50'	50'	21'
55'	50'	25'
60'	50'	28'
65'	50'	32'
70'	50'	35'
75'	50'	39'
80'	50'	43'

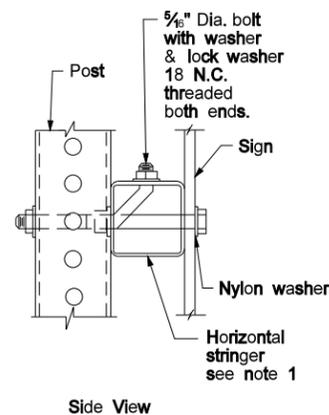
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation

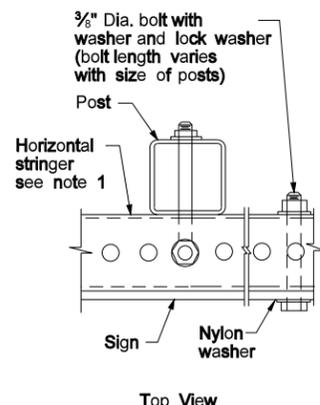
Mounting Details Perforated Tube

Note:

- Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1 1/2" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
- Metal washers used on sign face shall have a minimum outside diameter of 5/8" ± 1/16" and 10 gauge thickness.
- No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers. Material used for the attachment strap shall be included in the price bid for "Flat sheet for signs."
- In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

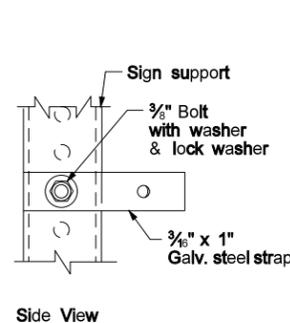


Side View

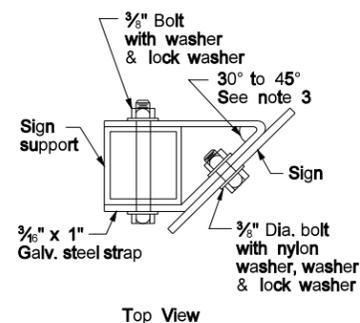


Top View

STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)

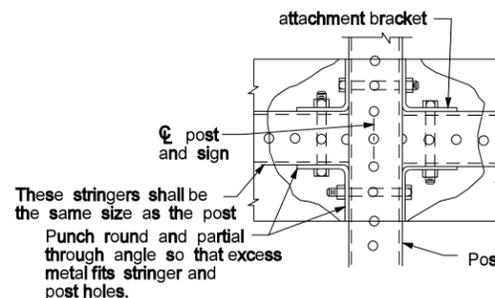


Side View



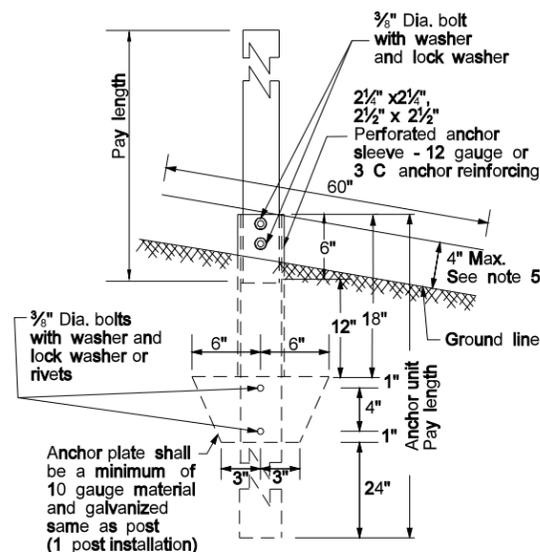
Top View

STRAP DETAIL

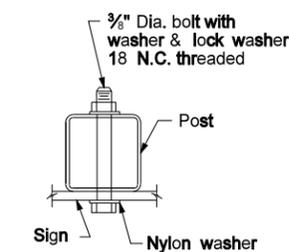
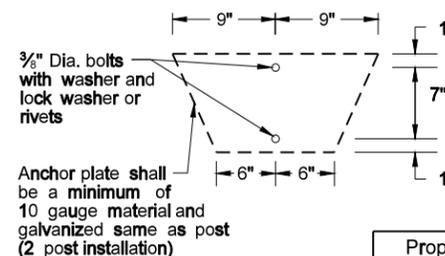


These stringers shall be the same size as the post. Punch round and partial through angle so that excess metal fits stringer and post holes.

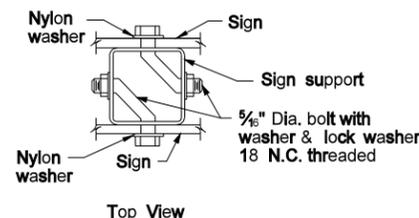
STREET NAME SIGNS
AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR
BACK TO BACK MOUNTING



ANCHOR UNIT AND
POST ASSEMBLY



BOLT MOUNTING



Top View

BACK TO BACK
MOUNTING

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783

The 2 1/4" size 10 gauge is shown as 2.19" size on the plans.
The 2 1/2" size is shown as 2.51" size on the plans.

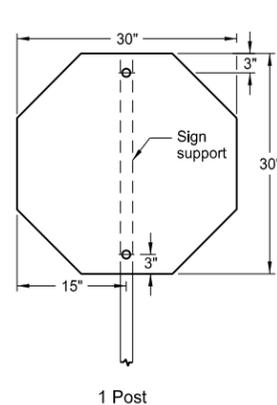
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/8	10	Yes		7

(B) - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

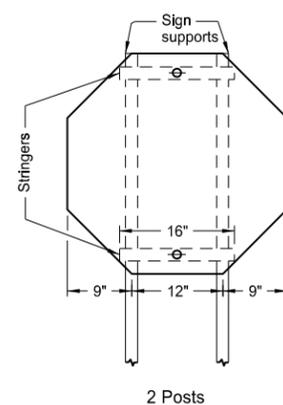
This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 08/06/09 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

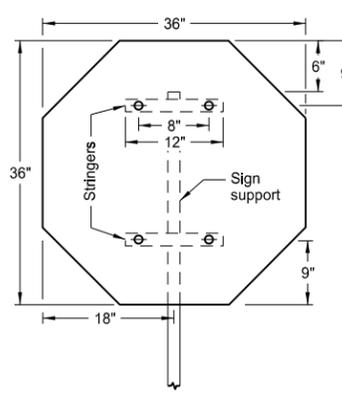


1 Post

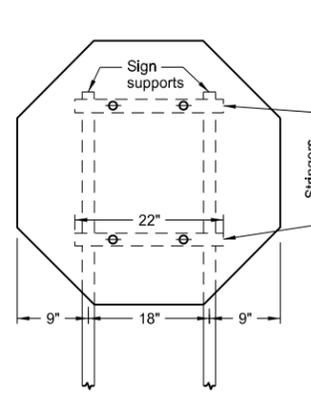
Assembly No. 1



2 Posts

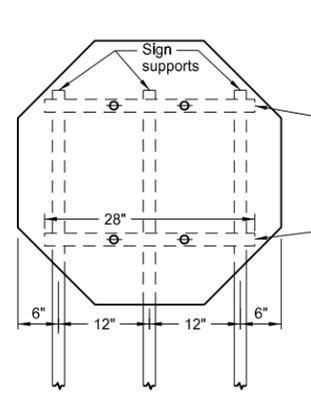


1 Post



2 Posts

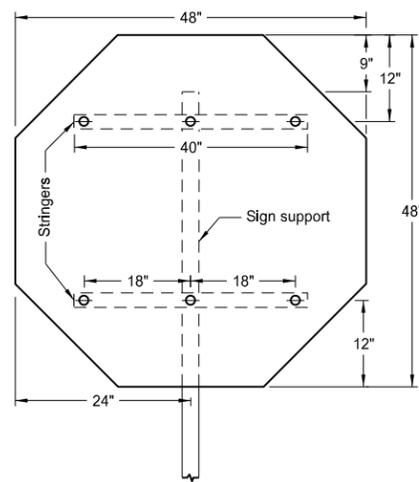
Assembly No. 2



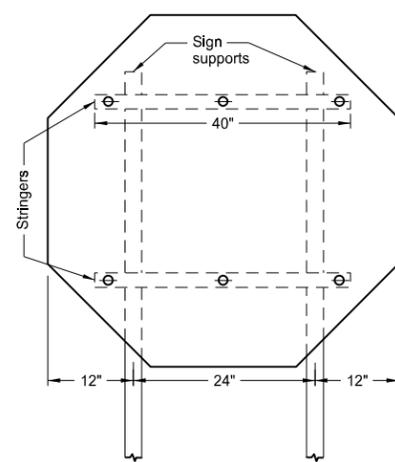
3 Posts

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1 1/2" x 1 1/2".
4. All holes shall be punched round for 3/8" bolt.

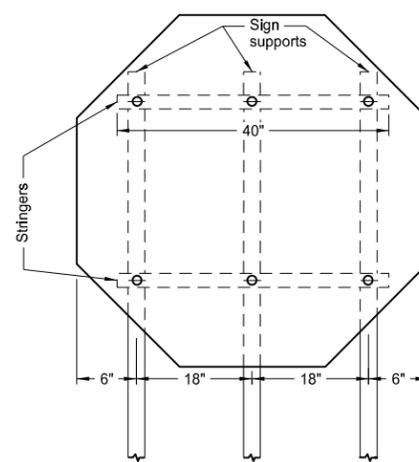


1 Post

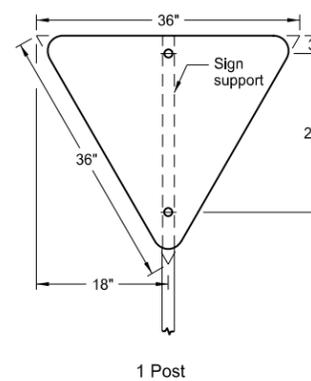


2 Posts

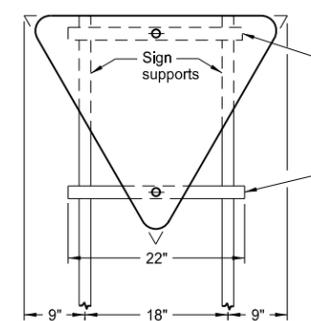
Assembly No. 3



3 Posts

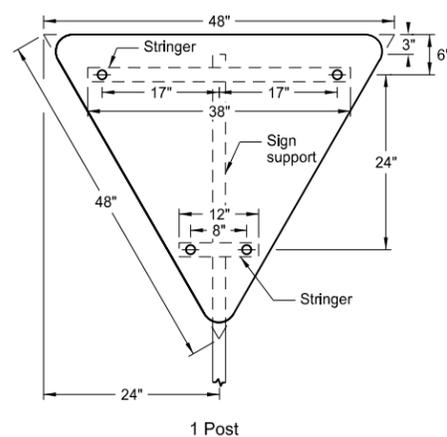


1 Post

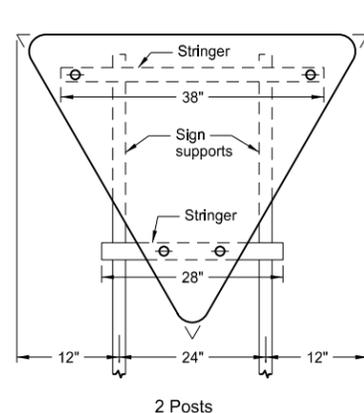


2 Posts

Assembly No. 4

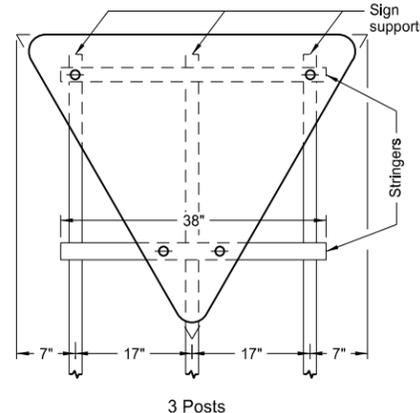


1 Post



2 Posts

Assembly No. 5

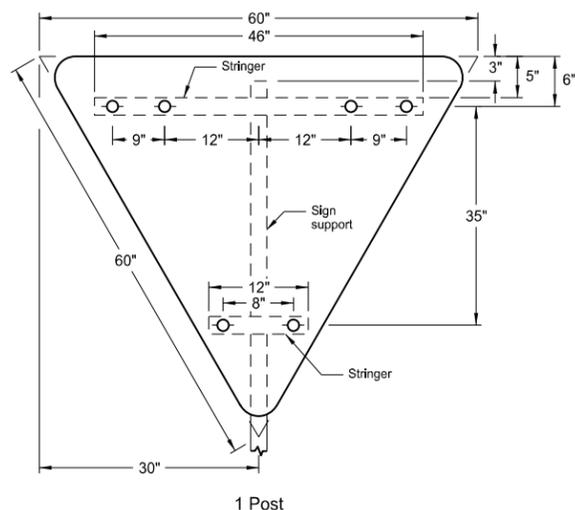


3 Posts

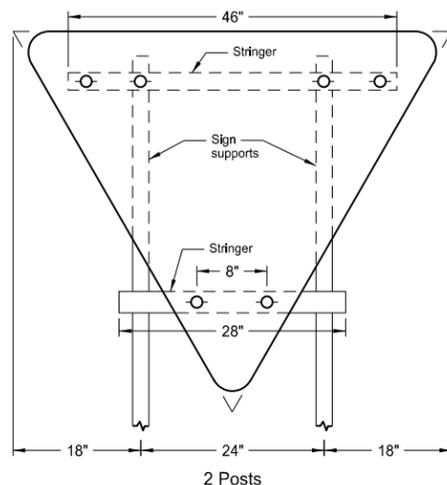
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation

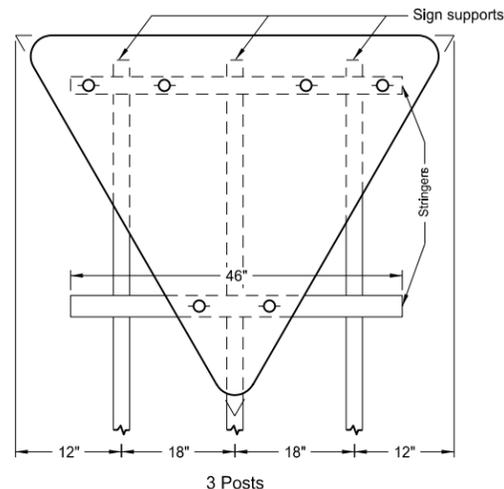
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

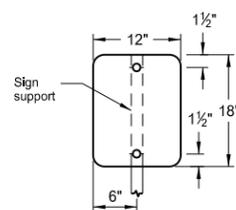


3 Posts

Assembly No. 6

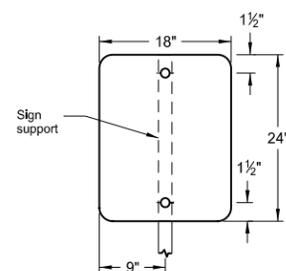
Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ¾" bolt.



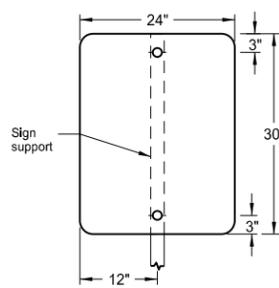
1 Post

Assembly No. 7



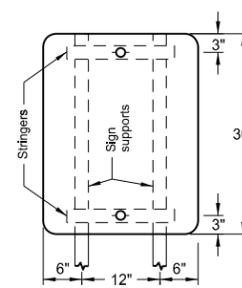
1 Post

Assembly No. 8

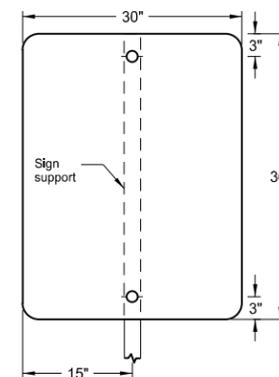


1 Post

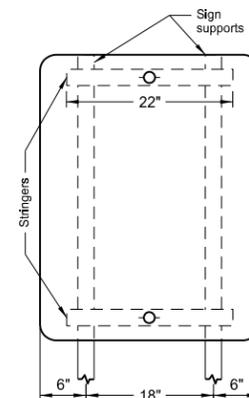
Assembly No. 9



2 Posts

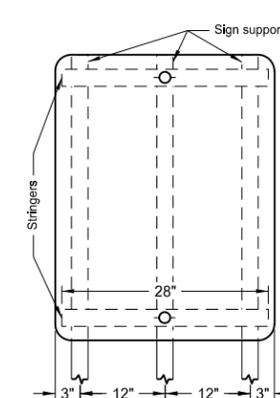


1 Post

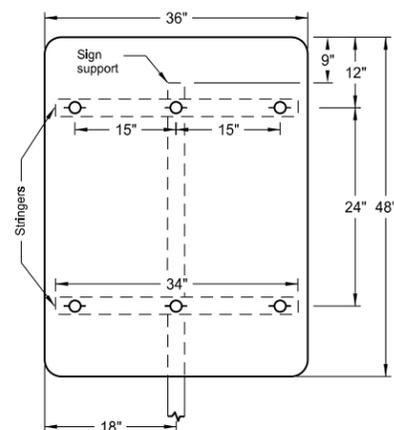


2 Posts

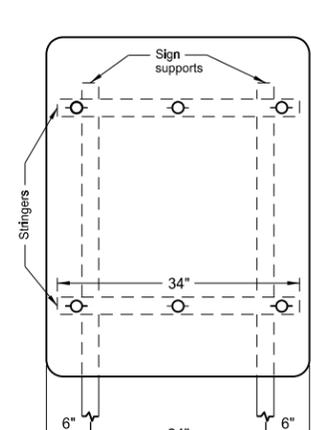
Assembly No. 10



3 Posts

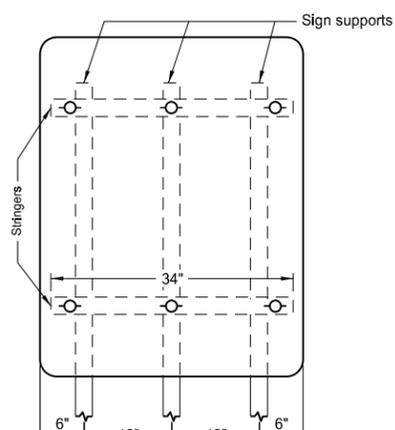


1 Post



2 Posts

Assembly No. 11



3 Posts

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation

