Cleveland Innerbelt CCG3A – I77 Redecking Scope of Work
04/18/2023

All,

Aaron and I made a field visit this morning to take a closer look at these three structures. Please see below comments which may assist in scoping this work. Photos from this morning can be found here: **I:\PROJECTS\PID82380 Innerbelt CCG3\Funding\I77-Decks\Photos.**

I77 over Woodland
CUY-77-1546 – SFN 1806815-US 422; 2016-Deck=5; 2020-Deck=4; 2022 GA=5

- Replace deck
- Jointed – have to look at seismic for pier and superstructure framing; likely quicker construction;
- Bearings and expansion joints are long lead times now (Oct-Dec 2024 likely sale; start work April 2025)
- Replace abutment bearings (elastomeric) and raise beam seats – in lieu of extensive spot patching of the abutment breastwall, consider performing spall and delamination removals in accordance with CMS 519, epoxy injecting cracks, and placing new reinforced concrete a minimum of 6" thickness from top of footing to construct a new breastwall face and beam seat in a single pour.
- Consultant to look at beam ends – have enough material to weld new end frames
- Paint last 10' of beams to protect beams
- Use standard concrete mixes
- No SIP – use conventional forms
- Replace approach slabs
- Replace backwalls
- Fatigue retrofits for moment plates or splices over piers – In lieu of automatically retrofitting these fatigue details per the BDM, perform a remaining fatigue life analysis per the process outlined in BDM 404.1.2.6 to determine which details require retrofitting. Discuss with the District any fatigue retrofits that will impact the minimum vertical clearance.
- Survey required – bottom of beam elevations – yes
- Install concrete slope protection – consider curb replacement within limits of bridge
- Abutment weep holes-If possible, plug weepholes, install new drainage behind abutment, and provide positive outfall. If not possible, maintain weepholes and ensure they outfall above concrete slope protection.
- Consider ditch CB replacement/repair adjacent to bridge
- Look to see if shoulder width design exceptions are needed on I77
- Underpass lighting-coordinate with Cleveland on potential installation; project would pay capital cost to install, Cleveland would be responsible for maintenance and power consumption.
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- *Field notes 1/11/23*
- *The slope protection is poor and a lot of soil has washed out to the bottom of the slopes. Further, the curbs on either side of the roadway under the bridge are more or less nonexistent so the washout extends out onto the roadway. We should address this by replacing the curbs and installing new slope protection. Concrete slope protection may be a good option here given how close the toe of the slope is to the roadway.*

- *The bearings, cross frames, and beam ends at both abutments are showing heavy corrosion. Bearings and end cross frame replacement would be recommended if we don't convert to semi-integral.*
- *The pier bearings are in good condition and probably don't need to be replaced.*
- *The backwalls and abutments above the footings are in very poor condition (worst of the three). The abutments are significantly spalled and cracked, and it would probably be best to replace instead of trying to patch the existing.*

I77 over E. 22nd

CUY-77-1562; SFN 1806874-E22nd; 2016-Deck=5; 2020-Deck=4; 2022 GA=6

- Replace deck
- Jointed – have to look at seismic for pier and superstructure framing; likely quicker construction;
- Bearings and expansion joints are long lead times now (Oct-Dec 2024 likely sale; start work April 2025)
- Replace abutment bearings (elastomeric) and raise beam seats – in lieu of extensive spot patching of the abutment breastwall, consider performing spall and delamination removals in accordance with CMS 519, epoxy injecting cracks, and placing new reinforced concrete a minimum of 6" thickness from top of footing to construct a new breastwall face and beam seat in a single pour.
- Consultant to look at beam ends – have enough material to weld new end frames
- Paint last 10' of beams to protect beams
- Use standard concrete mixes
- No SIP – use conventional forms
- Replace approach slabs
- Replace backwalls
- Fatigue retrofits for moment plates or splices over piers – In lieu of automatically retrofitting these fatigue details per the BDM, perform a remaining fatigue life analysis per the process outlined in BDM 404.1.2.6 to determine which details require retrofitting. Discuss with the District any fatigue retrofits that will impact the minimum vertical clearance.
- Survey required – bottom of beam elevations – yes
- Keep concrete slope protection except for what needed to complete backwall work
- Abutment weep holes-If possible, plug weepholes, install new drainage behind abutment, and provide positive outfall. If not possible, maintain weepholes and ensure they outfall above concrete slope protection. (See existing detail.)
- Consider ditch CB replacement/repair adjacent to bridge
- Look to see if shoulder width design exceptions are needed on I77
- Underpass lighting-aerial feed; need to re-route during construction; look to install power feed tied to Cleveland and not ODOT lighting circuits; coordinate with Cleveland as it is their maintenance/power consumption
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- *Field notes 1/11/23*
- *This location could use some minor drainage work under the bridge. There is quite a bit of washout onto the slope protection/sidewalk area from the adjacent ditch lines.*
- *We could get away with removing/replacing the top 10' or so of the concrete slope protection to do the abutment work and leave the rest in place as it is in decent condition.*

- *The bearings, cross frames, and beam ends at both abutments are showing heavy corrosion. Bearings and end cross frame replacement would be recommended if we don't convert to semi-integral.*
- *The pier bearings are in good condition and probably don't need to be replaced.*
- *The backwalls and abutments above footings are in poor condition. The backwalls should be replaced, and if we wanted to rehab the abutments instead of replace, significant patching and epoxy injection would be required.*

<u>I77 over E. 14th</u>

CUY-77-1575; SFN 1806904-E14th; 2016-Deck=6; 2019-Deck=5; 2020-Deck=4; 2022 GA=6

- Replace deck
- Jointed – have to look at seismic for pier and superstructure framing; likely quicker construction;
- Bearings and expansion joints are long lead times now (Oct-Dec 2024 likely sale; start work April 2025)
- Replace abutment bearings (elastomeric) and raise beam seats – in lieu of extensive spot patching of the abutment breastwall, consider performing spall and delamination removals in accordance with CMS 519, epoxy injecting cracks, and placing new reinforced concrete a minimum of 6" thickness from top of footing to construct a new breastwall face and beam seat in a single pour.
- Consultant to look at beam ends – have enough material to weld new end frames
- Paint last 10' of beams to protect beams
- Use standard concrete mixes
- No SIP – use conventional forms
- Replace approach slabs
- Replace backwalls
- Fatigue retrofits for moment plates or splices over piers – In lieu of automatically retrofitting these fatigue details per the BDM, perform a remaining fatigue life analysis per the process outlined in BDM 404.1.2.6 to determine which details require retrofitting. Discuss with the District any fatigue retrofits that will impact the minimum vertical clearance.
- Survey required – bottom of beam elevations – yes
- Install concrete slope protection
- Abutment weep holes- If possible, plug weepholes, install new drainage behind abutment, and provide positive outfall. If not possible, maintain weepholes and ensure they outfall above concrete slope protection.
- Look to see if shoulder width design exceptions are needed on I77
- Underpass lighting-aerial feed; need to re-route during construction; look to install power feed tied to Cleveland and not ODOT lighting circuits; coordinate with Cleveland as it is their maintenance/power consumption
- Look at scupper removal if possible
- Full paint on breams (this bridge has much lower paint coating rating)
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- Field note 1/11/23
- *The slope protection is in poor condition and there is some soil washout at the bottom of the slope, similar to Woodland. Recommend new slope protection.*

- *The bearings, cross frames, and beam ends at both abutments are showing heavy corrosion. Bearings and end cross frame replacement would be recommended if we don't convert to semi-integral.*
- *The pier bearings are in good condition and probably don't need to be replaced.*
- *The backwalls are in poor condition and should be replaced. The south abutment is in poor condition with areas of significant spalling and cracking throughout. The north abutment is in better condition than the south with less cracks, but still has large areas with spalling.*

MOT

- *Re-decking these bridges would take a <u>minimum</u> of two years. My opinion is that we should target one direction at a time with the goal of completing the work on one side in year 1 and the other in year 2. Giving a realistic construction timeframe of April – October, that would give the Contractor 3 months per phase (assuming two phases per side), which is tight but doable if we are just re-decking. For both directions we would probably have to look at only maintaining two lanes if we don't want to put traffic into a contraflow pattern. This would almost certainly require ramp closures to accomplish. I would recommend including a disincentive table with hard end dates for the season to make sure that the work for each year is completed before winter. We do not want to be in phase in this location during the winter.*

Other considerations

- *All three structures have underpass lighting. Woodland has lighting mounted on an angle iron attached to the beams, which appears to be un-operational. E. 22nd and E. 14th have lighting mounted to the pier caps. We need to look at whether or not lighting upgrades are needed and if we should perform this work while we are doing the rehabs.*
    - *One additional note – the power for E. 14th's underpass lighting is fed aerially from an adjacent light pole and clipped to the bottom flange of the bridge. This would need to be moved prior to construction.*
- *Since we are doing this work as a temporary rehab, I am assuming that we don't want to re-paint the bridges. In general, the existing paint is not that bad except for the beam ends. Of the three, Woodland's paint is in the worst conditions. At the very least, the last 10' of the beams on all three bridges should be repainted as they are all showing heavy corrosion.*
- *I was thinking more about efficiency suggestions to use high early strength concrete and stay in place forms and have the following comments:*
    - *Unless we include a plan note with specific curing & loading requirements, using high early strength concrete for the decks would not save us much time on the schedule. Superstructure concrete requires 7-days of continuous water curing regardless of early-break strength. Usually we can get to 85% f'c in those 7 days.*
    - *Because these bridges go over local roads, using stay-in-place forms wont significantly impact the schedule because the deck forms will be stripped from underneath and won't require lane restrictions on I-77.*