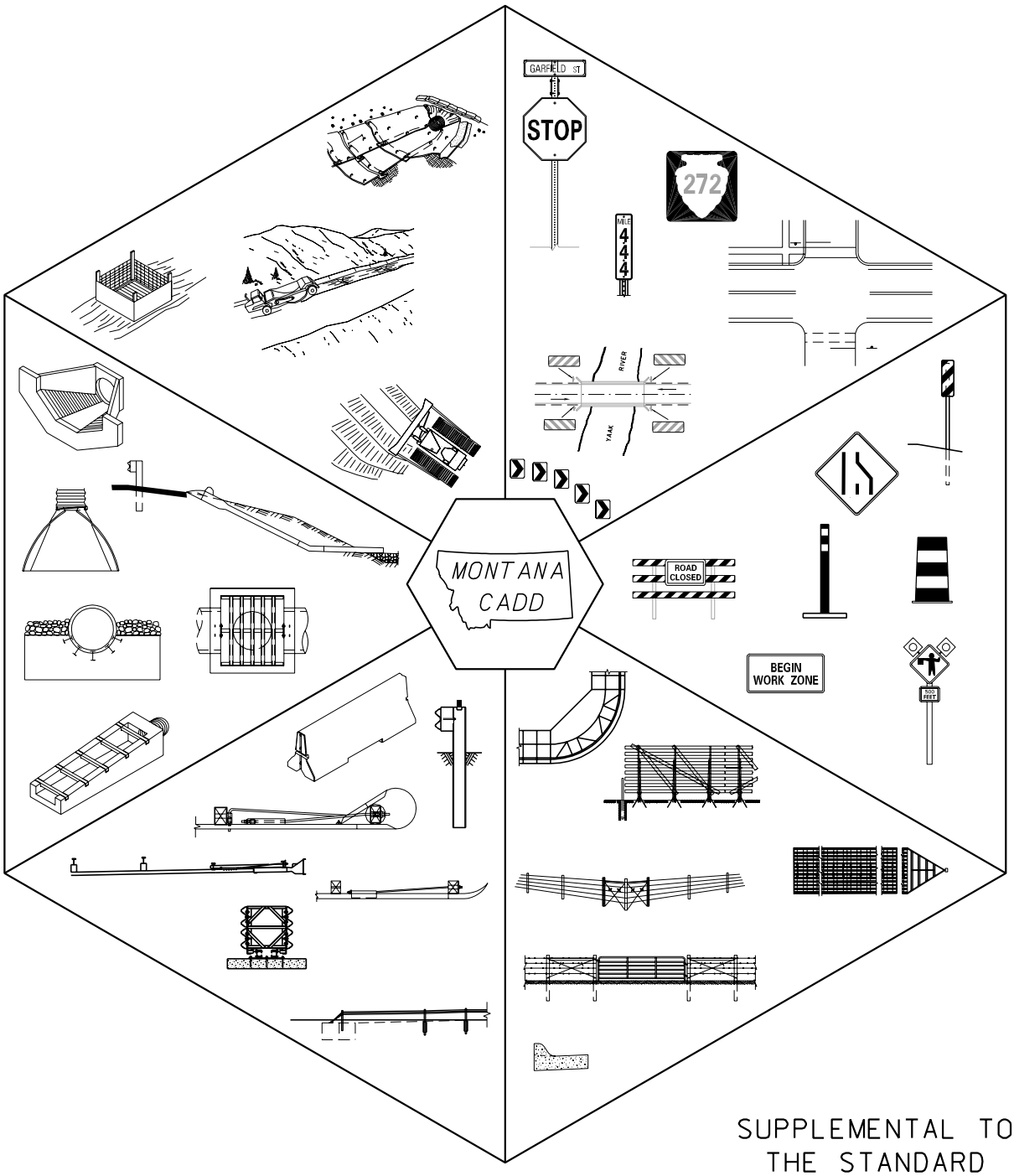
DETAILED DRAWINGS

METRIC EDITION

EFFECTIVE: FEBRUARY 2005



SUPPLEMENTAL TO
THE STANDARD
SPECIFICATIONS FOR
ROAD AND BRIDGE
CONSTRUCTION

serving you with pride

MONTANA DEPARTMENT
OF TRANSPORTATION

DETAILED DRAWINGS

FORWARD

ENCLOSED IS THE CURRENT SET OF DETAILED DRAWINGS CONSISTING OF METRIC DIMENSIONS AND QUANTITIES. IT IS A COMBINATION OF HARD AND SOFT NUMBERS. WHERE INDUSTRY HAS ALLOWED, HARD NUMBERS HAVE BEEN SPECIFIED. THE REMAINING NUMBERS HAVE BEEN SOFT COVERTED AND ROUNDED AS APPROPRIATE. AS INDUSTRY CHANGES AND PROGRESSES, SO WILL THE DETAILED DRAWINGS.

IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, COMPLY WITH REASONABLE AND CUSTOMARY MANUFACTURING AND CONSTRUCTION TOLERANCES WHERE WORKING TOLERANCES ARE NOT SPECIFIED.

SOME DISCREPANCIES MAY BE FOUND, IMPACTING THE CONSTRUCTABILITY OF CERTAIN ITEMS. PLEASE REPORT PROBLEMS AND ERRORS TO THE CONSTRUCTION BUREAU SO THAT THEY MAY BE RESOLVED IN FUTURE DETAILED DRAWINGS.

DETAILED DRAWINGS

TABLE OF CONTENTS

METRIC EDITION
EFFECTIVE: FEBRUARY 2005

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER
SECTION 101: DEFINITIONS AND TERMS	
ABBREVIATIONS	101–05
ABBREVIATIONS	101–06
ABBREVIATIONS	101–07
ABBREVIATIONS	101–08
SYMBOLS	101–10
SECTION 203: EXCAVATION AND EMBANKMENT	
ROADWAY EMBANKMENT AT BRIDGE END	203–00
APPROACHES	203–05
MAILBOX TURNOUT	203–15
DITCH BLOCKS	203–20
SECTION 208: WATER POLLUTION CONTROL AND STREAM PRESERVATION	
SCHEDULE OF BEST MANAGEMENT PRACTICES	208–00
INLET/OUTLET PROTECTION	208–1A
WATERWAY PROTECTION	208–1B
WATER RESOURCE PROTECTION	208–1C
PRESERVATION OF EXISTING VEGETATION (SS–2)	208–02
HYDRAULIC MULCH (SS–3)	208–04
TEMPORARY SEEDING (SS–4)	208–06
SOIL BINDERS (SS–5)	208–08
STRAW MULCH (SS–6)	208–10
GEOTEXTILES, PLASTIC COVERS & EROSION CONT. BLANKETS / MATS (SS–7)	208–12A
GEOTEXTILES, PLASTIC COVERS & EROSION CONT. BLANKETS / MATS (SS–7)	208–12B
WOOD MULCH (SS–8)	208–14
EARTH DIKES / DRAINAGE SWALES & LINED DITCHES (SS–9)	208–16
OUTLET PROTECTION / VELOCITY DISSIPATION DEVICES (SS–10)	208–18
SLOPE DRAINS (SS–11)	208–20
SLOPE ROUGHENING (SS–12)	208–22
TERRACED SLOPES (SS–13)	208–24
VEGETATED BUFFER (SS–14)	208–26
EROSION SEEDING (SS–15)	208–28
SILT FENCE (SC–1)	208–30
DESILTING BASIN (SC–2)	208–32A
DESILTING BASIN (SC–2)	208–32B
SEDIMENT TRAP (SC–3)	208–34
CHECK DAMS (SC–4)	208–36
FIBER ROLLS (SC–5)	208–38
GRAVEL BAG BERM (SC–6)	208–40
SAND BAG BARRIERS (SC–8)	208–42

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER
STRAW BALE BARRIERS (SC–9)	208–44
STORM DRAIN INLET PROTECTION (SC–10)	208–46A
STORM DRAIN INLET PROTECTION (SC–10)	208–46B
DUGOUT DITCH BASIN (SC–11)	208–48
WIND EROSION CONTROL (WE–1)	208–50
SNOW ACCUMULATION MANAGEMENT (SN–2)	208–52
FREEZE REDUCTION (SN–3)	208–54
STABALIZED CONSTRUCTION ENTRANCE / EXIT (TC–1)	208–56
ENTRANCE / EXIT TIRE WASH (TC–3)	208–58
TEMPORARY STREAM CROSSINGS (NS–4)	208–60
SECTION 401: COLD MILLING	
SHOULDER RUMBLE STRIPS	401–02
SECTION 552: CONCRETE STRUCTURES	
CONCRETE CUTOFF WALLS FOR CULVERTS	552–00
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	552–04
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	552–06
CONCRETE, RIPRAP AND BEDDING MATERIAL QUANTITIES FOR SING. AND DBL. CULVERT INSTALLATION	552–08
SECTION 603: CULVERTS, STORM DRAINS, SANITARY SEWERS, STOCKPASSES AND UNDERPASSES	
CMP FLARED END TERMINAL SECTION (FETS)	603–02
PREFABRICATED RCP FLARED END TERMINAL SECTION (FETS)	603–08
PREFABRICATED RCP ARCH FLARED END TERMINAL SECTION (FETS)	603–10
RCP ROAD APPROACH CULVERT END TREATMENT (RACET)	603–12
CMP ROAD APPROACH CULVERT END TREATMENT (RACET)	603–14
PRECAST MEDIAN U–TURN CROSS DRAIN AND CONC. BEVELED END	603–17
CSP AND SSPP CULVERT BEDDING	603–18
RCP CULVERT BEDDING	603–20
WATER TIGHT JOINT FOR REINFORCED CONCRETE PIPE	603–22
REINFORCED CONCRETE PIPE JOINT	603–24
TYPICAL FIELD CAST CONCRETE CONNECTIONS	603–26
EMBANKMENT PROTECTOR	603–28
VEHICULAR UNDERPASS AND BACKFILL RETAINER & CUTOFF WALL DETAIL	603–30
STEP BEVEL FOR CIRCULAR METAL CULVERT	603–32
BEVEL ON ARCH METAL CULVERT	603–34
CORRUGATED STEEL PIPE STOCKPASS	603–36
SECTION 604: MANHOLES, COMBINATION MANHOLES AND INLETS, AND INLETS	
MEDIAN INLET COVER	604–00
CONCRETE MANHOLE	604–02
CURB INLET TYPE II	604–03
DROP INLET TYPE IV	604–04
TYPE IV DROP INLET WITH SLOTTED DRAIN	604–06

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER

TYPE II CURB INLET WITH SLOTTED DRAIN 604–08
DROP INLETS 604–14

SECTION 606: GUARDRAIL AND CONCRETE BARRIER RAIL

METAL GUARDRAIL – WOOD POSTS 606–05A
METAL GUARDRAIL – STEEL POSTS 606–05B
STIFFENED GUARDRAIL SECTIONS 606–07
NESTED W–BEAM GUARDRAIL 606–09
OPTIONAL TERMINAL SECTION – ET–PLUS 606–13A
OPTIONAL TERMINAL SECTION – SKT 350 . . . . . 606–13B
ONE–WAY DEPARTURE TERMINAL SECTION 606–18
BRIDGE APPROACH SECTIONS – WOOD POSTS 606–24A
BRIDGE APPROACH SECTIONS – STEEL POSTS 606–24B
SKEWED BRIDGE APPROACH SECTIONS – WOOD POSTS 606–25A
SKEWED BRIDGE APPROACH SECTIONS – STEEL POSTS 606–25B
TAPERED CONCRETE CURB DETAIL 606–26
TAPERED CONCRETE CURB DETAIL 606–27
IMPACT ATTENUATOR – QUADGUARD 606–30A
IMPACT ATTENUATOR – TRACC 606–30B
IMPACT ATTENUATOR – QUADGUARD ASSEMBLY DETAILS 606–31A
IMPACT ATTENUATOR – TRACC ASSEMBLY DETAILS 606–31B
CABLE GUARDRAIL 606–40
CABLE GUARDRAIL TERMINAL ANCHOR ASSEMBLY 606–41
INTERSECTING ROADWAY TERMINAL SECTION 606–46
BOX BEAM GUARDRAIL 606–50
BOX BEAM ONE–WAY DEPARTURE TERMINAL SECTION 606–52
BOX BEAM BRIDGE APPROACH SECTIONS 606–53
BOX BEAM ONE–WAY BRIDGE DEPARTURE SECTION 606–54
OPTIONAL BOX BEAM TERMINAL SECTION – WY–BET 606–55A
OPTIONAL BOX BEAM TERMINAL SECTION – BEAT 606–55B
WY–BET BOX BEAM TERMINAL SECTION DETAILS 606–56A
BEAT BOX BEAM TERMINAL SECTION DETAILS 606–56B
BOX BEAM TO W–BEAM TRANSITION SECTION 606–58
CONCRETE BARRIER RAIL 606–60
ALTERNATE CONCRETE BARRIER RAIL 606–61
CONCRETE BARRIER RAIL ANCHORS 606–62
TALL CONCRETE BARRIER RAIL 606–64
ALTERNATE TALL CONCRETE BARRIER RAIL 606–65
CONCRETE BARRIER RAIL TRANSITION 606–66
CONCRETE BARRIER RAIL TERMINAL SECTION (ONE–WAY DEPARTURE) 606–68
SCHEDULE OF GUARDRAIL HARDWARE 606–80
GUARDRAIL HARDWARE 606–82
W–BEAM METAL GUARDRAIL HARDWARE 606–84
W–BEAM METAL GUARDRAIL HARDWARE 606–88
CABLE GUARDRAIL HARDWARE 606–92
CABLE GUARDRAIL HARDWARE 606–94
CABLE GUARDRAIL HARDWARE 606–95
BOX BEAM GUARDRAIL HARDWARE 606–97

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER

BOX BEAM GUARDRAIL HARDWARE 606–98

SECTION 607: FENCES

FARM FENCE 607–00
INTERSTATE FENCE 607–05
FENCING DETAILS 607–10
FENCING DETAILS 607–15
FARM ENTRANCE GATES 607–20
CHAIN LINK FENCE 607–25
2.4 m WOOD SNOW FENCE W/ ANCHOR SYSTEM #1 607–30
3.6 m WOOD SNOW FENCE W/ ANCHOR SYSTEM #1 607–35
WOOD SNOW FENCE ANCHOR SYSTEM #3 AND #1 DETAILS 607–40
WOOD SNOW FENCE ANCHOR SYSTEM #2 DETAILS 607–45

SECTION 608: CONCRETE SIDEWALKS

CONCRETE SIDEWALK 608–05
NEW CONSTRUCTION PUBLIC SIDEWALK CURB RAMPS 608–15
ALTERATIONS TO EXISTING FACILITIES – PUBLIC SIDEWALK CURB RAMPS 608–20
PERPENDICULAR PUBLIC SIDEWALK CURB RAMPS 608–25
PARALLEL PUBLIC SIDEWALK CURB RAMPS 608–30
DIAGONAL PERPENDICULAR PUBLIC SIDEWALK CURB RAMPS 608–35
TRUNCATED DOMES 608–40

SECTION 609: CURBS AND GUTTERS

CONCRETE VALLEY GUTTER 609–00
MISCELLANEOUS CURBS 609–05
MEDIAN CONCRETE CURBS 609–10
CONCRETE MEDIAN CAPS 609–12

SECTION 610: ROADSIDE RE–VEGETATION

TOPSOIL AND SEEDING 610–00

SECTION 611: CATTLE GUARDS

CAST–IN–PLACE CATTLE GUARD 611–00
CAST–IN–PLACE CATTLE GUARD REBAR DETAILS 611–05
PRECAST CONCRETE BASE FOR CATTLE GUARD – APPROACHES 611–10
PRECAST CONCRETE BASE FOR CATTLE GUARD 611–15
PRECAST CONCRETE CATTLE GUARD BASE DETAILS 611–20

SECTION 613: RIPRAP AND SLOPE AND BANK PROTECTION

CONCRETE EDGE PROTECTION FOR METAL CULVERTS 613–06
CONCRETE EDGE PROTECTION FOR CONCRETE CULVERTS 613–08
CONCRETE SLOPE PROTECTION 613–10
INLET AND OUTLET HEADWALLS FOR RCP AND CMP PIPES 613–12
CULVERT RIPRAP 613–14
EMBANKMENT PROTECTION 613–16
CONCRETE DRAINAGE CHUTE 613–18

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER

SECTION 615: IRRIGATION FACILITIES AND HEADWALLS

TRASHGUARD FOR CONCRETE IRRIGATION INLET AND OUTLET TRANSITION STRUCTURES 615–02
STANDARD CONCRETE IRRIGATION DIVISION BOXES 615–04
CONCRETE IRRIGATION INLET AND OUTLET TRANSITION FOR RCP AND CSP PIPES 615–06

SECTION 617: TRAFFIC SIGNALS AND LIGHTING

ROAD CLOSURE GATE 617–00
ROAD CLOSURE GATE DETAILS 617–02
ROAD CLOSURE GATE PIVOT ASSEMBLY 617–04
ROAD CLOSURE GATE PIVOT ASSEMBLY DETAILS 617–06
FOUR BOLT SLIP BASE 617–08
FOUR BOLT SLIP BASE DETAILS 617–10

SECTION 618: TRAFFIC CONTROL

BARRICADES AND CHANNELIZING DEVICES 618–00
CONSTRUCTION SIGN DETAILS 618–01
PORTABLE SIGN SUPPORT ASSEMBLY 618–02
TWO–LANE CONSTRUCTION PROJECT 618–04
TWO–LANE CONSTRUCTION PROJECT WORK ZONES 618–08
TWO–LANE CONSTRUCTION PROJECT SEAL COAT 618–10
TWO–LANE CONSTRUCTION PROJECT LANE CLOSURE 618–12
TWO–LANE EQUIPMENT ENTRANCES 618–14
TWO–LANE EQUIPMENT ENTRANCES 618–16
TWO–LANE CONSTRUCTION PROJECT DETOUR 618–18
DIVIDED FOUR–LANE CONSTRUCTION PROJECT 618–20
TEMPORARY ENTRANCE RAMP MEDIAN CROSSING 618–21
TEMPORARY EXIT RAMP MEDIAN CROSSING 618–22
DIVIDED FOUR–LANE CONSTRUCTION PROJECT WORK ZONES 618–24
DIVIDED FOUR–LANE EQUIPMENT ENTRANCES 618–27
DIVIDED FOUR–LANE MEDIAN CROSSINGS 618–28
TEMPORARY FOUR–LANE TO TWO–LANE MEDIAN CROSSING 618–30
TEMPORARY TWO–LANE TO FOUR–LANE MEDIAN CROSSING 618–32
SHORT DURATION CREW SIGNING 618–34
SHORT–TERM STATIONARY CREW SIGNING 618–36
MAINTENANCE GUIDELINE FOR SHORT–TERM TWO–LANE CRACK SEALING WORK ZONE 618–M1
MAINTENANCE GUIDELINE FOR SHORT–TERM TWO–LANE CHIP SEAL AND OVERLAY (PILOTED TRAFFIC) 618–M2
MAINTENANCE GUIDELINE FOR SHORT–TERM LANE CLOSURE ON INTERSTATE 618–M3

SECTION 619: SIGNS, DELINEATORS AND GUIDEPOSTS

SIGN CLEARANCES AND MOUNTING HEIGHTS 619–00
TYPICAL RURAL AND URBAN APPROACHES 619–02
ALUMINUM SHEET INCREMENT SIGN CONSTRUCTION DETAILS 619–04
PLYWOOD SHEET INCREMENT GUIDE SIGN CONSTRUCTION DETAILS 619–06
GUIDE SIGN CLEARANCE AND MOUNTING DETAILS 619–08

STANDARD SPECIFICATION SECTION AND DRAWING TITLE	DRAWING NUMBER

SHEET ALUMINUM OVERLAY 619–10
TUBULAR SIGN POST DETAILS 619–12
BREAKAWAY AND FOUNDATION DETAILS FOR MULTIPLE GUIDE SIGN SUPPORTS 619–13
TYPICAL STEEL POST MOUNTING DETAILS 619–16
CANTILEVER TYPE SIGN SUPPORT DETAILS FOR SIDEWALK AREAS 619–18
STRUCTURAL STEEL POST SIGN MOUNTING DETAILS 619–19
TREATED WOOD POLE SIGN MOUNTING AND SUPPORT DETAILS 619–20
TREATED WOOD POLE SIGN MOUNTING DETAILS 619–21
TREATED WOOD POLE OPTIONAL BACKBRACE 619–22
CHEVRON MOUNTING DETAILS 619–24
SPECIAL DESIGN ROUTE MARKER PANELS AND SHIELDS 619–26
SIGN HINGE DETAILS 619–30
REFERENCE POST DETAILS 619–32
DELINEATOR DETAILS 619–34
DELINEATOR PLACEMENT DETAILS 619–36
OBJECT MARKER DESIGN AND PLACEMENT DETAILS FOR OBSTRUCTIONS ADJACENT TO OR WITHIN HIGHWAYS 619–38
FLEXIBLE DELINEATORS 619–40
PERMANENT BARRICADE DESIGN DETAILS 619–42
INSTALLATION DATE TAGS 619–44

SECTION 620: PAVEMENT MARKING APPLICATION

PAVEMENT MARKING (LETTERS) 620–00
PAVEMENT MARKING (NUMBERS) 620–05
PAVEMENT MARKING (WORDS) 620–10
PAVEMENT MARKING (ARROWS) 620–15
PAVEMENT MARKING (SYMBOLS) 620–20

SECTION 621: REMOVE, RE–SET AND ADJUST FACILITIES

MANHOLE AND VALVE BOX ADJUSTMENT DETAILS 621–00
OPTIONAL MANHOLE AND VALVE BOX ADJUSTMENT DETAILS 621–05

MISCELLANEOUS

U–TURN MEDIAN OPENINGS ON CONTROLLED ACCESS HIGHWAYS 900–00
MAILBOX DETAIL 900–05
OPTIONAL MAILBOX DETAIL 900–10

&	AND
@	AT
A.A.D.T.	ANNUAL AVERAGE DAILY TRAFFIC
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB.	ABRUPT
A.C.	ALUMINUM CAP OR ASPHALT CEMENT
ADD. EXC.	ADDITIONAL EXCAVATION
ADJ.	ADJUSTED
A.D.T.	AVERAGE DAILY TRAFFIC
AGC	ASSOCIATED GENERAL CONTRACTORS OF AMERICA
AGG.	AGGREGATE
AH.	AHEAD
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APP.	APPROACH
APPL.	APPLICATION
APPROX.	APPROXIMATE
ARTBA	AMERICAN ROAD AND TRANSPORTATION BUILDERS ASSOCIATION
ASPH.	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
AVE.	AVENUE
AVG.	AVERAGE
AWS	AMERICAN WELDING SOCIETY
AZ.	AZIMUTH
BAL.	BALANCE
BBL. OR BBLS.	BARREL OR BARRELS
B.C.	BRASS CAP
B.C.R.	BEGIN CURB RETURN
B.E. OR BE	BRIDGE END
BEG.	BEGIN
BIT.	BITUMINOUS OR BITUMEN
BK.	BACK OR BANK
BLDG.	BUILDING
BLK.	BLOCK
B.L.M. OR BLM	U.S. BUREAU OF LAND MANAGEMENT
BLVD.	BOULEVARD
B.M.	BENCH MARK
BNDRY.	BOUNDARY
BOT.	BOTTOM
BR.	BRIDGE
B.R.	BASE OF RAIL
BRG.	BEARING
B.S. OR BS	BACKSIGHT
B.S.T.	BITUMINOUS SURFACE TREATMENT
B.W.FE.	BARBED WIRE FENCE
C	CUT
C/A	CONTROL OF ACCESS
C.A.C. OR CAC	CRUSHED AGGREGATE COURSE
CALC.	CALCULATED
C.A.P. OR CAP	CORRUGATED ALUMINUM PIPE
CATV	CABLE TV
CB.	CURB
C.B.	CATCH BASIN
C.B.W.	CONCRETE BLOCK WALL
C.C.	CLOSING CORNER
CDTN.	CONDITION
CEM.	CEMENT
C&G	CURB & GUTTER
CH.	CHANNEL OR CHAIN
CH.CH.	CHANNEL CHANGE
CHD.	CHORD
CHIS."x"	CHISELED CROSS
C.I.	CURB INLET
CIR.	CIRCLE
CL.	CLASS OR CLEARANCE
CL-4F,5F	CHAIN LINK FENCE (W/ HEIGHT - ENGLISH)
CL-1.2F,1.5F	CHAIN LINK FENCE (W/ HEIGHT - METRIC)
C/L OR ℄	CENTERLINE
C.M.P. OR CMP	CORRUGATED METAL PIPE
C.N.	CONCRETE NAIL
CO.	COUNTY OR COMPANY
C.O.	CLEAN OUT
COMP.	COMPACTION
CONC.	CONCRETE
COND.(TEL.)	CONDUIT (SPECIFY TYPE)
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONST. PMT.	CONSTRUCTION PERMIT
COR.	CORNER
CORR.	CORRECTED OR CORRUGATION
COV.	COVER
C.P.	CATCH POINT
CR.	CRUSHED OR CREEK
CRS.	COURSE
C.S. OR CS	CURVE TO SPIRAL
C.S.F. OR CSF	COMBINATION SCALE FACTOR
C.S.P. OR CSP	CORRUGATED STEEL PIPE
C.S.P.A OR CSPA	CORRUGATED STEEL PIPE ARCH
CT.	COURT
C.T.B. OR CTB	CEMENT TREATED BASE
CTR.	CENTER
C.T.S. OR CTS	CRUSHED TOP SURFACING
CULV.	CULVERT
C.Y.	CUBIC YARD
D	DEGREE OF CURVATURE OR DISTRIBUTION OF TRAFFIC
DBL.	DOUBLE
D_c	DEGREE OF CURVATURE (WITH SPIRALS)
D.D.	DOWN DRAIN
DE	DIFFERENCE IN ELEVATION
DEFL.	DEFLECTION
DESC.	DESCRIPTION
DEST.	DESTROYED
DET.	DETOUR OR DETAIL
DETC.	DETECTOR
D.H.	DRILL HOLE
D.H.V.	DESIGN HOURLY VOLUME
D.I.	DROP INLET
DIA.	DIAMETER
DIST.	DISTANCE OR DISTRICT
DN.	DOWN
DP.	DEEP
DR.	DRAIN OR DRIVE
DT.	DITCH
DTL.	DETAIL OR DETAILED
DWG.	DRAWING
DY.	DAYLIGHT
E	EAST OR EXTERNAL DISTANCE
EASE. OR ESMT.	EASEMENT
E.B. OR EB	EASTBOUND
E.C.R.	END CURB RETURN
E.D.M. OR EDM	ELECTRONIC DISTANCE MEASUREMENT OR MEASURER
E.G.	EDGE OF GUTTER
ELEV. OR EL.	ELEVATION
ELONG.	ELONGATED
ELY.	EASTERLY
EMB.	EMBANKMENT
EMUL.	EMULSIFIED
E.O.	EDGE OF OIL
E.P.	EDGE OF PAVEMENT
EQ.	EQUATION
E_s	EXTERNAL DISTANCE (WITH SPIRALS)
E.S.	EDGE OF SHOULDER
E.T.W. OR ETW	EDGE OF TRAVELED WAY
EW.	END WALL
EX.	EXISTING
EXC.	EXCAVATION
EXT.	EXTENSION
EXWY.	EXPRESSWAY

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 101

DWG. NO. 101-05

ABBREVIATIONS

EFFECTIVE: FEBRUARY 2005

MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION

F	FILL
F.A.	FEDERAL AID
F.C.	FLOOD CONTROL
FD.	FOUND
FDN.	FOUNDATION
FE.	FENCE
FERT.	FERTILIZER
F.E.T.S. OR FETS	FLARED END TERMINAL SECTION
F.G. OR FG	FINISHED GRADE OR FRONT OF GUTTER
F.G.S.	FINISHED GRADE STAKE
F.H.	FIRE HYDRANT
FHWA	FEDERAL HIGHWAY ADMINISTRATION
FIN.	FINISH
FL.	FLUSH
F.L. OR FL	FLOW LINE
F.O. OR FO	FIBER OPTIC CABLE
F.P.	FENCE POST
FR. OR FR	FRONTAGE
FR. RD.	FRONTAGE ROAD
F.S. OR FS	FORESIGHT
FT.	FOOT OR FEET
FTG.	FOOTING
FUT.	FUTURE
FWY.	FREEWAY
g	GRAM
G	GRADING
GA.	GAGE
GAL.	GALLON
GALV.	GALVANIZED
GAR.	GARAGE
GEOD.	GEODETIC
G.L.	GAS LINE
G.L.O.	GENERAL LAND OFFICE
G.P.S. OR GPS	GLOBAL POSITIONING SYSTEM
GR.	GRADE
G.R.	GUARDRAIL
GRD	GRID
GRND.	GROUND
GR.SEP.	GRADE SEPARATION
G.S.	GRAVEL SURFACING
G.S.P. OR GSP	GALVANIZED STEEL PIPE
GTR.	GUTTER
G.V.	GAS VALVE
ha	HECTARE
HDWL.	HEADWALL
HG.	HEADGATE
H.I. OR HI	HEIGHT OF INSTRUMENT
HO.	HOUSE
HOR.	HORIZONTAL
H.P.	HINGE POINT
HT.	HEIGHT
H&T	HUB & TACK
H.W.	HIGH WATER
HWY.	HIGHWAY
I	INTERSTATE
I.C.	INCIDENTAL CONSTRUCTION
I.D.	INSIDE DIAMETER
I.E.	INVERT ELEVATION
IN.	INCH
INC.	INCORPORATED OR INCREMENT
INCL.	INCLUDED
INSTR.	INSTRUMENT
INT.	INTERSECTION
INTCH.	INTERCHANGE
INV.	INVERT
I.P.	IRON PIN
IRR.	IRRIGATION
I.R.T.S. OR IRTS	INTERSECTING ROADWAY TERMINAL SECTION
JCT.	JUNCTION
J.P.	JOINT USE POLE
kg	KILOGRAM
km	KILOMETER
L	LENGTH OF CURVE, LITER OR ANGLE IRON
LB.	POUND
L_c	LENGTH OF CIRCULAR CURVE
L.C.	LONG CHORD
L.D.	LOOP DETECTOR
LENG.	LENGTH OR LENGTHEN
L.F.	LINEAR FOOT
LN.	LANE
L_s	LENGTH OF SPIRAL
L.S.	LAND SURVEYOR
LT.	LEFT
m	METER
m^2	SQUARE METER
m^3	CUBIC METER
mm	MILLIMETER
mm^2	SQUARE MILLIMETER
MATL.	MATERIAL
MAX.	MAXIMUM
M.C. OR MC	MEDIUM CURING
MDT	MONTANA DEPARTMENT OF TRANSPORTATION
MEAS.	MEASURED
MED.	MEDIAN
MH.	MANHOLE
MIN.	MINIMUM, MINERAL OR MINUTE
MISC.	MISCELLANEOUS
MKR.	MARKER
M.L.	MAINLINE
MNCPL.	MUNICIPAL
M.O.	MID ORDINATE
MON.	MONUMENT
M.P.C. OR MPC	MID-POINT OF CURVE
MUTCD	MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
M.Y.	MILE YARD
N	NORTH
N.B. OR NB	NORTHBOUND
N.C.	NORMAL CROWN
N.E.	NORTHEAST
N.G. OR NG	NATURAL GAS
N.G.S. OR NGS	NATIONAL GEODETIC SURVEY
NL.	NAIL
NLY.	NORTHERLY
NO. OR #	NUMBER
N.W.	NORTHWEST
N.W.EL.	NORMAL WATER ELEVATION
O. OR O/S	OFFSET
O.C.	ON CENTERS OR OVERHEAD CROSSING
O.D.	OUTSIDE DIAMETER
O.G.	OLD GROUND OR ORIGINAL GROUND
OH.	OVERHANG OR OVERHEAD
O'PASS	OVERPASS
P	POWER CABLE, PIPE OR PRIMARY
P. OR PG.	PAGE
PAVT.	PAVEMENT
P.B.	PULL BOX
P.C. OR PC	POINT OF CURVE (BEGINNING)
P.C.C. OR PCC	POINT OF COMPOUND CURVE OR PORTLAND CEMENT CONCRETE
P.C.S.	PROJECT CONTROL SYSTEM
P.E. OR PE	PRELIMINARY ENGINEERING OR PROFESSIONAL ENGINEER

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 101

DWG. NO. 101-06

ABBREVIATIONS

EFFECTIVE: FEBRUARY 2005

serving you with pride

MONTANA DEPARTMENT OF TRANSPORTATION

PEN.	PENETRATION
PERF.	PERFORATED
P.I. OR PI	POINT OF INTERSECTION
PL.	PLACE, PLATE OR PLANT
P.L.	PROPERTY LINE
PLAS.	PLASTIC
P.M.	PRINCIPAL MERIDIAN OR PUNCH MARK
P.M.B.	PLANT MIX BASE
P.M.P.	PERFORATED METAL PIPE
P.M.S. OR PMS	PLANT MIX SURFACING
PMT.	PERMIT
P.O.C. OR POC	POINT ON CURVE
P.O.L. OR POL	POINT ON LINE
P.O.S. OR POS	POINT ON SPIRAL
P.O.S.T. OR POST	POINT ON SEMI-TANGENT
P.O.T. OR POT	POINT ON TANGENT
P.O.V.C. OR POVC	POINT ON VERTICAL CURVE
P.P. OR PP	POWER POLE
PP.	PAGES
PREST.	PRESTRESSED
PRIM.	PRIMARY
PROC.	PROCESSING
PROJ.	PROJECT OR PROJECTED
PROT.	PROTECT, PROTECTOR OR PROTECTION
P.T. OR PT	POINT OF TANGENT (END OF CURVE)
PT.	POINT
P.T.W. OR PTW	PRESENT TRAVELED WAY
PVC. OR PVC	POLYVINYL CHLORIDE
PVT.	PRIVATE
PWR. OR PWR	POWER (LINES)
Q	PEAK DISCHARGE (WATER)
QTY.	QUANTITY
R	RANGE, RADIUS OR RISE
R.A.C.E.T. OR RACET	ROAD APPROACH CULVERT END TREATMENT
R.A.P. OR RAP	RECYCLED ASPHALT PAVEMENT
R_c	SPIRAL CURVE RADIUS
R.C OR RC	RAPID CURING
R.C.B. OR RCB	REINFORCED CONCRETE BOX
R.C.P. OR RCP	REINFORCED CONCRETE PIPE
R.C.P.A. OR RCPA	REINFORCED CONCRETE PIPE ARCH
RD.	ROAD
RDL.	RADIAL
RDWY.	ROADWAY
REC.	RECORD
REF.	REFERENCE
REINF.	REINFORCEMENT
RET.W.	RETAINING WALL
RIV.	RIVER
R.M.	REFERENCE MONUMENT
R.P. OR RP	REFERENCE POINT, POST OR RADIUS POINT
R.R.	RAILROAD
RT.	RIGHT OR ROUTE
RTE.	ROUTE
R/W	RIGHT OF WAY
RY.	RAILWAY
S	RATE OF FULL SUPERELEVATION, SLOPE IN FT. PER FT., SPAN, SOUTH OR SECONDARY
SA.	SATELLITE (FOR TRAVERSE USE)
SAN.SEW.	SANITARY SEWER
S.B. OR SB	SOUTHBOUND
S.C. OR SC	SPIRAL TO CURVE OR SLOW CURING
SCH.	SCHEDULE
SDWK.	SIDEWALK
S.E.	SOUTHEAST
SEC.	SECTION, SECOND OR SECONDARY
SEL.	SELECT
S.G., SG OR SUBGR.	SUBGRADE
SHLD. OR SH.	SHOULDER
SHT.	SHEET
SING.	SINGLE
SIP.	SIPHON
S.L.D.	SEA LEVEL DATUM
SLOT.DR.	SLOTTED DRAIN
SLP.STK.	SLOPE STAKE
SLY.	SOUTHERLY
S.P.	STAND PIPE OR STATE PLANE
SPEC. PROV.	SPECIAL PROVISION
S.P.H.P.	STEEL PIPE, HIGH PRESSURE
SPK.	SPIKE
SQ.	SQUARE
S.S. OR SS	EMULSIFIED ASPHALT
S.S.P.P. OR SSPP	STRUCTURAL STEEL PLATE PIPE
S.S.P.P.A. OR SSPPA	STRUCTURAL STEEL PLATE PIPE ARCH
S.S.P.P.A.C. OR SSPPAC	STRUCTURAL STEEL PLATE PIPE ARCH CULVERT
S.T. OR ST	SPIRAL TO TANGENT
ST.	STREET
STA.	STATION
STD.	STANDARD
STD. SPEC.	STANDARD SPECIFICATIONS
STK.	STAKED OR STAKE
STL.	STEEL
STM.	STORM DRAIN
STPD.	STAMPED
STR.	STRUCTURE OR STRAIGHT
SUBD.	SUBDIVISION
SURF.	SURFACE OR SURFACING
SURV.	SURVEY
S.W.	SOUTHWEST OR SIDEWALK
S.Y.	SQUARE YARD
†	METRIC TON
T	TOWNSHIP, TANGENT LENGTH OR PERCENT TRUCKS
TAN.	TANGENT
T.B.C. OR TBC	TOP BACK OF CURB
T.B.M.	TEMPORARY BENCH MARK
TBR.	TIMBER
TEL. OR TEL	TELEPHONE
TEL.C.	TELEPHONE CABLE
TELG.	TELEGRAPH
TEL.P.	TELEPHONE POLE
TEMP.	TEMPERATURE OR TEMPORARY
THK.	THICKNESS
TK.	TACK
TOPOG.	TOPOGRAPHIC
T.P. OR TP	TURNING POINT
TR.	TRACT
TRANS.	TRANSMISSION LINE OR TRANSITION
TRAV.	TRAVERSE
TRIA.	TRIANGULATION
T_s	LENGTH OF TANGENT (CURVE WITH SPIRALS)
T.S. OR TS	TANGENT TO SPIRAL
T.T. OR TT	TRANSMISSION TOWER
TYP.	TYPICAL
U	UNIT
U.G.	UNDERGROUND
UNCL.	UNCLASSIFIED
U'PASS	UNDERPASS
U.S.C. & G.S.	U.S. COAST & GEODETIC SURVEY
U.S.C.E.	U.S. CORPS OF ENGINEERS
U.S.F.S.	U.S. FOREST SERVICE
U.S.G.S.	U.S. GEOLOGICAL SURVEY
U.S.P.L.S.	U.S. PUBLIC LAND SURVEY
V	DESIGN SPEED OR VELOCITY
V.A.B.M.	VERTICAL ANGLE BENCH MARK

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 101

DWG. NO. 101-07

ABBREVIATIONS

EFFECTIVE: FEBRUARY 2005

serving you with pride

MONTANA DEPARTMENT OF TRANSPORTATION

V.C. OR VC	VERTICAL CURVE
V.C. CORR.	VERTICAL CURVE OFFSET CORRECTION
V.C.M.	VERTICAL CONTROL MONUMENT
V.C.P.	VITRIFIED CLAY PIPE
VEH.	VEHICULAR
VERT. OR VT.	VERTICAL
VIT.	VITRIFIED
V.P.	VENT PIPE
V.P.C. OR VPC	VERTICAL POINT OF CURVE
V.P.I. OR VPI	VERTICAL POINT OF INTERSECTION
V.P.T. OR VPT	VERTICAL POINT OF TANGENCY
W	WEST
W/	WITH
W.B. OR WB	WESTBOUND
W.C.	WITNESS CORNER
W.L.	WATER LINE
WLY.	WESTERLY
W/O	WITHOUT
W.P.	WING POINT
W.S.	WATER SERVICE OR WARPED OR VARIABLE SLOPE
WT.	WEIGHT
W.T.	WATER TABLE
W.V.	WATER VALVE
W.W.	WING WALL OR WOVEN WIRE
YD	YARD
YD^2	SQUARE YARD
YD^3	CUBIC YARD
XING.	CROSSING
XSEC.	CROSS SECTION

DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 101

DWG. NO.
101-08

ABBREVIATIONS

EFFECTIVE: FEBRUARY 2005

serving you with pride

MONTANA DEPARTMENT OF TRANSPORTATION

TITLE SHEET

- PRIMARY ROAD **
- PRIMITIVE ROAD
- PROPOSED ROAD
- GRADED ROAD
- BLADED ROAD
- PRIMITIVE ROAD
- GRAVELED ROAD (CADD *)
- PAVED ROAD
- FEDERAL AID ROUTING (ON EXISTING ROAD)
- FEDERAL AID ROUTING (NON-EXISTING ROAD)
- INTERCHANGE
- STRUCTURE
- F.F. FREE FERRY
- T.F. TOLL FERRY
- HIGHWAY TUNNEL
- PASS
- RAILROAD
- RESERVATION LINE
- STATE & NATIONAL LINE
- COUNTY LINE
- TOWNSHIP & SECTION LINE
- 10 INTERSTATE
- 10 U.S. HIGHWAY
- 23 STATE HIGHWAY (CADD *)
- CITY OR TOWN
- AIR FIELD
- DAM
- BUILDING OR HOUSE
- BRIDGE

** PRIMARY ROADS ARE 2.03 mm WIDE. ALL OTHERS ARE 1.27 mm WIDE.

PROFILE

- FLOWLINE AT ℄ CULVERT
- FLOWLINE AT ℄ IRRIGATION SYPHON
- FLOWLINE AT ℄ CONCRETE BOX CULVERT

CROSS SECTIONS

- POWER POLE (NO. OF WIRES AND VOLTAGE)
- TELEPHONE POLE (NO. OF WIRES)
- TELEGRAPH POLE (NO. OF WIRES)
- GUY POLE
- GUY AND ANCHOR

PLAN

- STATE & NATIONAL LINE
- COUNTY LINE
- CITY OR TOWN BOUNDARIES
- TOWNSHIP LINE
- 1/4 CORNER 6 5 7 8 — SECTION LINE (SHOWING CORNER SOLID IF FOUND - OPEN IF NOT FOUND)
- CLOSING CORNER
- MEANDER CORNER
- OWNERSHIP TIE
- PROPERTY CORNER
- EXISTING R/W MONUMENT
- NEW R/W MONUMENT
- PROPERTY LINE
- SECTION LINE
- EXISTING ACCESS
- AC AC — FULL ACCESS CONTROL
- LIMITED CONTROL
- EXISTING RIGHT-OF-WAY
- R/W, 12.19 m, 18.29 m, 24.38 m, RR R/W, PC, STA, N 89° 40' E — HIGHWAY RIGHT-OF-WAY
- RAILROAD RIGHT-OF-WAY
- BASE OR SURVEY LINE
- N 89° 40' E — ℄ OF STAKED LINE WHEN A PROJECTION IS MADE
- RAILROAD
- TRAVELED WAY
- LEVEE OR DIKE (CADD *)
- RETAINING WALL (CADD *)
- PROPOSED RETAINING WALL (CADD *)
- RIPRAP
- GEOTEXTILE PATTERN
- CONCRETE SIDEWALK
- NEW IN PLACE — CONCRETE CURB
- EXISTING FENCE
- PROPOSED FENCE
- SNOW FENCE
- PROPOSED SNOW FENCE
- EXISTING GUARDRAIL
- PROPOSED GUARDRAIL
- EXISTING CONCRETE MEDIAN RAIL
- TEN MILE CREEK — SMALL DRAINAGE
- LARGE DRAINAGE
- RESERVOIR WITH DAM
- LAKE
- MARSH, SWAMP (CADD *)

PLAN

- BLUFFS OR CLIFFS
- WATER'S EDGE
- DEPRESSION
- DEPRESSION OBSCURE
- DITCH BLOCK
- EXISTING DITCH OR FLOW LINE
- PROPOSED DITCH
- FLOW LINE UP HILL
- CULVERT WITH HEADWALL (IN PLACE)
- CULVERT WITHOUT HEADWALL (IN PLACE)
- PROPOSED CULVERT
- EXISTING DROP OR MEDIAN INLET
- PROPOSED DROP OR MEDIAN INLET
- W WATER VALVE BOX
- MANHOLE (LABEL AS TO TYPE OR SERVICE)
- PROPOSED MANHOLE
- FIRE HYDRANT
- WATER WELL — WELL (CADD *)
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- CONDUIT & WIRING
- P — POWER CABLE
- PWR — EXISTING UNDERGROUND POWER (CADD *)
- PWR — EXISTING OVERHEAD POWER (CADD *)
- TEL or TELG — TELEPHONE OR TELEGRAPH CABLE
- TEL — EXISTING UNDERGROUND TELEPHONE (CADD *)
- TEL — EXISTING OVERHEAD TELEPHONE (CADD *)
- W — WATER LINE
- W — EXISTING WATER LINE (CADD *)
- STM — STORM SEWER
- STM — EXISTING STORM DRAIN (CADD *)
- STM — PROPOSED STORM DRAIN (CADD *)
- SAN — SANITARY SEWER
- SAN — EXISTING SANITARY SEWER (CADD *)
- SAN — PROPOSED SANITARY SEWER (CADD *)
- NG — NATURAL GAS LINE
- NG — EXISTING NATURAL GAS LINE (CADD *)
- GAS OR OIL — GASOLINE OR OIL LINE
- GAS — EXISTING GAS PIPE LINE (CADD *)
- OIL — EXISTING OIL PIPE LINE (CADD *)
- FO — EXISTING UNDERGROUND FIBER CABLE (CADD *)
- TV — EXISTING UNDERGROUND TV CABLE (CADD *)
- MIS — EXISTING UNDERGROUND MISSILE CABLE (CADD *)

PLAN

- SINGLE POST SIGN
- MULTIPLE POST SIGN
- TELEGRAPH POLE
- TELEPHONE POLE
- T TELEPHONE PEDESTAL
- POWER POLE
- P POWER PEDESTAL
- TROLLEY POLE
- LIGHT POLE
- GUY POLE
- GUY WIRE & ANCHOR
- TRANSMISSION TOWER
- G GAS VALVE
- OIL OR GAS WELL
- TANKS
- TREE OR BUSH
- TREE LINE
- HEDGE LINE
- MB MAILBOX
- EXISTING APPROACH
- PROPOSED APPROACH
- EXISTING CATTLE GUARD
- PROPOSED CATTLE GUARD
- GRAVEL PIT
- SCALES
- MILE POST
- PROJECT MARKER
- STATION MARKER
- ℄ CENTERLINE
- DEFLECTION ANGLE
- Δ_c DEFLECTION ANGLE (CIRCULAR CURVE WITH SPIRALS)
- Θ_s DEFLECTION ANGLE OF ONE SPIRAL
- N NORTH ARROW
- GATE

* SYMBOLOGY USED ON CADD DRAFTED PLANS

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 101	DWG. NO. 101-10
SYMBOLS	
EFFECTIVE: FEBRUARY 2005	

MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION