NORTHWEST HIGHWAY S-CURVE
PEDESTRIAN/BICYCLE ACCESS FEASIBILITY STUDY

Northwest Highway (US 14)
From Seegers Road to Western Avenue
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**Project Background**

V3 Companies was selected by the City of Des Plaines to conduct a feasibility study for constructing a pedestrian/bicycle culvert underpass and connecting sidepath at the Northwest Highway “S-Curve” railroad crossing.

Northwest Highway (US Route 14) currently passes underneath a timber railroad bridge, built in the 1930’s, that carries the crossing of two major rail lines – the Union Pacific (UP) rail line and the Wisconsin Central (WC) rail line. As a result of the curvature of the roadway as it passes underneath the bridge, along with reduced lanes and minimal shoulder space, safe pedestrian and bicycle travel through the crossing currently is not feasible. However, due to a lack of convenient alternative routes and high bicycle and pedestrian demand through the corridor, bicycles have been observed through the underpass and pedestrians have reportedly trespassed along/across the tracks in order to traverse the area.

**Alternative Analysis**

The proposed path navigating the railroad bridge crossing would remove a key barrier and provide safe access for pedestrian and bicycle travel between downtown Des Plaines and areas west. The project would also provide a regional benefit, removing a barrier in the envisioned 20-mile Northwest Highway Regional Bicycle Corridor connecting six suburban transit-oriented downtown districts with the greater City of Chicago Bike Network.

Exhibit 1 presents the proposed alignments for each of the alternatives that were developed and evaluated.

**Alternative 1 (Over)** – This alternative consists of a 10-foot wide PC Concrete path along the north side of US 14, shown on Exhibits 2 and 10. The path would be constructed at the back of the curb of US 14 and would be separated from traffic by a guardrail and fence or railing. This crossing of the rail lines would be made by the construction of a bridge, which spans both rail lines and is generally parallel to US 14. The majority of the path would be constructed on an embankment between two retaining walls. The retaining walls could be constructed with cast-in-place reinforced concrete, sheet pile or T-wall. The cost presented for this alternative is based on a cast-in-place retaining wall as this would likely be the most expensive alternative. The wall along the back of curb of US 14 would vary in height between zero and 44 feet in height near the railroad bridge.
Alternative 1 (Under) – This alternative consists of a 10-foot wide PC Concrete path along the north side of US 14, shown on Exhibits 3 and 10. The path would be constructed at the back of the curb of US 14 and would be separated from traffic by a guardrail and fence or railing. The path for this alternative would be constructed slightly higher than the US 14 pavement so there would be no need for a retaining wall between the roadway and the path. However, there would be a retaining wall between the path and the slope to the north. The path would traverse the UP rail line beneath the existing bridge structure. There would be no impact to the existing UP bridge except for excavation between the existing steel H-piles. The path would be reduced to 8-foot in width beneath the bridge structure to provide for the construction of a fence and rub rails to separate the bicycle and pedestrian traffic from the existing H-piles.

The path would traverse beneath the WC railroad as well. Based on the existing pile configuration, this would require reconstruction of the entire bridge section from the rail crossing structure to the existing abutment. This bridge, which has a span of 35 feet and is a single track bridge, could be constructed as a roll-in type structure to minimize any rail outages.

Alternative 2 – This alternative consists of a 10-foot wide PC Concrete path from the existing sidewalk near Hanbury Lane extending along the south side of Weller Creek within the greenspace along the north side of the proposed Buckingham Place development, shown on Exhibits 4 and 10. The path crosses beneath the WC rail line at the existing WC bridge over Weller Creek. This crossing beneath the existing WC structure will not require any modification to the bridge structure but will require excavation and the construction of retaining walls beneath the existing bridge to provide the necessary grading for the path. This Alternative includes Segments 1D and 1E of Alternative 1-Under to completely traverse both railroads.
Alternative 3 – This alternative consists of a 10-foot wide PC Concrete path within the right-of-way of Seegers Road, Rand Road and along the east edge of the ComEd Property, shown on Exhibits 5, 6, and 10. The alignment begins at the intersection of US 14 with Seegers Road and extends along Seegers Road to the intersection with Rand Road. The path is located within the southwest right of way of Rand Road from Seegers Road to the eastern edge of the ComEd property. The proposed trail would be located along the east side of the car wash property and be located within an easement along the east edge of the ComEd property. The path would cross the UP rail line near the east edge of the ComEd property and cross onto the Colfax Crossing property between the proposed easternmost townhomes and the proposed detention facility. The crossing of the UP rail line would be via an underpass tunnel. The southwestern end of this alignment would match into the sidewalk within the Colfax Crossing development where bicycles could utilize the existing street network and pedestrians could utilize the City sidewalks.

Alternative 4 – This alternative consists of a 10-foot wide PC Concrete path along the west side of the ComEd property from Seegers Road to Weller Creek and would connect a portion of Alternative 2 to a portion of Alternative 3, shown on Exhibits 7 and 10. This alternative requires a short bridge structure to span Weller Creek. This Alternative includes Segments 3A, 3B, 2C, and 1D & 1E of Alternative 1-Under to completely traverse both railroads.
Alternative 5 – This alternative is located south of US 14 and is adjacent to the UP Harvard Subdivision (Northwest Commuter Line). The existing UP and WC rail facilities in this area could be grade separated either over or under the existing rail lines. This alternative was discussed with the UP during our kickoff meeting and it was determined that this alternative would have significant impacts to the UP yard located between the UP and WC lines and the UP would not grant the necessary easements for its construction. This alternative has been dropped from consideration.

Alternative Evaluation

The above listed alternatives were evaluated based on the following criteria:

1. Acceptability to stakeholders
2. Pedestrian safety
3. Impacts to rail operations
4. Ability to be designed to meet ADA requirements
5. Ability to be designed to meet typical design guidelines
6. Property impacts
7. Cost

The results of our evaluation are presented in Exhibit 14. This exhibit summarizes our evaluation of the above alternatives base on the above criteria. The opinions of cost for each alternative are presented in Exhibit 14. Additional details of the costs of each alternative are presented in Exhibit 15.

Additionally, the general advantages and disadvantages of Alternatives 1-4 are as follows:

Alternative 1 (Over)

Advantages:

1. No adverse travel distance
2. No impact to WC rail operations
3. No impact to UP rail operations
Disadvantages:

1. The retaining walls along US 14 will reach a maximum height of 44 feet above US 14, making the existing roadway underpass feel even more cavernous
2. Will require lane closures on US 14 to construct
3. Significant impacts to ComEd facilities requiring relocation of transmission towers
4. Although it can be constructed to be ADA/PROWAG compliant, there will be a very long segment of 5% longitudinal slope which would make this alternative very difficult for handicapped persons to negotiate
5. Very costly to construct
6. Right of way and easements will be required from the adjacent property owners:
   a. UP – 0.05 acres
   b. WC – 0.07 acres
   c. Other – 0.54 acres

Alternative 1 (Under)

Advantages:

1. No adverse travel distance
2. No impact to ComEd operations
3. No impact to UP rail operations

Disadvantages:

1. Limited impact to WC rail operations
2. Will require lane closures on US 14 to construct
3. Costly to construct
4. Right of way and easements will be required from the adjacent property owners:
   a. UP – 0.06 acres
   b. WC – 0.07 acres
   c. Other – 0.55 acres
5. Substandard Design Elements:
   a. Path radii from Sta. 166+43 to 167+92 is based on 12 MPH design speed
   b. Path width decreases to 8’ beneath the UP bridge structure

Alternative 2

Advantages:

1. No impact to ComEd operations
2. No impact to UP rail operations
3. No impact to WC rail operations
4. Provides a trail system through the Buckingham Place Development
Disadvantages:

1. Adverse travel distance of approximately 750 feet
2. Perceived as less safe because it diverts cyclists and pedestrians through areas with very little pedestrian or vehicular traffic
3. Path will not be accessible during significant rain events as the segment beneath the WC bridge of Weller Creek will be inundated
4. Right of way and easements will be required from the adjacent property owners:
   a. UP – 0.06 acres
   b. WC – 0.29 acres
   c. ComEd – 0.33 acres
   d. Other – 1.50 acres
5. Substandard Design Elements:
   a. Path radius at 221+00 is based on 12 MPH design speed
   b. Path radius at 220+80 to 232+50 is based on 12 MPH design speed

Alternative 3

Advantages:

1. No impact to ComEd operations
2. No impact to UP operations
3. No impact to WC operations

Disadvantages:

1. Adverse travel distance of approximately 2200 feet
2. Perceived as less safe because it diverts cyclists and pedestrians through areas with very little pedestrian or vehicular traffic
3. Crossing of WC rail line is at grade
4. Right of way and easements will be required from the adjacent property owners:
   a. UP – 0.08 acres
   b. ComEd – 0.44 acres
   c. Other – 0.25 acres
5. Requires the construction of a tunnel under the UP rail line
6. Requires the relocation of a newly constructed 30” diameter storm sewer
7. Requires the relocation of power poles along Seegers and within Colfax Crossing development
8. Requires the construction of a pump station to keep underpass free of stormwater
9. May require that the embankment between the south ramp and the detention facility be reconstructed to ensure stability
10. Connects to the existing street network, but does not provide off street path for the entire length
**Alternative 4**

**Advantages:**

1. No impact to ComEd operations
2. No impact to UP rail operations
3. No impact to WC rail operations

**Disadvantages:**

1. Adverse travel distance of approximately 1400 feet
2. Perceived as less safe because it diverts cyclists and pedestrians through areas with very little pedestrian or vehicular traffic
3. Crossing of WC rail line is at grade
4. Right of way and easements will be required from the adjacent property owners:
   a. UP – 0.06 acres
   b. WC – 0.41 acres
   c. ComEd – 0.62 acres
   d. Other – 0.36 acres
5. Will require lane closures on US 14 to construct
6. Substandard Design Elements:
   a. Path radii from 166+43 to 167+92 is based on 12 MPH design speed
   b. Path width decreases to 8’ beneath the UP bridge structure

**Coordination with Project Stakeholders**

We have made several attempts to coordinate with the stakeholders for this project which include the WC, the UP, ComEd, PACE Suburban Bus, Metra, and the Illinois Commerce Commission (ICC).

The UP indicated that they would prefer Alternative 3 which has no impact on their facility. In general, they have a preference for alternatives that do not impact their operations such as Alternative 1 (Over) and Alternative 3. The only alternative that was rejected outright by the UP was Alternative 5. The UP said they would not provide the necessary easements on their properties for the construction of Alternative 5 because of their operations and yard at the proposed location. Alternative 5 has been dropped from consideration based on this input.

ComEd offered no detailed feedback other than to refer us to their “Summary of ComEd Lease Consideration Process” should any of the alternatives require property from ComEd.
PACE indicated that they would not support Alternative 2 if it required any property acquisition or easements from PACE. Due to the constant bus operations occurring and the limited size of their property, it is unlikely PACE would grant an easement for this alternative.

The WC provided input and indicated the order of preference for alternatives as follows: Alternative 1 (Over); Alternative 2; Alternative 3; Alternative 4; Alternative 1 (Under). Although the least desirable for the WC is Alternative 1 (Under), it is important to note that their concern is related to outages to WC operations. This alternative would be acceptable if the outages are limited to weekends and a maximum of 4 hours at a time.

**Alternative Recommendation**

Based on the evaluation of each of the alternatives and our coordination with the stakeholders, we recommend that the City select Alternative 1 (Under) as the preferred alternative.

Our recommendation is based on the fact that only Alternative 1 (Under) and Alternative 1 (Over) meet the most critical goals of the project which is to provide a local/regional pedestrian/bicycle connection that will be attractive for pedestrian and bicycle trips along Northwest Highway. The adverse travel distance of Alternatives 2-4 will result in most of the pedestrians traveling along Northwest Highway to continue to walk along the roadway or within the right of way of Northwest Highway. Pedestrians are very sensitive to adverse travel distance and even short distances of just few hundred feet will result in the majority of pedestrians seeking the shorter route regardless of the higher level of safety and comfort provided by the longer route.

Although Alternative 1 (Over) meets all of the goals of the project, it is significantly more costly and has some significant drawbacks. The most significant drawback is the very long and moderately steep slope necessary to traverse the bridge. This slope could encourage some pedestrians and cycles to continue to utilize the Northwest highway pavement. In addition, the bridge construction will require the construction of a retaining wall that will reach a height of 45 feet above the roadway surface of Northwest Highway as it approaches the railroad structure. This retaining wall will require maintenance and could be attractive as a canvas for graffiti. Although this wall will be constructed within the right-of-way of Northwest Highway, it is unlikely that IDOT will agree to maintain it. As part of permitting for the path within the Northwest Highway right-of-way, the City of Des Plaines will likely have to agree to accept all maintenance responsibilities. In addition, the retaining wall will exacerbate the cavernous feeling of Northwest Highway as drivers traverse the S-curve. Alternative 1 (Under) is therefore a more efficient, practical and cost-effective option.

**Preferred Alternative Development**

Upon the selection of Alternative 1 (Under) as the preferred alternative, two variations of this alternative were further evaluated with the path passing underneath the bridges.
Alternative 1 (Under - Bifurcating Path) – This alternative consists of a 10-foot wide PC Concrete path along the north side of US 14, shown on Exhibits 8 and 11. As the path approaches the existing UP bridge, the path will bifurcate into two 5-foot wide paths that pass between the steel H-piles in order to provide adequate lateral clearance between the edges of paths and the piles. Excavation around the existing steel H-piles would be required, however this would not impact the stabilization of the piles even as the path is lowered to provide 10-foot vertical clearance to the bottom of the bridge beams.

This alternative would also require reconstruction of the existing WC bridge, as detailed in the Alternative 1 (Under) description.

Alternative 1 (Under - On-Street Path) – This alternative, shown on Exhibits 9 and 12, consists of a 10-foot wide PC Concrete path on the north side of US 14 picking up west of Western Avenue beyond the existing curb and gutter. The path then shifts onto the existing outside westbound lane pavement of US 14, with concrete barrier separating the inside westbound lane from the path. The path would remain on the existing outside westbound lane pavement of US 14 until approximately 350’ east of the PACE bus driveway, at which point the path shifts back behind the existing curb and gutter along US 14 and a 185-foot right turn lane serving the PACE bus driveway. US 14 would be fully reopened to two westbound thru-lanes west of the driveway.

To avoid creating an extended choke point, the concrete barrier would be placed to allow one 16-foot westbound lane while the path utilizes the existing US 14 pavement. To obtain a 10-foot path, existing curb and barrier along US 14 would need to be removed and the roadway would still need to be widened by as much as 12’. Retaining wall would also still be required between the path and the sloped embankment. Additionally, the existing roadway width is 20’ as it passes underneath the railroad bridge. This pinch point would result in a 10-foot lane and 8-foot path under the bridge, separated by a concrete barrier.

Preferred Alternative Recommendation

In comparing the Bifurcating Path to the On-Street Path alternatives, several factors come into play. A cost analysis, shown on Exhibit 16, indicates that the On-Street Path alternative would cost significantly less at $1,465,242 vs. $4,466,310 for the Bifurcating Path alternative. This significant difference in cost is a result of less sidewalk pavement, retaining wall, and earthwork. Land acquisition, also shown on Exhibit 16, is also significantly reduced with the On-Street Path alternative. This alternative also does not require that the WC rail bridge be replaced, saving $668,487. It would also completely avoid impacting the existing UP bridge.

However, the impact of closing one lane the existing outside westbound lane from Western Avenue to the PACE bus driveway is significant, as is reducing the width of the remaining westbound lane to 10’ with concrete barrier on both sides of the lane underneath the railroad bridge. Doing so will require approval from IDOT. IDOT has indicated that they would not approve this alternative since it would introduce a discontinuity in capacity along this US Route 14 and increase the potential for safety
concerns by adding merging movements at points of both vertical and horizontal curvature. Considering these factors, the Bifurcating Path alternative is the most viable option for this underpass, and is our recommended alternative.
APPENDIX A

Alternative Exhibits
NOTES

1. PATH WIDTH IS 30' UNLESS OTHERWISE NOTED.

2. SUBSTANTIATED DESIGN ELEMENTS
   a. Path width from STA 500+0 to STA 4752 are based on a 15 mph design speed.
   b. Path width decreases to 0' in segment 55.

EXHIBIT 2
ALTERNATIVE 3: UNDER - NORTHWEST HIGHWAY
RAILROAD UNDERPASS

US 14 S-CURVE PEDESTRIAN/BICYCLE FEASIBILITY STUDY

S. ALLEN
NOTES

1. PATH WIDTH IS 10' UNLESS OTHERWISE NOTED.
## EXHIBIT 14
US 14 S-CURVE UNDERPASS FEASIBILITY STUDY
ALTERNATIVE COMPARISON MATRIX

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<tr>
<th>Alternative</th>
<th>Length of Path (Acres)</th>
<th>Cost Opinion</th>
<th>Notes</th>
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<td>1 (Over)</td>
<td>2,543</td>
<td>$9,155,403</td>
<td>- Very long segment of 5% longitudinal slope which would make this alternative very difficult for handicapped persons to negotiate. Requires the construction of a 45' high retaining wall along US 14</td>
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<td>1 (Under)</td>
<td>2,543</td>
<td>$4,466,610</td>
<td>- Path Radius from Sta. 166+43 to 167+92 is based on 12 MPH Design Speed. -Path Width is decreased to 8' beneath UP Bridge Structure (May be able to be widened if UPRR is cooperative). -Impacts for Rail Operations will be minor and limited to weekends and 4-hour periods</td>
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<td>2</td>
<td>4,631</td>
<td>$3,449,259</td>
<td>- Path Radius at 221+00 is based on 12 MPH design speed. -Path Radius at 220+80 to 232+50 is based on 12 MPH design speed. -Path will not be accessible during significant rain events as the segment beneath the WC bridge of Weller Creek will be inundated</td>
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<td>3</td>
<td>5,777</td>
<td>$7,613,847</td>
<td>- Cross WC line at Grade. -Requires a pump station to keep underpass free of stormwater. -Portion of Path is on Street</td>
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<td>4</td>
<td>5,408</td>
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<td>- Path Radius from Sta. 166+43 to 167+92 is based on 12 MPH Design Speed. -Path Width is decreased to 8' beneath UP Bridge Structure (May be able to be widened if UPRR is cooperative)</td>
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<td>5</td>
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<td>Eliminated from consideration based on Union Pacific feedback</td>
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### Recommended Alternative

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## US 14 S-Curve Underpass Feasibility Study

### Detailed Cost Opinions

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<td>FINAL ENGINEERING (1%)</td>
<td>$258,500</td>
<td>$258,500</td>
<td>$258,500</td>
<td>$258,500</td>
<td>$258,500</td>
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<tr>
<td>CONSTRUCTION ENGINEERING (1%)</td>
<td>$77,110</td>
<td>$77,110</td>
<td>$77,110</td>
<td>$77,110</td>
<td>$77,110</td>
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<tr>
<td>TOTAL ESTIMATED COST</td>
<td>$3,019,630</td>
<td>$2,552,784</td>
<td>$3,382,988</td>
<td>$2,482,333</td>
<td>$2,134,232</td>
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</tbody>
</table>

**PREFERRED ALTERNATIVE**

| ALTERNATIVE 1-OVER           | $3,019,630         | $2,552,784         | $3,582,988    | $2,482,333    |
| ALTERNATIVE 1-UNDER          | $1,091,900         | $1,191,175         | $1,500        | $1,927        |
| ALTERNATIVE 2                | $1,500             | $1,500             | $1,500        | $1,500        |
| ALTERNATIVE 3                | $1,927             | $1,927             | $1,927        | $1,927        |
| ALTERNATIVE 4                | $2,482,333         | $2,134,232         | $2,134,232    |

**TOTALS**

| ALTERNATIVE 1-OVER           | $3,019,630         | $2,552,784         | $3,582,988    |
| ALTERNATIVE 1-UNDER          | $1,091,900         | $1,191,175         | $1,500        |
| ALTERNATIVE 2                | $1,500             | $1,500             | $1,500        |
| ALTERNATIVE 3                | $1,927             | $1,927             | $1,927        |
| ALTERNATIVE 4                | $2,482,333         | $2,134,232         |

**Assumes 2021 Construction**

* 9,155,403

**4,460,310

**3,449,259

**7,651,847

**9,375,450
EXHIBIT 16
US 14 S-Curve Underpass Feasibility Study
Preferred Alternative
Detailed Cost Opinions

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL COST</th>
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<tr>
<td></td>
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<td>BIFURCATING PATH</td>
<td>ON-STREET PATH</td>
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<td>PCC Bike Path</td>
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<td>Replace Rail Bridge Structure</td>
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SEGMENT SUBTOTAL  $ 2,314,996  $ 752,825
CONTINGENCY (25%)  $ 578,749  $ 188,206
ESCALATION (20%)*  $ 578,749  $ 188,206
MAINTENANCE OF TRAFFIC (3%)  $ 104,176  $ 33,877
UNION PACIFIC RAILROAD REVIEW & COORDINATION  $ 20,000  $ 20,000
PRELIMINARY ENGINEERING  $ 227,229  $ 73,400
FINAL ENGINEERING (7.5%)  $ 260,437  $ 84,693
CONSTRUCTION ENGINEERING (11%)  $ 381,974  $ 124,216
TOTAL ESTIMATED COST  $ 4,466,310  $ 1,465,424

* Assumes 2021 Construction