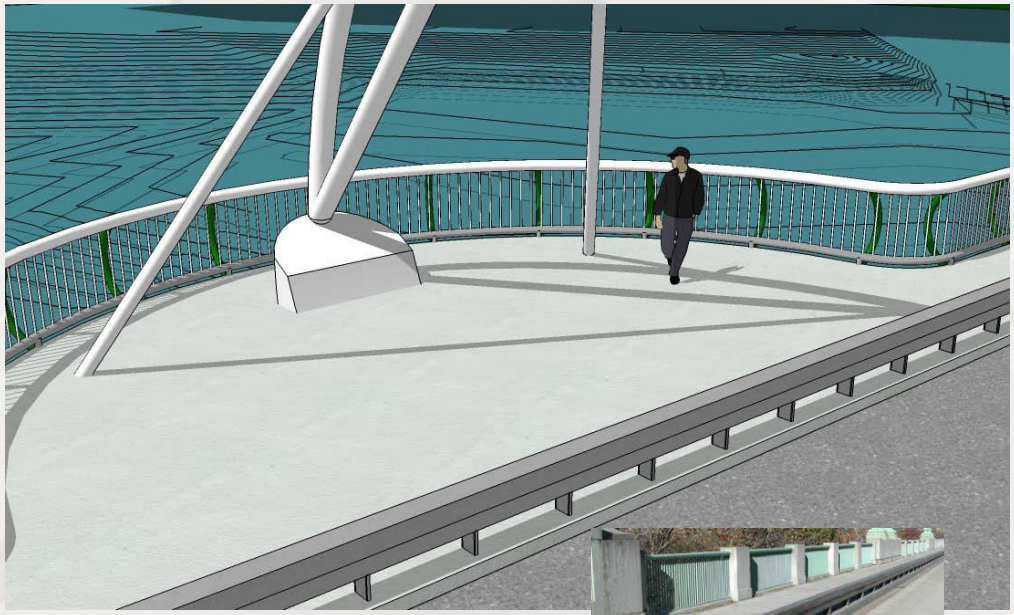
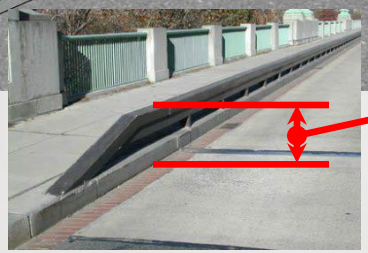
Hinsdale, NH – Brattleboro, VT
NH 119 over Connecticut River
NHDOT Project 12210C

PAC Meeting Presentation
February 1, 2017

Bridge Rail Between Roadway & Sidewalk



Chris Carley rendition, 2005



- Older crash criteria is NCHRP 350. Newer criteria is MASH
- Must be crash tested to MASH criteria after 12/31/19.
- Ad Date Sept 2019.
- Design speed of 35mph allows for Test Level 2 (TL2) or Test Level 3 (TL3) rail systems.
- The top must be a minimum of 27” above pavement to meet the AASHTO design minimum for vehicular rail.

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Bridge Rail Between Roadway & Sidewalk

Pros:

- Allows pedestrian rail along sidewalk fascia
- Provides a safer place to walk on sidewalk

Cons:

•Future maintenance of rail

•Additional weight on bridge (three rail lines on bridge instead of two; Concrete rail = 500 plf, T4 Steel Rail = 80 plf)

•Sidewalk Snow Removal

- **End Termination**

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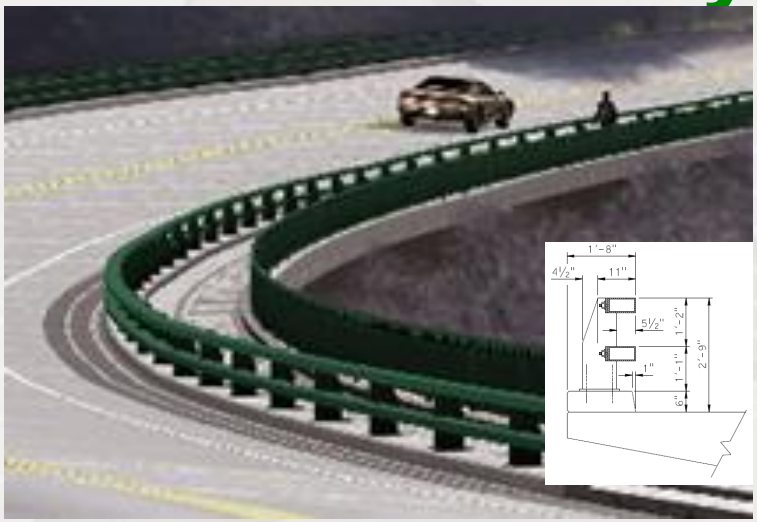
Bridge Rail Between Roadway & Sidewalk



CA Type ST-10, (TL 4, NCHRP 350)

NH Concrete Barrier (computer tested to TL-2, NCHRP 350)

CA Type 80, (TL 4, NCHRP 350)

NHDOT T2, (TL 4, NCHRP 350)

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Bridge Rail Between Roadway & Sidewalk

CA Type 90, (TL 4, NCHRP 350)

CA Type 80SW, (TL 2, NCHRP 350)

- <45 mph
- Pedestrian rail component omitted unless used as dual rail at fascia

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Bridge Rail Between Roadway & Sidewalk

TX Type T1F, (TL 3, MASH)

TX Type T1P, (TL 3, MASH)

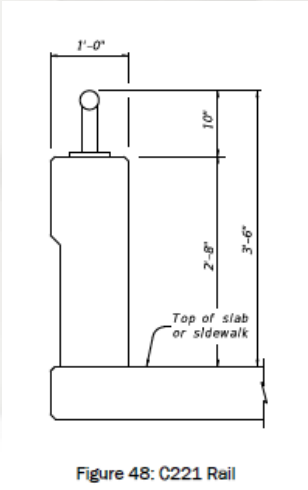

Figure 48: C221 Rail

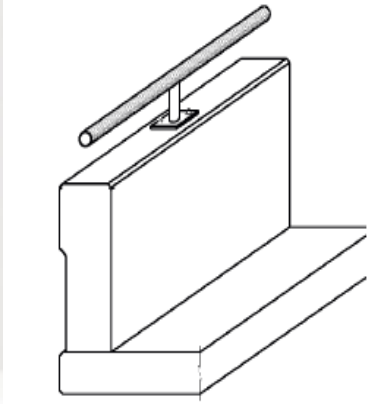

Figure 47: C221 Rail

TX Type C221, (TL 3, MASH)

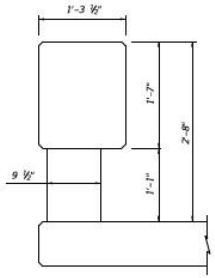

Figure 56: T223 Rail

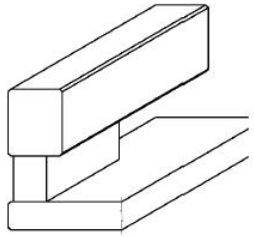

Figure 55: T223 Rail

TX Type T223, (TL 3, MASH)

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Bridge Rail Between Roadway & Sidewalk

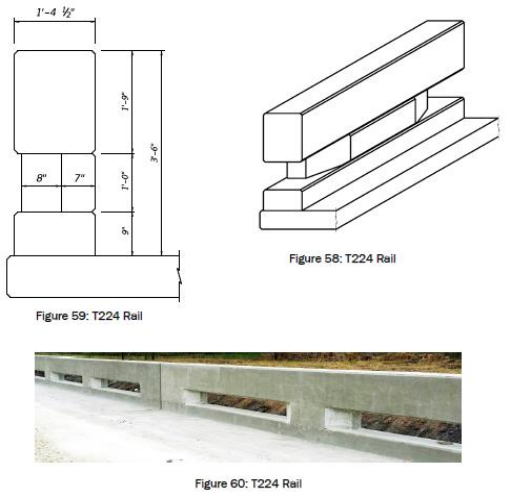


Figure 59: T224 Rail

Figure 58: T224 Rail

Figure 60: T224 Rail

TX Type T224, (TL 5, MASH)

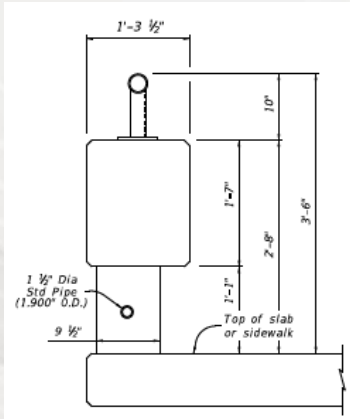


Figure 62: C223 Rail

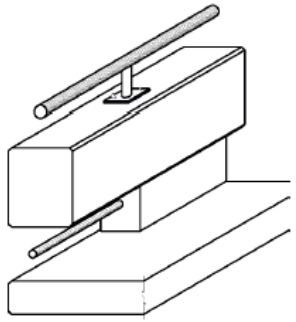
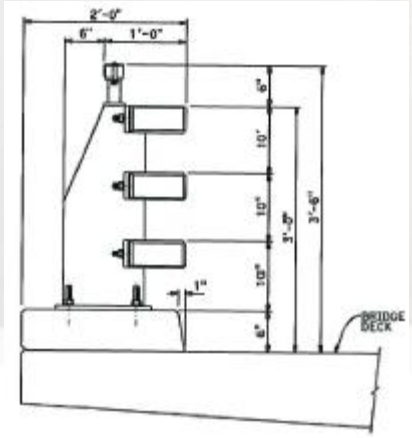


Figure 61: C223 Rail

TX Type C223, (TL 3, MASH)

CA Type 85, (TL 4, MASH)



CA Type ST-75, (TL 4, MASH)

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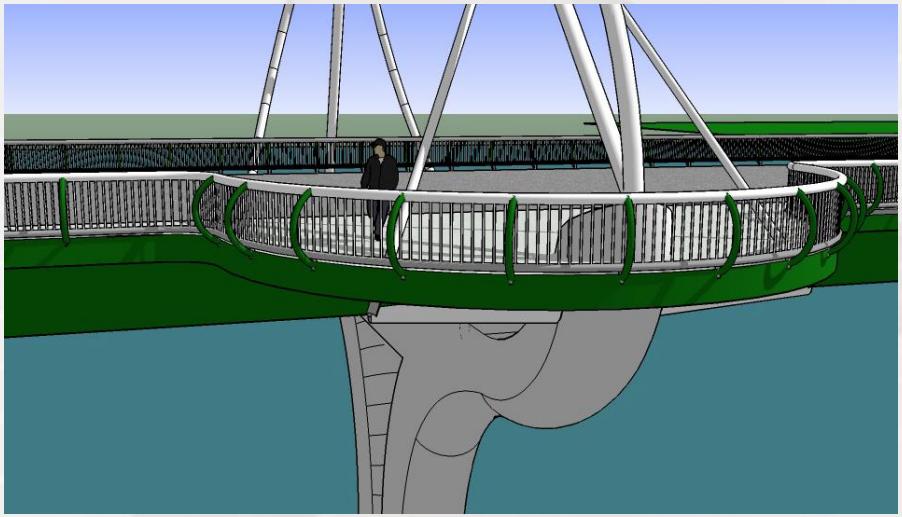
Pedestrian Bridge Rail



Chris Carley rendition, 2005

NH Steel Ped Rail, Plymouth

Pros:

- Less obtrusive than vehicular crash rail.
- More options when used as pedestrian rail only.

Cons:

•Requires vehicle rail between roadway and sidewalk

•Different rail type than on VT 142 retaining wall presents difficulty with termination and continuity between this rail and the fascia rail coming off the bridge.

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Pedestrian Bridge Rail

NH Aluminum Ped Rail – Allenstown

Internet

Internet

Internet

New Hampshire DOT
Department of Transportation

Pedestrian Bridge Rail

Internet

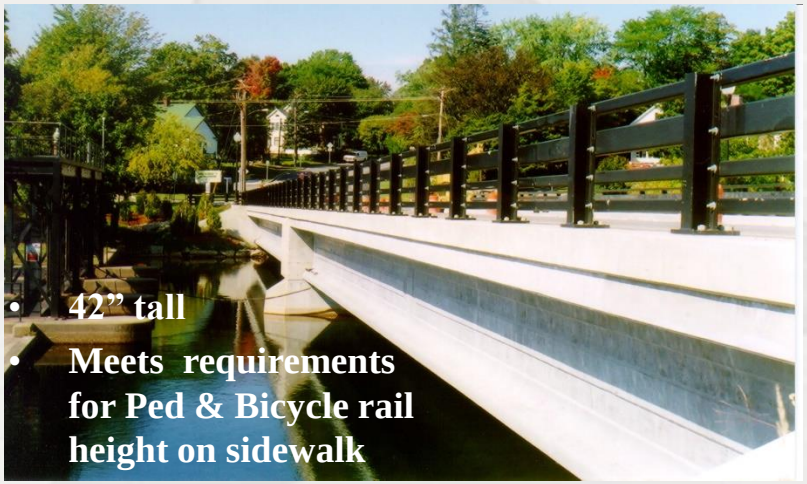
Internet

Internet

Internet

Combined Vehicular/Pedestrian Rail

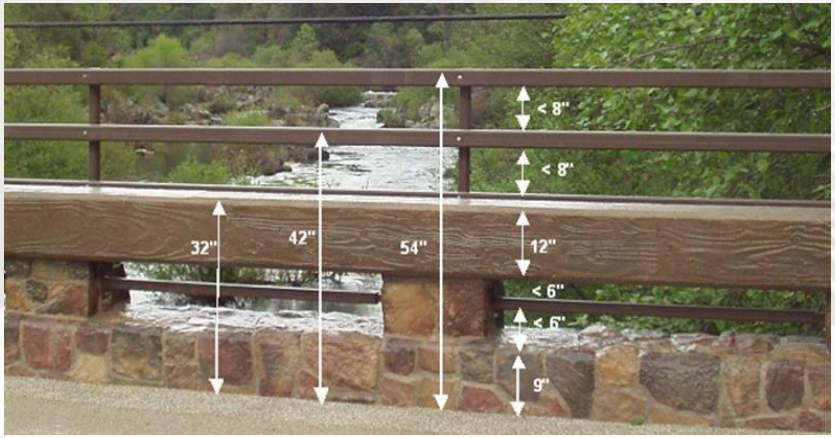
NHDOT Preferred Approach



NHDOT Standard T4 Rail, (TL4, NCHRP 350)

UK, EdgeRail, (TL4, NCHRP 350)

CA Type ST-20, (TL 4, NCHRP 350)



CA Type 80, (TL 4, NCHRP 350)
Modified for Pedestrian Use

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Combined Vehicular/Pedestrian Rail

Ma Steel Rail, (TL 4, NCHRP 350), NH Municipal project

- Must have concrete pedestal between bridge and approach rail.
- Similar to NHDOT T3 (taller)
- Tall enough for bicycle rail (non-sidewalk side) and pedestrians (sidewalk side)

NHDOT T3, (TL 4, NCHRP 350)

- Tall enough for bicycle rail on coping side with reveal
- NOT tall enough for pedestrian rail on sidewalk side.

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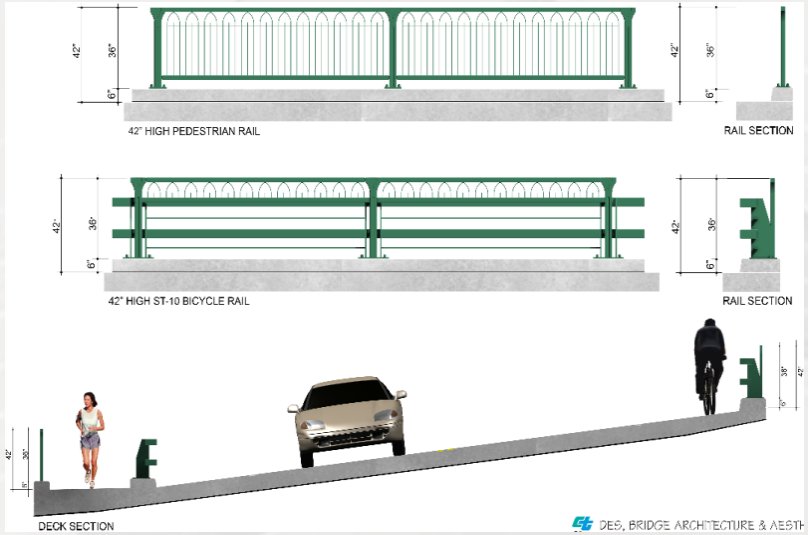
Combined Vehicular/Pedestrian Rail



CA Type ST-10, (TL 4, NCHRP 350), modified

CA Type 90, (TL 4, NCHRP 350)

- For pedestrian/bicycle rail, additional steel rail mounted at least 15” behind the rail face as well as modification to reduce the clear openings.

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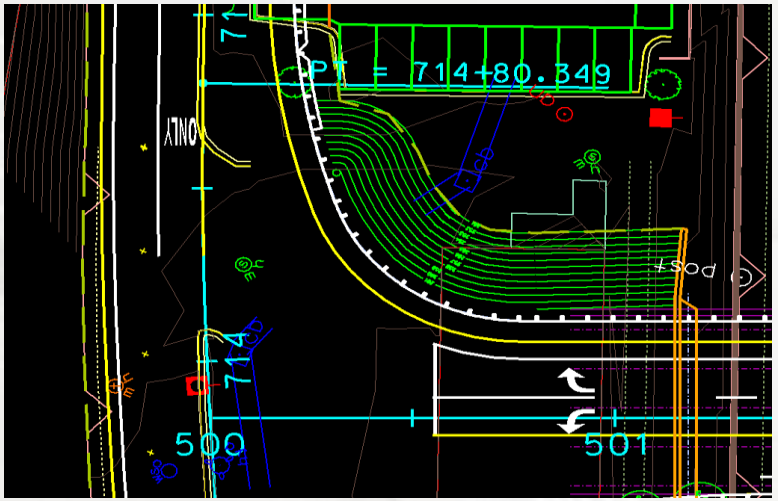
Pedestrian Landing at Intersection

Chris Carley rendition, 2005



NHDOT CADD Plan View of corner contours, 2016

- Circular landing is not currently incorporated.
- Stairway accesses green space below but has no other destination.
- Current NHDOT layout eliminates 120’ of wall.

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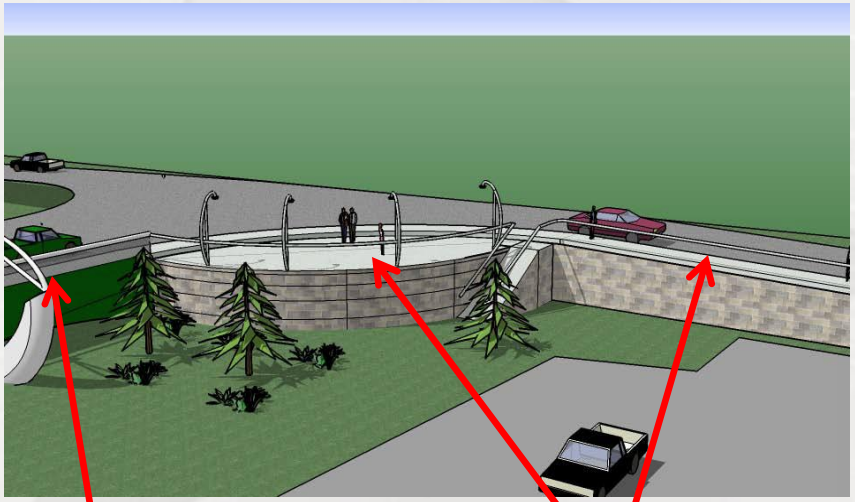
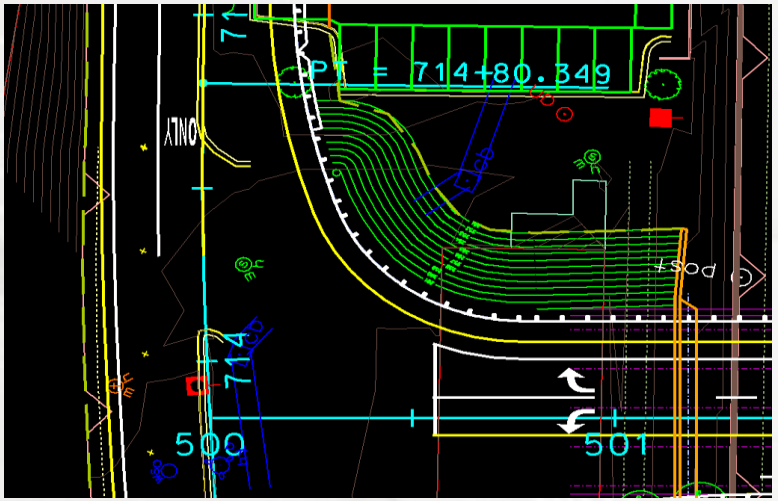
Pedestrian Landing at Intersection



Chris Carley rendition, 2005



NHDOT CADD Plan View of corner contours, 2016

- Pedestrian **and** Vehicular Rail

- Pedestrian **or** Ped/Veh Rail (on bridge)

Continuity of rail or termination of rail?

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Pedestrian Overlook On Bridge

Chris Carley rendition, 2005

Enfield

Enfield

Note:

- Depending on size, bearing support will be required.
- Aluminum bridge rail shown in both photos at right is no longer an option as vehicular barrier.

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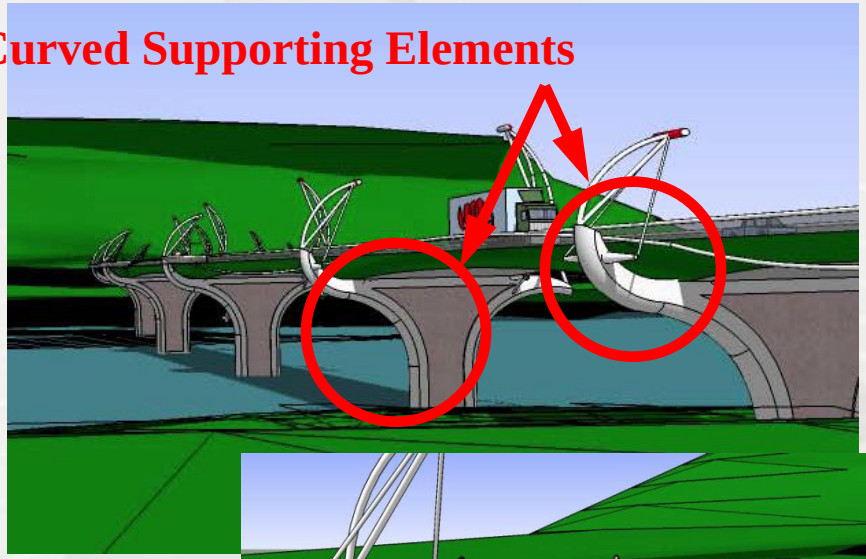
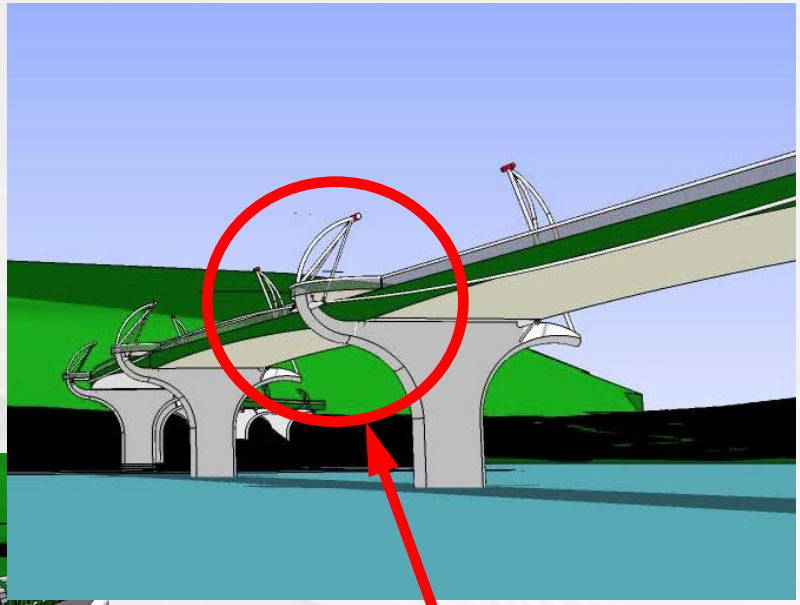
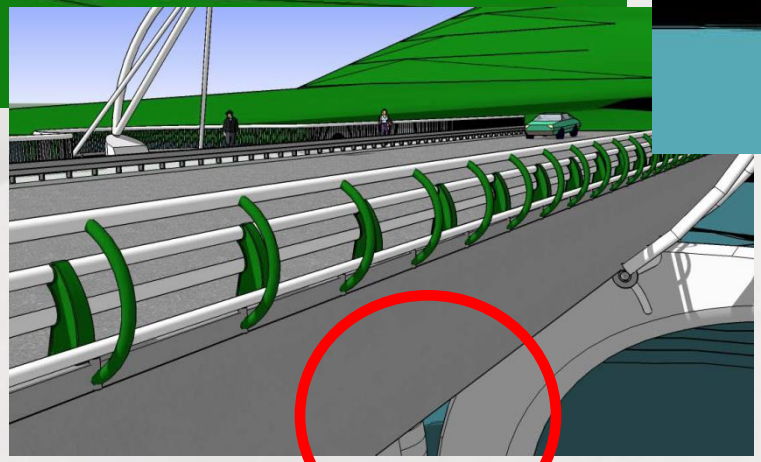
Pier Shape and Aesthetics







Chris Carley renditions, 2005

- Allow birds to roost accelerating deterioration of concrete.
- Can be mimicked with form liners.

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Pier Shape and Aesthetics

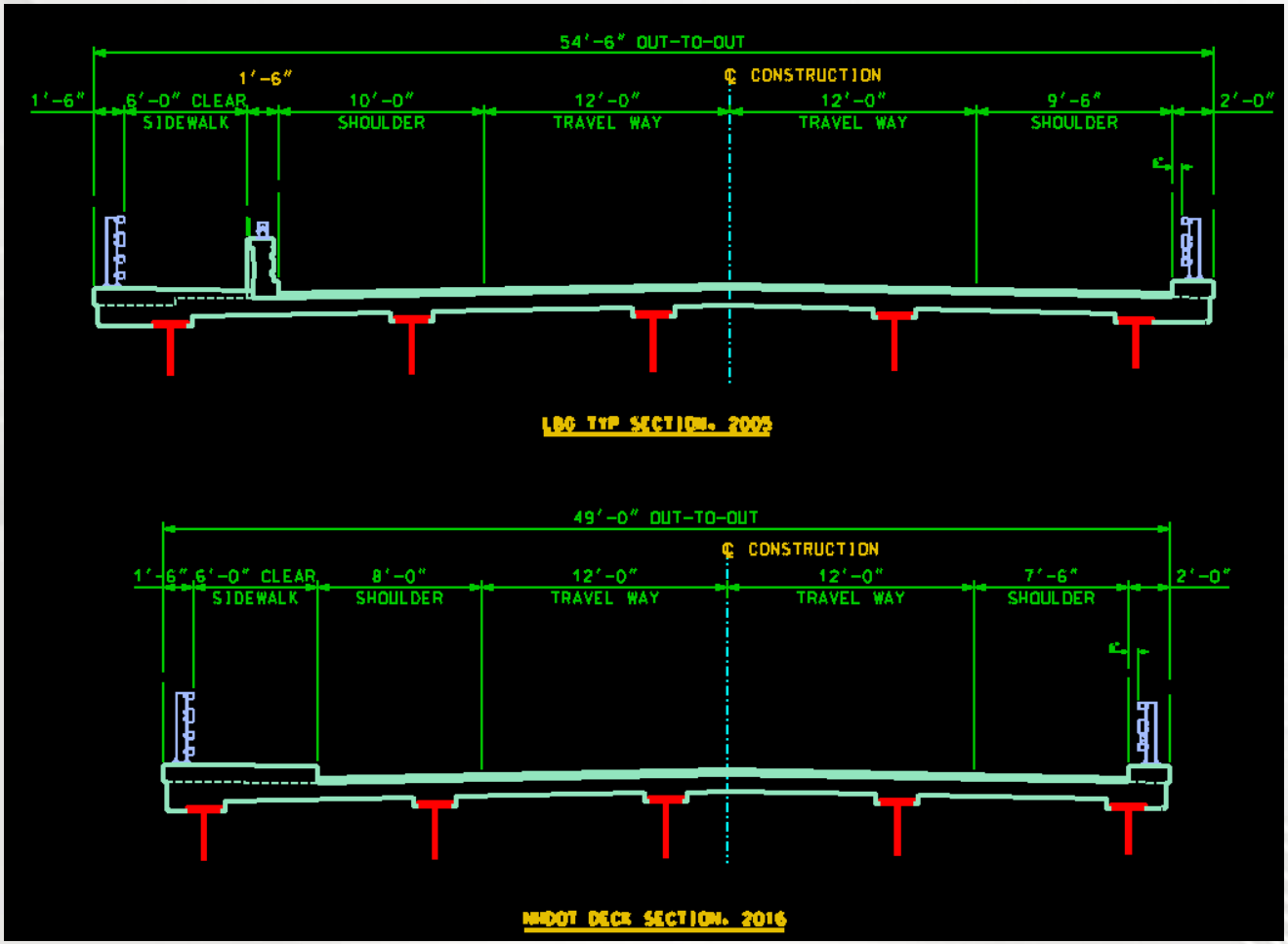
Form Liners

Support for Overlook

Bridge Typical X-Section

12’ TW w/ 8’ Shoulder w/o shoulder barrier allows:

- Adequate shoulder width for broken down vehicle
- Future 3-phase rehabilitation w/ 1-lane each direction
- 5’-6” less width ($2.5M savings)
- Bridge widening at VT intersection w/o excessive overhangs



Note: Towns will be required to have winter maintenance agreements with NHDOT if sidewalk to be placed on bridge.

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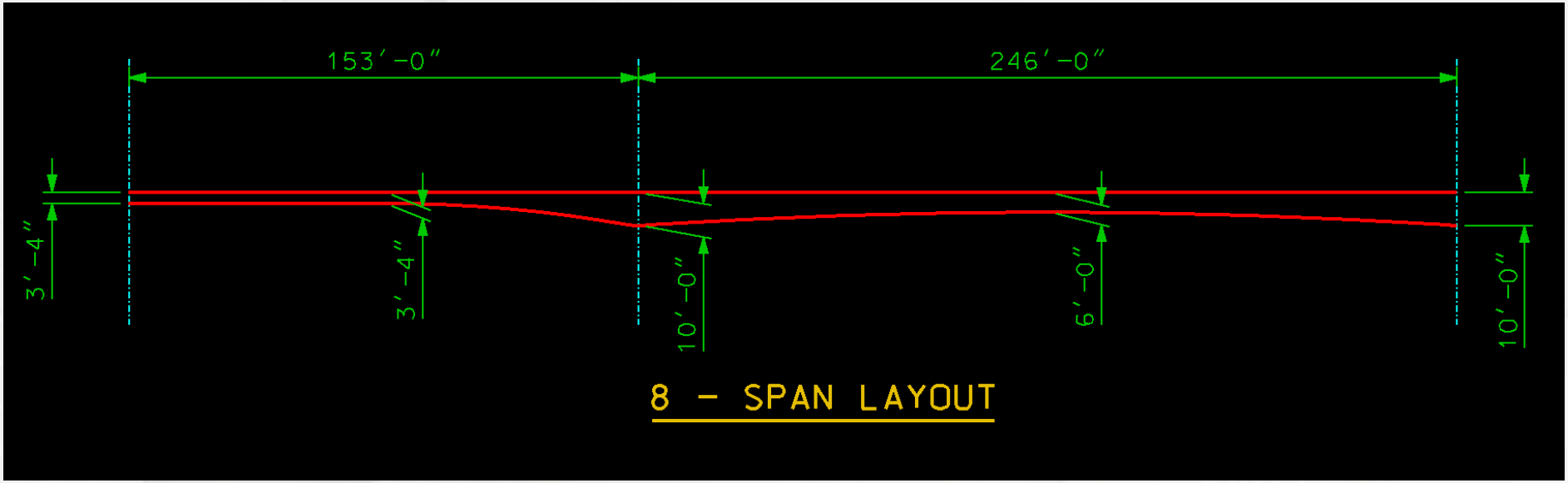
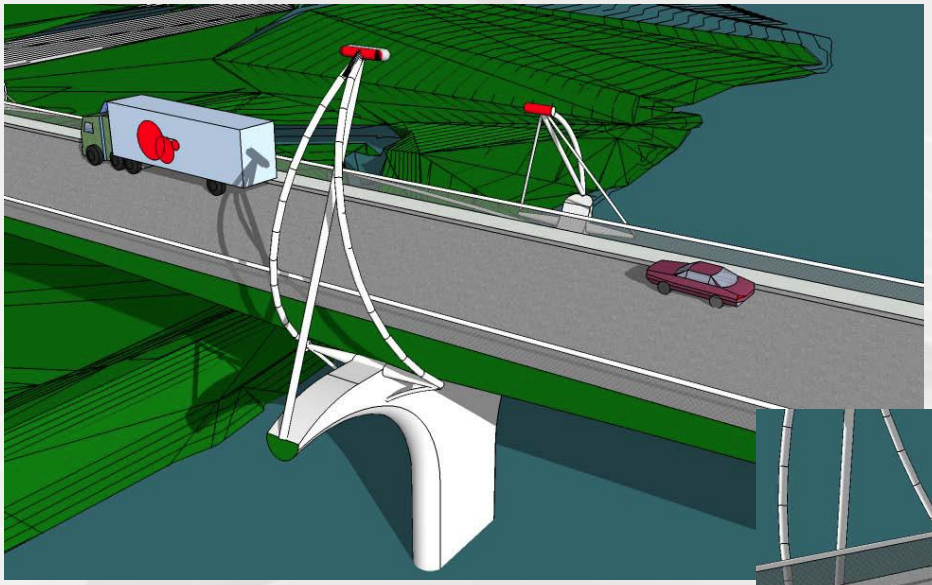
Girder Profile



Lighting



Chris Carley rendition, 2005

Lighting

Lebanon

Plymouth

Enfield

- Lighting purchased and installed as project expense (reasonable cost).
- Lighting operated and maintained by municipalities.
- NHDOT is willing to accept any commercially available light standard.
- Color susceptible to fading and scratching over time

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Lighting

St. Louis

Dover