### GUARDRAIL - TABS

- Column headings match the SEQ descriptions
- Both ends of guardrail accounted for
- All notes accounted for and make sense
- SP/funding splits shown

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<th>SITE NO.</th>
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| TOTAL             | 369 2      | 2 2         | 442 5      | 4 1 4 2375 50 1 |
GUARDRAIL – PLAN VIEW

- Show guardrail site/location
- Show inplace guardrail
- Show proposed work
GUARDRAIL –
END TREATMENTS

Guardrail must be in tension to work...

“This car drives so smooth it feels like we’re flying!”
GUARDRAIL – END TREATMENTS

Guardrail must be in tension to work...

- Must have tension at both ends!

Tools of tension are...

- Design Special
- End Treatment (i.e. Tangent terminal, Flared terminal, etc.)
- Anchorage Assembly
GUARDRAIL – LINE REMOVALS

- 2104.509 REMOVE GUARD RAIL – PLATE BEAM by LIN FT
- 2104.509 REMOVE CABLE GUARDRAIL by LIN FT
- 2104.509 REMOVE GUARD RAIL by LIN FT

When re-using the posts but not the rail because the rail is in bad condition
GUARDRAIL – END TREATMENT REMOVALS

- 2104.509 REMOVE ANCHORAGE ASSEMBLY – PLATE BEAM by EACH
- 2104.509 REMOVE ANCHORAGE ASSEMBLY – CABLE by LIN FT
- 2104.509 REMOVE ENERGY ABSORBING TERMINAL by EACH note what it is (i.e. ET-2000, SKT-350, etc)
- 2104.509 REMOVE TWISTED END TREATMENT by EACH Note if it includes the removal of anchorage blocks
- 2104.509 REMOVE ECCENTRIC LOADER BCT by EACH
- 2104.509 REMOVE SLOTTED RAIL TERMINAL by EACH

When removing design special pay for it as
2104.501 REMOVE GUARD RAIL – PLATE BEAM by LIN FT and add note “Includes Design Special”.
GUARDRAIL – SALVAGE LINE

- 2104.521 SALVAGE GUARD RAIL – PLATE BEAM by LIN FT...when salvaging whole system

- 2104.521 SALVAGE GUARDRAIL - CABLE by LIN FT

- 2104.521 SALVAGE GUARD RAIL by LIN FT when salvaging beam but replacing posts... add note “Includes the removal of wood posts.”

- 2104.521 SALVAGE GUARD RAIL – BULL NOSE by LIN FT
GUARDRAIL – SALVAGE END TREATMENT

- 2104.523 SALVAGE ANCHORAGE ASSEMBLY – CABLE by EACH
- 2104.523 SALVAGE ANCHORAGE ASSEMBLY – PLATE BEAM by EACH
- 2104.523 SALVAGE ENERGY ABSORBING TERMINAL by EACH used when you know what it is…add note to SEQ stating what it is (i.e. ET-2000, SKT-350, etc)
- 2104.523 SALVAGE TANGENT TERMINAL by EACH and 2104.523 SALVAGE FLARED TERMINAL by EACH …Used when contractor chooses temporary use. Need to note options.
- 2104.523 SALVAGE ECCENTRIC LOADER BCT by EACH salvaged for parts only, cannot be installed.
- 2104.523 SALVAGE SLOTTED RAIL TERMINAL by EACH

Salvaging Design Special can only be done if the existing Design Special is up to present standards.
GUARDRAIL – F & I LINE

- 2554.501 TRAFFIC BARRIER DESIGN B8338 by LIN FT...plate beam with steel posts
- 2554.501 TRAFFIC BARRIER DESIGN B8307 by LIN FT...plate beam with wood posts
- 2554.501 TRAFFIC BARRIER DESIGN BULLNOSE by LIN FT
- 2554.501 TRAFFIC BARRIER DESIGN 8330 by LIN FT...cable with wood posts
- 2554.501 TRAFFIC BARRIER DESIGN 8331 by LIN FT...cable with steel posts
GUARDRAIL – F & I END TREATMENT

- 2554.521 ANCHORAGE ASSEMBLY – CABLE by EACH
- 2554.521 ANCHORAGE ASSEMBLY –PLATE BEAM by EACH
- 2554.523 END TREATMENT _ ENERGY ABSORBING TERMINAL by EACH used for FLEAT-350…add note “Shall be flared and have steel posts.”
- 2554.523 END TREATMENT - TANGENT TERMINAL by EACH and 2554.523 END TREATMENT – FLARED TERMINAL by EACH add note to SEQ stating options.
- 2554.501 TRAFFIC BARRIER DESIGN SPECIAL by LIN FT…includes the bridge connection 8318.
- 2554.602 T-BARRIER BRIDGE CONN DES 8318 by EACH…typically used on the downstream side of bridge rails.
GUARDRAIL – INSTALL LINE

- 2554.603 INSTALL GUARDRAIL by LIN FT...used when replacing posts and installing rail only. Add note “Includes the furnish and install of steel posts.”

- 2554.511 INSTALL TRAFFIC BARRIER DESIGN BULL NOSE by LIN FT.

- 2554.511 INSTALL TRAFFIC BARRIER DESIGN B8338 by LIN FT....used to install the whole plate beam system.

- If able to install design special use...2554.511 INSTALL TRAFFIC BARRIER DESIGN B8338 by LIN FT and note that it includes the design special.
GUARDRAIL – INSTALL END TREATMENT

- 2554.602 INSTALL ANCHOR ASSEMBLY – 3 CABLE by EACH
- 2554.602 INSTALL ANCHOR ASSEMBLY – PLATE BEAM by EACH
- 2554.602 INSTALL ENERGY ABSORBING TERMINAL by EACH used when you know what it is…add note to SEQ stating what it is (i.e. ET-2000, SKT-350, etc)
- 2554.602 INSTALL TANGENT TERMINAL by EACH and 2554.602 INSTALL FLARED TERMINAL by EACH Used when contractor chooses temporary use. Need to note options.

- Can’t replace wood posts with steel posts on an end treatment. Must put in a new system
- Design Special can only be installed on the same structure it was salvaged from. Paid for as 2554.511 INSTALL TRAFFIC BARRIER DESIGN B8338 by LIN FT.
GUARDRAIL

- When revising existing profile grade elevations consider guardrail heights (28” to 30”). Adjust guardrail height if necessary.
- Design Specials are needed on all approaches within the clear zone.
- Consider end treatments and design specials for approaches during staging.
GUARDRAIL
When plate beam is behind cable....

- Use FLEAT – 350 for end treatment behind cable.
- Include Standard Plate 8340
- Do NOT put the detail in the plan.

Diagram:
- NCHRP 350 APPROVED ANCHOR,
  CENTER BETWEEN POSTS 7 AND 8
GUARDRAIL – FLAT WALL or SINGLE LINE RAIL

Check with the bridge office EARLY in the design process... do you need a bridge design concrete end section?

- If yes, make sure you include the correct design special detail.
- For flat face rail include Standard Plan 5-297.619
- If a detail is needed have the bridge office supply you with one to put in the plan.
- Paid for as part of the F barrier
GUARDRAIL – POST SEAT

- Use when you can’t go deep (i.e. over culverts).
- Wood posts…Reference Standard Plate 8316
- Steel posts…include a detail in the plan
- Pay for it as…2554.602 GUARDRAIL POST SEAT by the EACH
GUARDRAIL – SHORT RADIUS DETAIL

This detail is paid for as…2554.501 TRAFFIC BARRIER DESIGN B8307 by the LIN FT…it uses wood posts.

If steel posts are desired then:

- Pay for it as…2554.501 TRAFFIC BARRIER DESIGN B8338 by LIN FT
- Change the reference from 8307 to 8338
- Add the following two notes to the detail…
  ◊ All posts shall be steel.
  ◊ All weak (CRT) posts shall be bolted hinged posts (steel plug welded posts may be used as an option).
TENSION CABLE GUARDRAIL

‡ 2104.501 REMOVE TENSION CABLE GUARDRAIL by LIN FT
‡ 2104.509 REMOVE ANCHORAGE ASSEMBLY-TENSION CABLE by EACH
‡ 2104.521 SALVAGE TENSION CABLE GUARDRAIL by LIN FT
‡ 2554.521 ANCHORAGE ASSEMBLY-TENSION CABLE by EACH
‡ 2554.603 RECONSTRUCT TENSION CABLE GUARDRAIL by LIN FT
‡ 2554.603 TENSION CABLE GUARDRAIL by LIN FT
‡ 2554.603 INSTALL TENSION CABLE GUARDRAIL by LIN FT
TENSION CABLE GUARDRAIL

‡ Refer to Technical Memorandum 13-02-TS-01

‡ Need to add this note to the plan unless it is in the special provisions....

"Line posts shall be furnished and installed with a 10 foot maximum spacing from center of post to center of post."

‡ Do NOT place in ditch bottom!