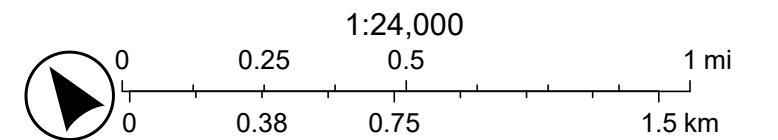


HS-2413M
Map 2 of 4

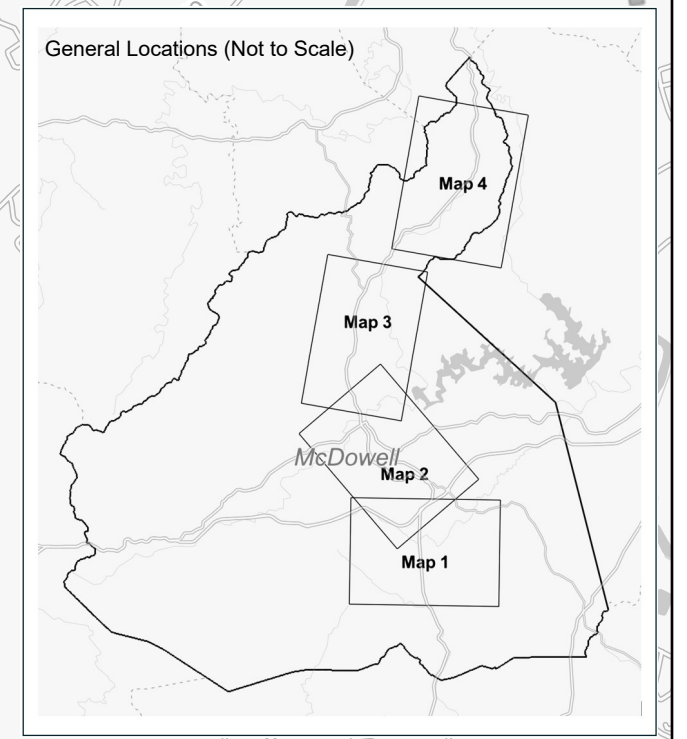
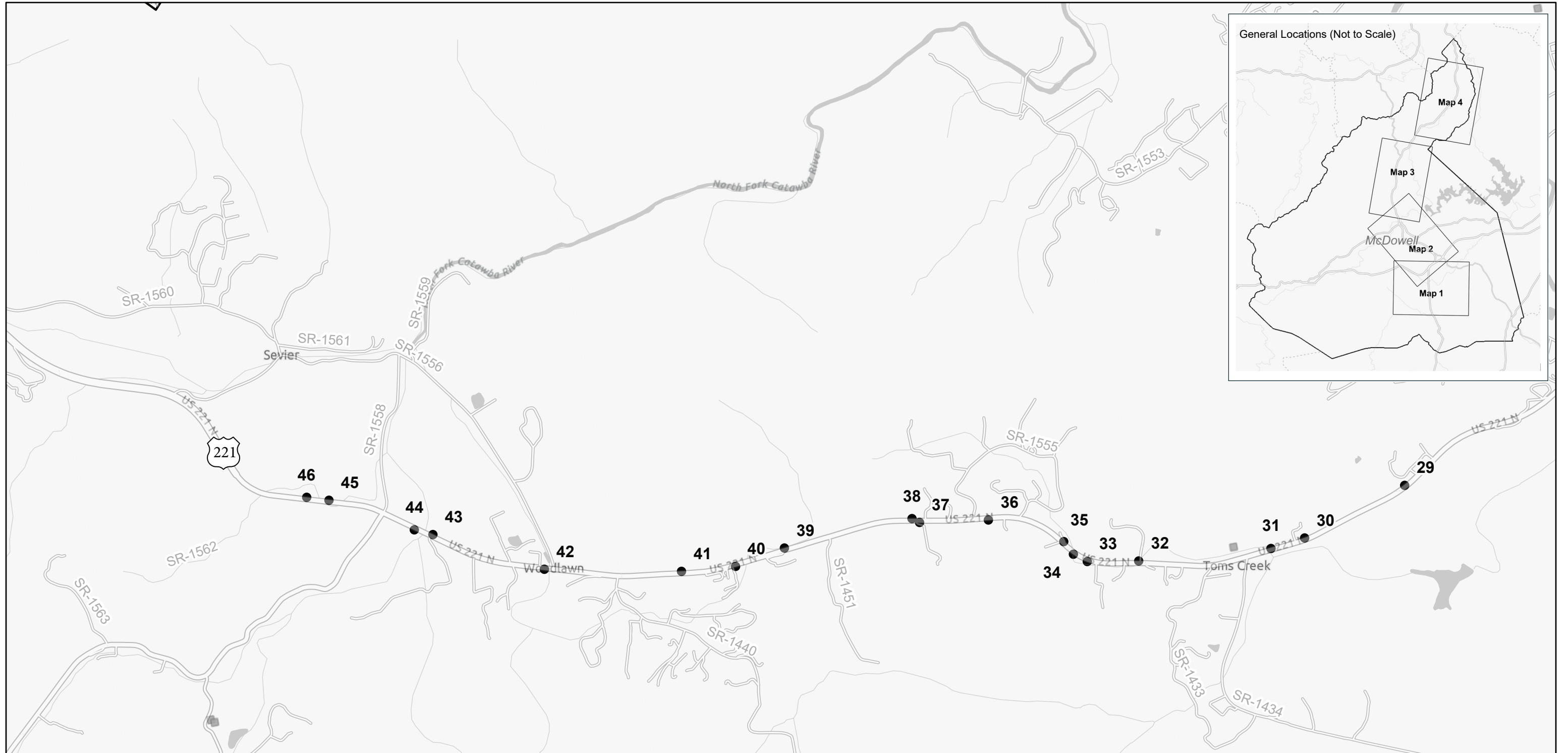
North Carolina Department of Transportation - Division of Highways, Division 13.

McDowell County, NC. US 221 Rutherford County Line to Avery County Line. Upgrade Guardrail End Units. Numbered locations correspond with the summary of quantities.



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

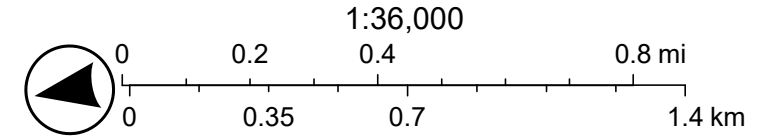
NC HPO Districts NC HPO Resource Points



HS-2413M
Map 3 of 4

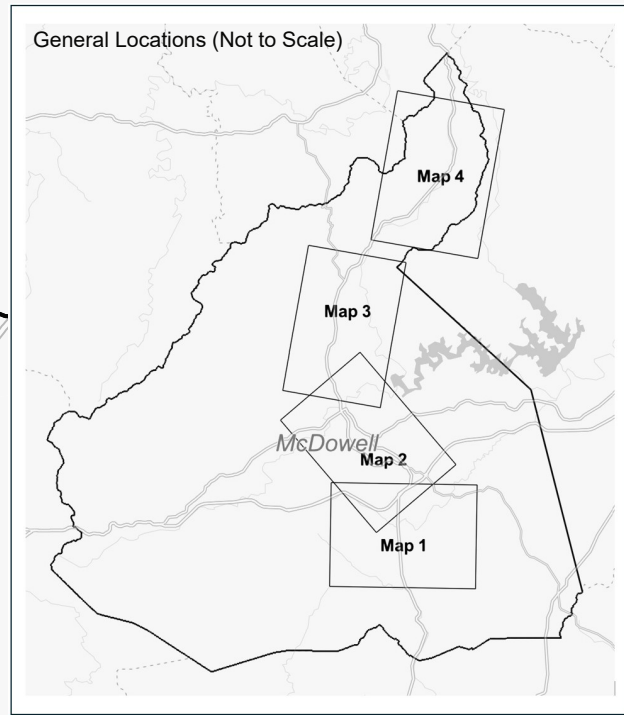
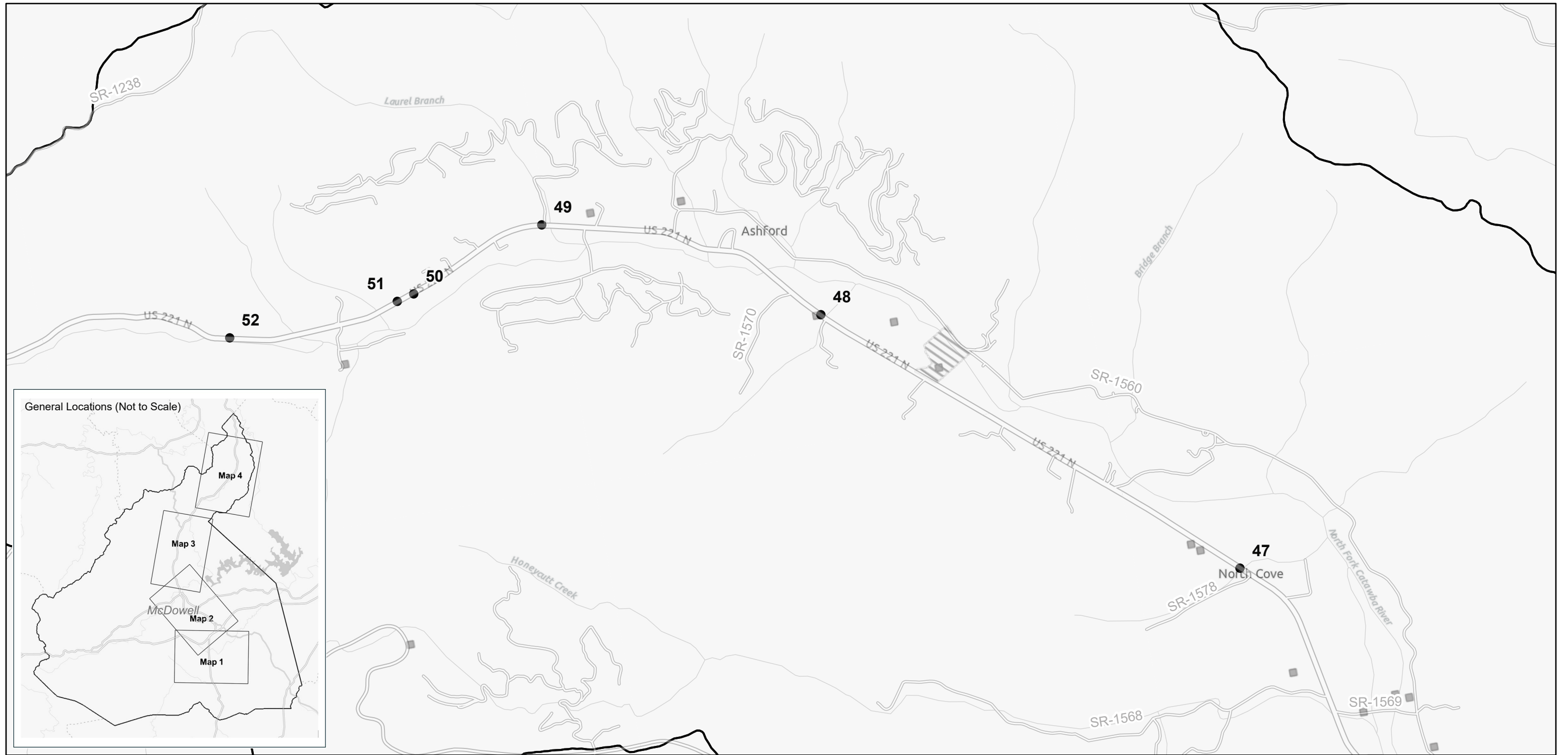
North Carolina Department of Transportation - Division of Highways, Division 13.

McDowell County, NC. US 221 Rutherford County Line to Avery County Line. Upgrade Guardrail End Units. Numbered locations correspond with the summary of quantities.



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

NC HPO Districts NC HPO Resource Points



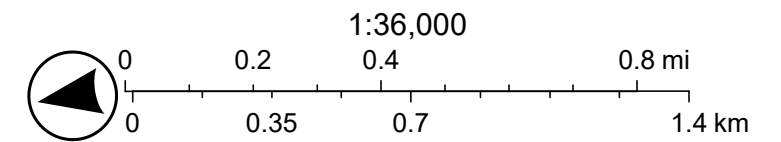
HS-2413M

Map 4 of 4

North Carolina Department of Transportation - Division of Highways, Division 13.

McDowell County, NC. US 221 Rutherford County Line to Avery County Line. Upgrade Guardrail End Units. Numbered locations correspond with the summary of quantities.

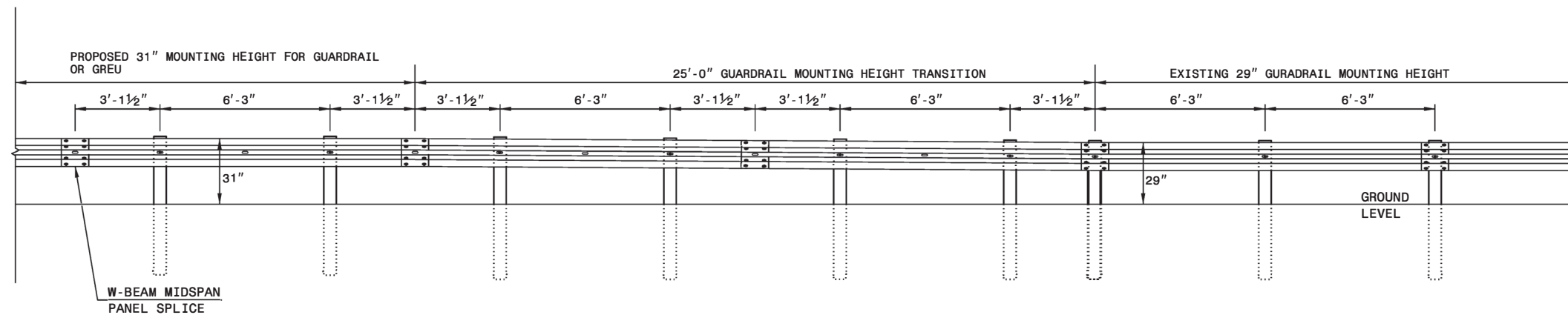
4/28/2025



Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

 NC HPO Districts  NC HPO Resource Points

NOTE: IF EXISTING GUARDRAIL IS LOWER THAN 29", USE AN ADDITIONAL 12'-6" LONG SECTION OF GUARDRAIL, FOR EVERY 1" OF HEIGHT DIFFERENCE, TO TRANSITION FROM EXISTING GUARDRAIL TO PROPOSED 31" GUARDRAIL.



ELEVATION VIEW

TRANSITION FROM 29" TO 31" W-BEAM GUARDRAIL MOUNTING HEIGHT

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 9
862D02



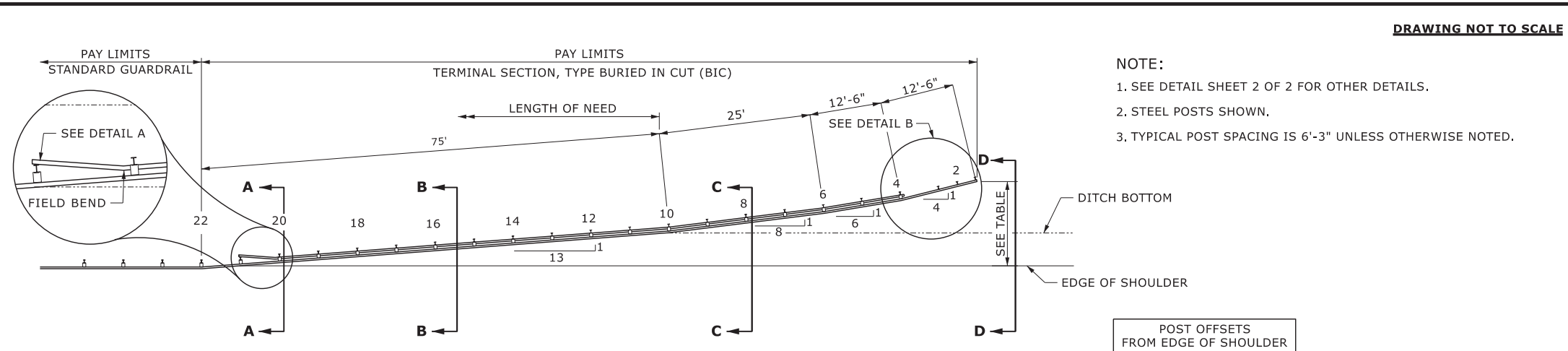
Signed by:
Nicole M. Hackler
5884323D34164C5...

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

**CONTRACTS STANDARDS
AND DEVELOPMENT UNIT**
Office 919-707-8950 FAX 919-250-4119

SEE TITLE BLOCK

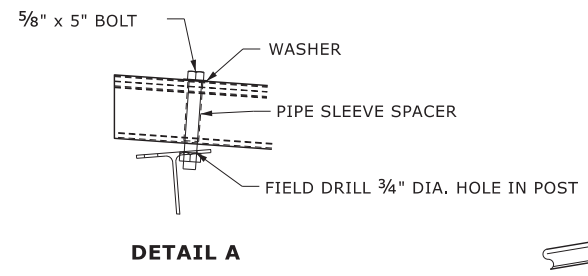
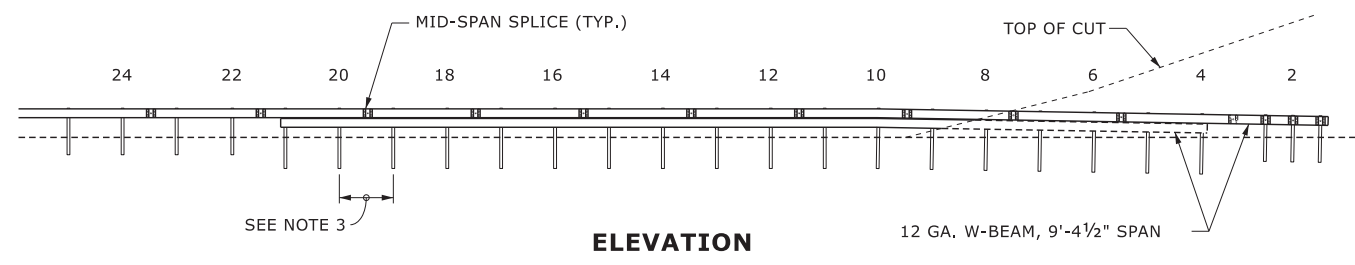
ORIGINAL BY: K. Aldridge DATE: 02-25
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____



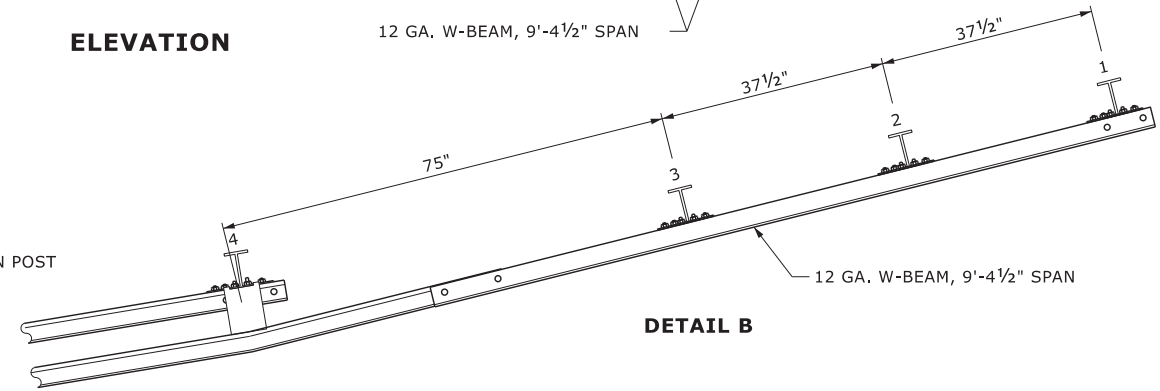
NOTE:

1. SEE DETAIL SHEET 2 OF 2 FOR OTHER DETAILS.
2. STEEL POSTS SHOWN.
3. TYPICAL POST SPACING IS 6'-3" UNLESS OTHERWISE NOTED.

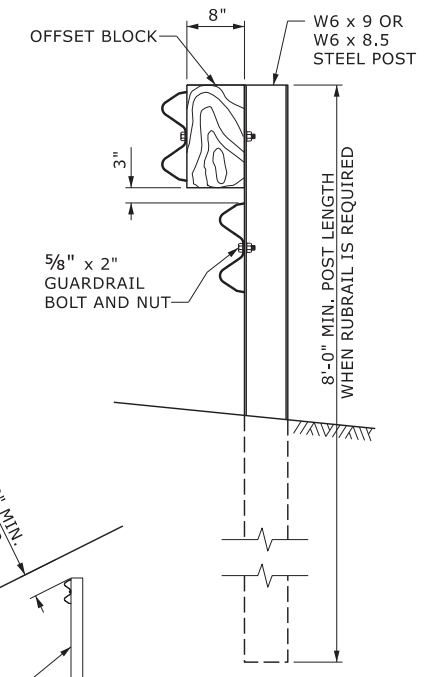
POST OFFSETS FROM EDGE OF SHOULDER	
POST	DISTANCE
1	13'-11 ³ / ₄ "
4	10'-11"
6	8'-10 ¹ / ₄ "
10	69"



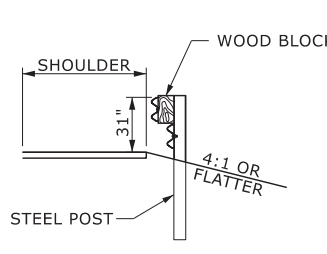
DETAIL A



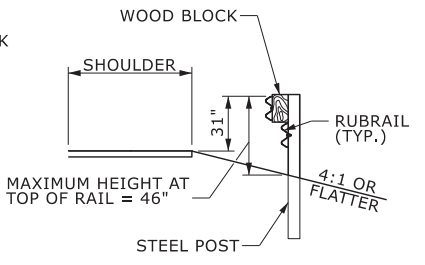
DETAIL B



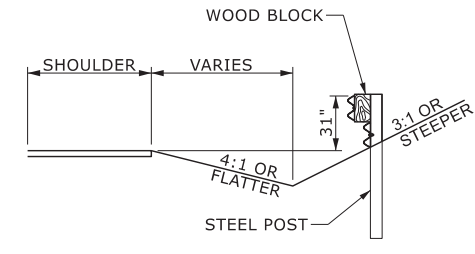
STEEL POST AND BLOCK DETAIL



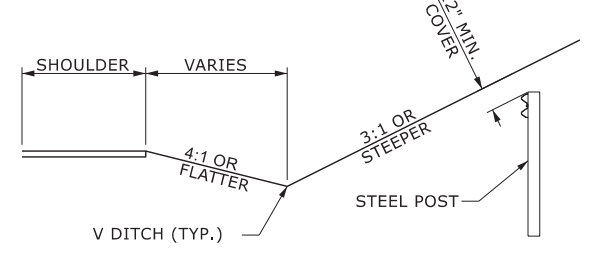
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR
GUARDRAIL PLACEMENT
BURIED IN CUT END UNIT



Signed by:
Nicole M. Hackler
5884323D34164C5...

SHEET 14 OF 15
862D01

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CONTRACTS STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE TITLE BLOCK

ORIGINAL BY: S.CALHOUN DATE: 7-25-2024
MODIFIED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
FILE SPEC.: _____

PROJECT NO.	SHEET NO.
50985.3.14	6

GUARDRAIL ITEM SUMMARY

LOCATION NO	ROUTE	DESCRIPTION	DIRECTION	3030000000-E	3045000000-E	3210000000-N	3345000000-E	3421000000-E	3287000000-N	3317000000-N	3360000000-E	3215000000-N	3435000000-N	NOTES	
				STEEL BEAM GUARDRAIL	STEEL BM GUARDRAIL, SHOP CURVED	GUARDRAIL END UNITS, TYPE CAT-1	REMOVE AND RESET EXISTING GUARDRAIL	STEEL BEAM GUARDRAIL, 2'-1" HEIGHT TRANSITION	GUARDRAIL END UNITS, TYPE TL-3	GUARDRAIL ANCHOR UNITS, TYPE B-77	REMOVE EXISTING GUARDRAIL	GUARDRAIL ANCHOR UNITS, TYPE III MODIFIED	GUARDRAIL ANCHOR UNITS TYPE BURIED IN CUT		
				LF	LF	EA	EA	LF	EA	EA	LF	EA	EA		
1	US 221	APPROXIMATELY 0.07 MILES FROM SR 1152 (Fire House RD) (MP 6.25 - 6.28)	SB						1		37.5			Remove and replace of a pre MASH standard end unit with MASH approved Endunit. TL3	
2	US 221	APPROXIMATELY 0.11 MILES FROM LOC. 1, 0.18 SR 1152 MP 8.07 (Fire House RD) (MP 6.47 - 6.84)	SB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunit. TL3	
3	US 221	APPROXIMATELY 4.29 MILES FROM LOC. 1, 0.26 MILES FROM US 221 BUS. INTERSECTION MP 10.54	NB	25				87.5			87.5		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
4	US 221	APPROXIMATELY 4.63 MILES FROM LOC. 1, 0.60 MILES FROM US 221 BUS. INTERSECTION MP 10.88	NB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
5	US 221	APPROXIMATELY 4.74 MILES FROM LOC. 1, 0.71 MILES FROM US 221 BUS. INTERSECTION MP. 10.99	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
6	US 221	APPROXIMATELY 4.99 MILES FROM LOC. 1, 0.76 MILES FROM US 221 BUS. INTERSECTION MP 11.24	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
7	US 221	APPROXIMATELY 5.16 MILES FROM LOC. 1, 1.76 MILES FROM US 221 BUS. INTERSECTION MP 11.41	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
8	US 221	APPROXIMATELY 5.52 MILES FROM LOC. 1, 1.49 MILES FROM US 221 BUS. INTERSECTION MP 11.77	NB					100			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
9	US 221	APPROXIMATELY 5.79 MILES FROM LOC. 1, 1.76 MILES FROM US 221 BUS. INTERSECTION MP 12.04	NB	137.5			25	150			150			Remove substandard buried in cut trailing end and approach and connect the two locations with a continuous run of SBG. 75' Transition each direction.	
10	US 221	APPROXIMATELY 6.02 MILES FROM LOC. 1, 1.99 MILES FROM US 221 BUS. INTERSECTION MP 12.27	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
11	US 221	APPROXIMATELY 6.15 MILES FROM LOC. 1, 2.12 MILES FROM US 221 BUS. INTERSECTION MP 12.40	NB	25				75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
12	US 221	APPROXIMATELY 6.19 MILES FROM LOC. 1, 2.16 MILES FROM US 221 BUS. INTERSECTION MP 12.44	SB	500				150			150			Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
13	US 221	APPROXIMATELY 6.36 MILES FROM LOC. 1, 2.33 MILES FROM US 221 BUS. INTERSECTION MP 12.61	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
14	US 221	APPROXIMATELY 6.53 MILES FROM LOC. 1, 2.39 MILES FROM US 221 BUS. INTERSECTION MP 12.78	NB	68.75				75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
15	US 221	APPROXIMATELY 6.97 MILES FROM LOC. 1, 2.94 MILES FROM US 221 BUS. INTERSECTION MP 13.22	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
16	US 221	APPROXIMATELY 7.07 MILES FROM LOC. 1, 3.04 MILES FROM US 221 BUS. INTERSECTION MP 13.32	NB	300			25	75			175			Remove substandard buried in cut trailing end and approach and connect the two locations with a continuous run of SBG. 300' Transition 75'	
17	US 221	APPROXIMATELY 7.14 MILES FROM LOC. 1, 3.11 MILES FROM US 221 BUS. INTERSECTION MP 13.39	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
18	US 221	APPROXIMATELY 7.15 MILES FROM LOC. 1, 3.12 MILES FROM US 221 BUS. INTERSECTION MP 13.40	NB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
19	US 221	APPROXIMATELY 7.66 MILES FROM LOC. 1, 3.63 MILES FROM US 221 BUS. INTERSECTION MP 13.91	SB	25				75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
20	US 221	APPROXIMATELY 8.19 MILES FROM LOC. 1, 4.16 MILES FROM US 221 BUS. INTERSECTION MP 14.44	SB	25				75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
21	US 221	APPROXIMATELY 8.25 MILES FROM LOC. 1, 4.22 MILES FROM US 221 BUS. INTERSECTION MP 14.50	NB	175			50	150			250			Remove substandard buried in cut trailing end and approach and connect the two locations with a continuous run of SBG. 150' Transition each direction 150'.	
22	US221	APPROXIMATELY 8.59 MILES FROM LOC. 1, 4.56 MILES FROM US 221 BUS. INTERSECTION MP 14.84	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
23	US 221	APPROXIMATELY 8.76 MILES FROM LOC. 1, 4.73 MILES FROM US 221 BUS. INTERSECTION MP 15.01	NB	31.25								1	1	Remove and replace of a pre MASH standard end unit with MASH approved End unit. BIC, 31.25' SBG to a Type 3 anchor unit.	
24	US 221	APPROXIMATELY 4.29 MILES FROM LOC. 1, 0.26 MILES FROM US 221 BUS. INTERSECTION MP 15.09	SB									1	1	Remove and replace of a pre MASH standard end unit with MASH approved End unit. BIC, To a Type 3 anchor unit.	
25	US 221	APPROXIMATELY 9.13 MILES FROM LOC. 1, 5.10 MILES FROM US 221 BUS. INTERSECTION MP 15.38	NB	350					1				1	Remove and replace of 1 pre MASH standard end unit with a MASH approved Endunit. TL3	
26	US 221	APPROXIMATELY 9.35 MILES FROM LOC. 1, 0.11 MILES FROM US 221N AND US70 West INTERSECTION MP 15.60	NB					75	1		75			Remove and replace of 2 pre MASH standard end units with MASH approved Endunit. BIC, 350 SBG, TL3	
27	US 221	APPROXIMATELY 9.71 MILES FROM LOC. 1, 0.47 MILES FROM US 221N AND US70 West INTERSECTION MP 15.96	SB					100			100		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
GRAND TOTAL				1,662.50	0.00	0	100	2,013	4	0	2,225.00	2	20		

NOTES: QUANTITIES ARE ESTIMATED AND MAY CHANGE ACCORDING TO ACTUAL FIELD CONDITIONS.
THE ENGINEER SHALL FIELD MARK ALL PROPOSED GUARDRAIL AND END UNITS PRIOR TO BEGINNING CONSTRUCTION AT EACH LOCATION.

INSTALL EXTRA LENGTH GUARDRAIL POSTS ACCORDING TO FIELD CONDITIONS AND AS DIRECTED BY THE ENGINEER.

PROJECT NO.	SHEET NO.
50985.3.14	7

GUARDRAIL ITEM SUMMARY

LOCATION NO	ROUTE	DESCRIPTION	DIRECTION	3030000000-E	3045000000-E	3210000000-N	3345000000-E	3421000000-E	3287000000-N	3317000000-N	3360000000-E	3215000000-N	3435000000-N	NOTES	
				STEEL BEAM GUARDRAIL	STEEL BM GUARDRAIL, SHOP CURVED	GUARDRAIL END UNITS, TYPE CAT-1	REMOVE AND RESET EXISTING GUARDRAIL	STEEL BEAM GUARDRAIL, 2'- 1" HEIGHT TRANSITION	GUARDRAIL END UNITS, TYPE TL-3	GUARDRAIL ANCHOR UNITS, TYPE B-77	REMOVE EXISTING GUARDRAIL	GUARDRAIL ANCHOR UNITS, TYPE III MODIFIED	GUARDRAIL ANCHOR UNITS TYPE BURIED IN CUT		
				LF	LF	EA	EA	LF	EA	EA	LF	EA	EA		
28	US 221	APPROXIMATELY 9.86 MILES FROM LOC. 1, 0.62 MILES FROM US 221N AND US70 West INTERSECTION MP 16.11	SB					75			75		1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC	
29	US 221	APPROXIMATELY 11.0 MILES FROM LOC. 1, 1.76 MILES FROM US 221N AND US70 West INTERSECTION MP 17.25	NB					87.5	1		87.5			Remove and replace of 1 pre MASH standard end unit with a MASH approved Endunit. TL3	
30	US 221	APPROXIMATELY 11.53 MILES FROM LOC. 1, 2.29 MILES FROM US 221N AND US70 West INTERSECTION MP 17.80	NB					100	1		100			Remove and replace of 1 pre MASH standard end unit with a MASH approved Endunit. TL3	
31	US 221	APPROXIMATELY 11.72 MILES FROM LOC. 1, 2.48 MILES FROM US 221N AND US70 West INTERSECTION MP 17.97	NB	25					2					Remove and replace of pre MASH standard end unit with 2 MASH approved Endunits. TL3 25 SBG	
32	US 221	APPROXIMATELY 12.33 MILES FROM LOC. 1, 3.09 MILES FROM US 221N AND US70 West INTERSECTION MP 18.58	NB	125					2					Remove and replace of 2 pre MASH standard end unit with MASH approved Endunits. TL3 125 SBG	
33	US 221	APPROXIMATELY 12.57 MILES FROM LOC. 1, 3.22 MILES FROM US 221N AND US70 West INTERSECTION MP 18.82	SB	75					2					Remove and replace of a pre MASH standard end unit with MASH approved Endunit. TL3 75 SBG	
34	US 221	APPROXIMATELY 12.68 MILES FROM LOC. 1, 3.44 MILES FROM US 221N AND US70 West INTERSECTION MP 18.93	SB	50					2					Remove and replace of 2 pre MASH standard end unit with 2 MASH approved Endunits. TL3 50 SBG	
35	US 221	APPROXIMATELY 12.72 MILES FROM LOC. 1, 3.48 MILES FROM US 221N AND US70 West INTERSECTION MP 18.97	NB	75					1					Remove and replace of 2 pre MASH standard end units with MASH approved Endunits. 2 TL3 300 SBG	
36	US 221	APPROXIMATELY 13.10 MILES FROM LOC. 1, 3.86 MILES FROM US 221N AND US70 West INTERSECTION MP 19.35	SB	300					2					Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 SBG	
37	US 221	APPROXIMATELY 13.43 MILES FROM LOC. 1, 4.19 MILES FROM US 221N AND US70 West INTERSECTION MP 19.68	SB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 SBG	
38	US 221	APPROXIMATELY 13.46 MILES FROM LOC. 1, 4.21 MILES FROM US 221N AND US70 West INTERSECTION MP 19.71	NB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 SBG	
39	US 221	APPROXIMATELY 14.08 MILES FROM LOC. 1, 4.84 MILES FROM US 221N AND US70 West INTERSECTION MP 20.33	NB	75					2					Remove and replace 2 pre MASH standard end units with MASH approved Endunits. 2 TL3 75 SBG	
40	US 221	APPROXIMATELY 14.33 MILES FROM LOC. 1, 4.99 MILES FROM US 221N AND US70 West INTERSECTION MP 20.58	SB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 Transition	
41	US 221	APPROXIMATELY 14.58 MILES FROM LOC. 1, 5.34 MILES FROM US 221N AND US70 West INTERSECTION MP 20.83	NB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 Transition	
42	US 221	APPROXIMATELY 15.27 MILES FROM LOC. 1, 6.03 MILES FROM US 221N AND US70 West INTERSECTION MP 21.52	SB	75		1					131.25			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3, CAT	
43	US 221	APPROXIMATELY 15.84 MILES FROM LOC. 1, 6.60 MILES FROM US 221N AND US70 West INTERSECTION MP 22.09	NB	100					1	1				Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3, SBG, B77	
44	US 221	APPROXIMATELY 15.93 MILES FROM LOC. 1, 6.69 MILES FROM US 221N AND US70 West INTERSECTION MP 22.18	SB	75					1	1				Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3, SBG, B77	
45	US 221	APPROXIMATELY 16.15 MILES FROM LOC. 1, 6.91 MILES FROM US 221N AND US70 West INTERSECTION MP 22.62	NB					50	1		50			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 50 Transition	
46	US 221	APPROXIMATELY 16.15 MILES FROM LOC. 1, 6.91 MILES FROM US 221N AND US70 West INTERSECTION MP 22.72	NB					50	1		50			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 50 Transition	
47	US 221	APPROXIMATELY 21.2 MILES FROM LOC. 1, 11.96 MILES FROM US 221N AND US70 West INTERSECTION MP 27.45	SB					75	1		75			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 75 Transition	
48	US 221	APPROXIMATELY 23.48 MILES FROM LOC. 1, 14.24 MILES FROM US 221N AND US70 West INTERSECTION MP 29.73	NB					37.5	1		37.5			Remove and replace of a pre MASH standard end unit with MASH approved Endunits. TL3 37.5 Transition	
49	US 221	APPROXIMATELY 24.97 MILES FROM LOC. 1, 15.73 MILES FROM US 221N AND US70 West INTERSECTION MP 31.22	NB	25					1				1	Remove and replace of a pre MASH standard end unit with MASH approved Endunit. BIC, TL3, 25 SBG	
50	US 221	APPROXIMATELY 25.65 MILES FROM LOC. 1, 16.41 MILES FROM US 221N AND US70 West INTERSECTION MP 31.9	SB	25					2					Remove and replace 2 pre MASH standard end units with MASH approved Endunits. 2 TL3 25 SBG	
51	US 221	APPROXIMATELY 25.75 MILES FROM LOC. 1, 16.51 MILES FROM US 221N AND US70 West INTERSECTION	NB		12.5									Install 12.5 additional shop curved radius rail to existing site	
52	US 221	ES FROM LOC. 1, 17.32 MILES FROM US 221N AND US70 W	NB		25									Install 25 additional shop curved radius rail to existing site	
GRAND TOTAL				1,025.00	37.50	1	0	775.00	29	2	906.25	0	2		

NOTES: QUANTITIES ARE ESTIMATED AND MAY CHANGE ACCORDING TO ACTUAL FIELD CONDITIONS.
THE ENGINEER SHALL FIELD MARK ALL PROPOSED GUARDRAIL AND END UNITS PRIOR TO BEGINNING CONSTRUCTION AT EACH LOCATION.

INSTALL EXTRA LENGTH GUARDRAIL POSTS ACCORDING TO FIELD CONDITIONS AND AS DIRECTED BY THE ENGINEER.