Appendix G

Description of Construction and Phasing for Build Alternatives

- Final EIS Addendum G, Description of Construction and Phasing, July 2022
    - o Attachment A, Construction Activities Matrix
    - o Attachment B, Construction Schedule

Chicago Red Line Extension Project

Description of Construction and Phasing

Final EIS Addendum G

July 2022

Prepared for:
Chicago Transit Authority
567 W. Lake Street
Chicago, IL 60661

Prepared by:
TranSystems
222 S. Riverside Plaza, Suite 610
Chicago, IL 60606

Table of Contents

Figures

Attachments

Abbreviations

AREMA	American Railway Engineering and Maintenance-of-Way Association
CHA	Chicago Housing Authority
Chicago DIGGER	Chicago Utility Alert Network
CN/MED	Canadian National/Metra Electric District
Conrail	Consolidated Rail Corporation
CTA	Chicago Transit Authority
EA	Environmental Assessment
EIS	Environmental Impact Statement

FTA	Federal Transit Administration
IDOT	Illinois Department of Transportation
IHB	Indiana Harbor Belt Railroad
JULIE	Joint Utility Locating Information for Excavators
MWRD	Metropolitan Water Reclamation District of Greater Chicago
NICTD/CSS & SBRR	Northern Indiana Commuter Transportation District Chicago South Shore & South Bend Railroad
NS	Norfolk Southern
OUC	Office of Underground Coordination
RLE	Red Line Extension
UPRR	Union Pacific Railroad

Section 1 - Summary

The Chicago Transit Authority (CTA) is preparing the Final Environmental Impact Statement (EIS) for Red Line Extension (RLE) Project. This Addendum updates the description of construction activities and phasing for the Preferred Alignment of the Union Pacific Railroad (UPRR) Rail Alternative, as compared with the Draft EIS.

Construction activities for the Preferred Alignment would occur for up to five years, including construction staging and utility relocations. Construction is anticipated to occur from 2025 through 2029.

Section 2 - Project Description and Background

CTA, as project sponsor to the FTA, proposes to extend the existing Red Line heavy rail transit service 5.6 miles south from the existing 95th/Dan Ryan terminal to Chicago's Far South Side. This project is one part of the Red Ahead Program to extend and enhance the entire Red Line. The Red Line provides rapid transit services 24/7 and is the most heavily traveled rail line in the CTA System.

The RLE Project would reduce commute times for residents, improve mobility and accessibility, and provide connection to other transportation modes. The RLE Project could also foster economic development, where new stations may serve as catalysts for neighborhood revitalization and help reverse decades of disinvestment in local business districts. The RLE Project would also provide a modern, efficient railcar storage yard and shop facility.

CTA undertook an extensive Alternatives Analysis process from 2006 to 2009 that considered multiple modes and corridor options for the RLE Project. The Chicago Transit Board designated the UPRR Rail Alternative as the Locally Preferred Alternative on August 12, 2009. Based on further technical analysis and public input, CTA selected the UPRR Rail Alternative as the NEPA Preferred Alternative in August 2014. The Draft EIS, published on October 6, 2016, disclosed the environmental benefits and impacts of the No Build Alternative and the two UPRR Rail Alternative options: the East Option and the West Option shown in **Figure 2-1**.

Subsequent to the publication of the Draft EIS, continued design and outreach by CTA resulted in the selection of the Preferred Alignment for the RLE Project. The Preferred Alignment was announced to the public on January 26, 2018. The Preferred Alignment is a hybrid of the East and West Options of the UPRR Rail Alternative presented in the Draft EIS. CTA reviewed multiple locations for a cross-over area that would maximize the benefits and reduce the impacts of the East and West Options.

The UPRR provided comments on the Draft EIS where they expressed their preference for the West Option due to concerns for the proximity of the East Option to their tracks. UPRR noted that the location of the Roseland Pumping Station could not accommodate UPRR's requested clearance of 25 feet between the centerlines of the UPRR's potential tracks and the proposed East Option. Therefore, all hybrid options considered in selecting the Preferred Alignment started with the West Option and crossed over from the west to the east side of the UPRR tracks south of the pumping station and north of 115th Street to minimize property impacts. Comparative analysis of parcel impacts and alignment with the goals of the RLE Project identified the vicinity of 108th Place as the cross-over location that would provide the greatest benefit. A cross-over in the vicinity of 108th Place would preserve viable businesses; minimize impacts on schools, residences, and the historic

Roseland Pumping Station; and preserve properties slated for future development surrounding the station areas. However, additional engineering refined the alignment further, which moved the UPRR crossing north from 108th Place to 107th Place. The refinement would lower the 111th Street station platform height and would lower the profile of the elevated structure.

After the announcement of the Preferred Alignment in 2018, CTA continued to conduct stakeholder coordination and further develop design plans. Norfolk Southern Railway (NS) shared their plans for future potential access to Canadian National/Metra Electric District (CN/MED) tracks to the north of Kensington Yard and the national freight rail network at that location. This access would allow restoration of a former connection that the Michigan Central Railroad had with the CN/MED tracks, which were then owned by the Illinois Central Railroad. The 120th Street yard and shop presented in the Draft EIS would have precluded future potential access to those tracks as well as access to All American Recycling located west of the railroad tracks (11900 S. Cottage Grove Avenue). The All American Recycling facility is served by the NS via its joint ownership of Conrail and the Indiana Harbor Belt Railroad (IHB). This coordination with NS resulted in additional adjustments to the Preferred Alignment near the 120th Street yard and shop. The 120th Street yard and shop and the tracks south to 130th Street were shifted approximately 100 feet to the west to accommodate NS railroad access to the All American Recycling and potential improvements to the national freight rail network, namely a future connection from the NS track to CN tracks along the MED corridor. In addition, this design refinement would provide a rail connection to facilitate rail delivery of ballast, ties, and other material to support CTA operations.

In 2019, CTA began exploring an opportunity to relocate the 130th Street station, the terminating station of the RLE Project, to a location south of 130th Street. The Draft EIS had originally proposed the station location north of 130th Street. In 2017, after publication of the Draft EIS, the Chicago Housing Authority (CHA) demolished Blocks 11, 12, and 13 of the Altgeld Gardens neighborhood, creating an opportunity to relocate the station south of 130th Street to the area of the demolished blocks. The demolition of Blocks 11, 12, and 13 of Altgeld Gardens was an activity completed by CHA and was independent and unrelated to the RLE Project. CTA evaluated the station relocation for feasibility. Meetings were held with partner agencies and stakeholder groups of residents in the station area with these agencies and groups expressing support for the station relocation. The design refinement relocated the station from north of 130th Street, as presented in the Draft EIS, to south of 130th Street, adjacent to the Altgeld Gardens neighborhood.

Since the publication of the Draft EIS and selection of the Preferred Alignment, three design refinements were made as discussed above: (1) the location of the 107th Place cross-over between UPRR East and West alignment options evaluated in the Draft EIS required for selection of a hybrid

Preferred Alignment; (2) refinement of the 120th Street yard and shop location; and (3) relocation of the 130th Street station to extend the Preferred Alignment farther south so the 130th Street station would be within the Altgeld Gardens neighborhood. These design refinements were evaluated in a Supplemental Environmental Assessment (EA). The agency coordination and outreach associated with the Supplemental EA have influenced the design refinements incorporated into the Preferred Alignment and that is analyzed in this Final EIS.

Additional details about the Preferred Alignment may be found in **Appendix E**.

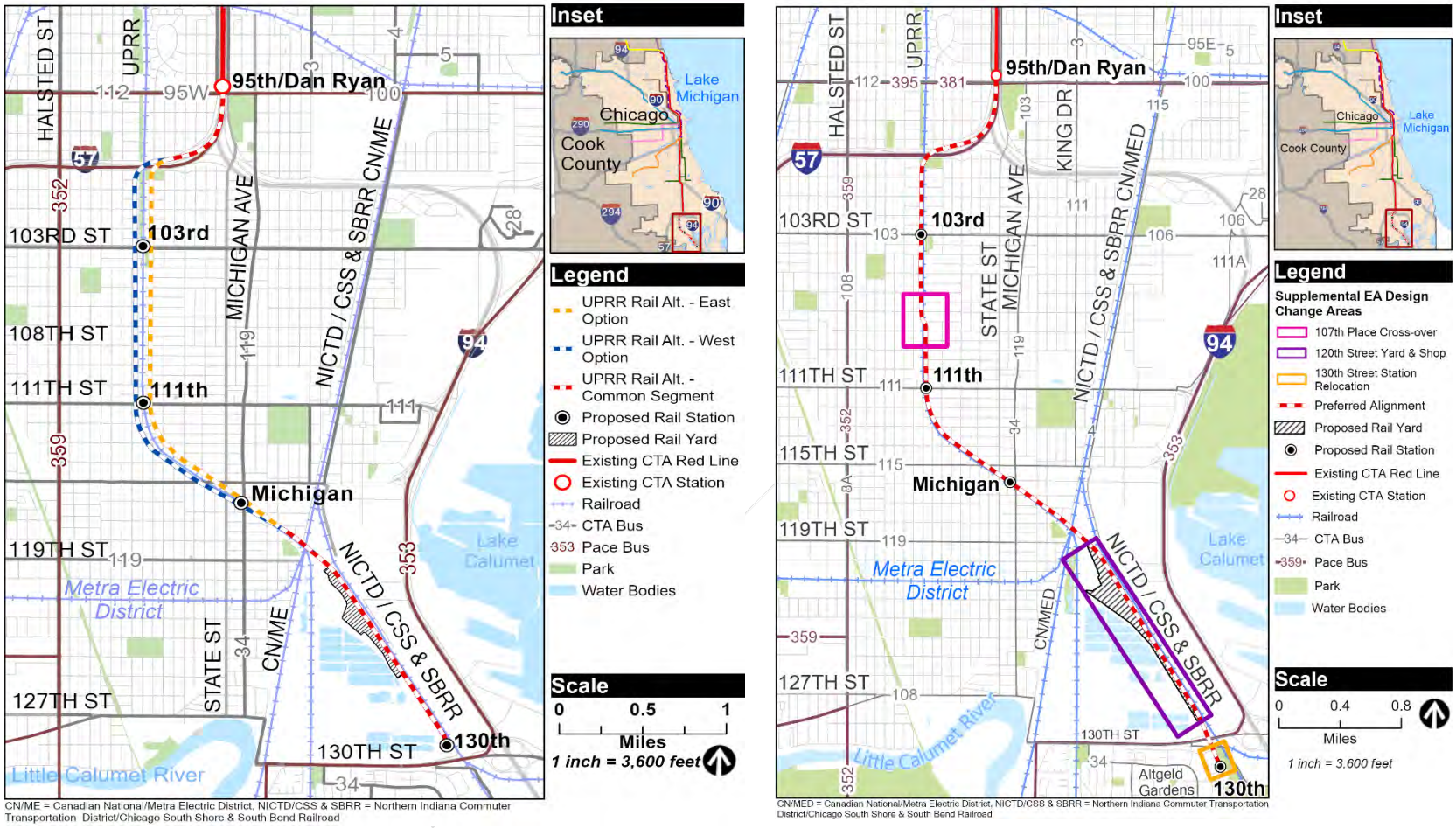


Figure 2-1: Left- East and West Options of the UPRR Rail Alternative (Draft EIS), Right- Preferred Alignment (Final EIS)

Section 3 - Description of Construction

This section summarizes the construction that would be needed for the Preferred Alignment. Construction activities are not expected to be markedly different than those described in the Draft EIS. The construction matrix for the Preferred Alignment is presented as **Attachment A**.

3.1 Construction Phasing and Segments

This section describes the anticipated construction activities and phasing for the Preferred Alignment. Construction and equipment related definitions are provided in **Section 3.3.9** for additional reference. The overall schedule and coordination of all construction segments would be phased and scheduled to maintain CTA operations at the 95th/Dan Ryan terminal and 98th Street Yard and Shop, and to minimize vehicular traffic on affected expressways and roadways. Only temporary interruptions to CTA operations and vehicular traffic would occur.

3.1.1 Construction Assumptions

The following are the major constructability, construction sequencing, and phasing assumptions. Phasing and construction segments may change due to refined engineering, available funding, and other factors later in the project implementation stage.

The coordinated construction of infrastructure and stations is a key component of planning and design of the RLE Project. Assumptions that affect design solutions include the following:

- Refinement of station, park & ride facility, and yard locations.
- Refinement of aerial structure type. New construction of elevated structure includes foundation, columns, superstructure, and deck. New construction of retained fill structures includes foundation and two parallel reinforced concrete retaining walls with fill in between.
- The ability to construct facilities in sequences and phases to facilitate CTA operations, specifically around the 95th/Dan Ryan terminal and 98th Street Yard and Shop. This includes systems such as trackwork, traction power, signals, and communications.
- The ability to construct facilities in sequences and phases to facilitate UPRR operations.
- The location and size of proposed foundations and structural members, potentially limited by clearance requirements (e.g., caisson size and depth, concrete pour access, steel piece weight and size, etc.).
- The ability to construct structures in sequences and phases to facilitate vehicular traffic operations on I-94, I-57, and 130th Street.

The following parameters have been assumed for construction of the Preferred Alignment:

- The methods of construction required along the alignment are anticipated to be conventional, utilizing standard construction methods and materials including cast-in-place concrete, pre-cast concrete, and structural steel.
- Demolition of buildings would be performed in accordance with local ordinances for construction activities. CTA would make every effort to demolish buildings to clear the area for construction of the RLE Project in a timely manner.
- New construction in and around the 95th Street Terminal would require some tracks to be taken out of service or realigned to access and perform the work. To perform this work in an efficient manner while maintaining reasonable service and access to the 98th Street Yard and Shop, it is anticipated that construction would be sequenced and phased to maintain access to the 98th Street Yard and Shop.
- Space for storage and staging of construction materials, equipment, and temporary facilities would be needed within and/or adjacent to the right-of-way. Construction material storage and contractor yard areas appear to be available along the alignment through a combination of publicly owned and privately owned properties. Construction access adjacent to the right-of-way could be required.
- During construction, access to work zones adjacent to the expressway would require shoulder and possible lane closures. Temporary closures would occur per Illinois Department of Transportation (IDOT) approval. For the superstructure erection over expressway traffic lanes, temporary shutdown of all traffic would be required. Temporary shutdown of traffic would occur at nighttime and low traffic volume intervals per IDOT's approval. Construction adjacent to or over railroads would require flagging operations and scheduled track closures.
- It is anticipated that streets crossed by stations and aerial guideway structures, along with adjacent alleys, would be closed temporarily or the number of travel lanes would be reduced during heavy construction. Aerial guideway construction activities, along with all construction access, would be centered upon or phased around these streets and alleys.

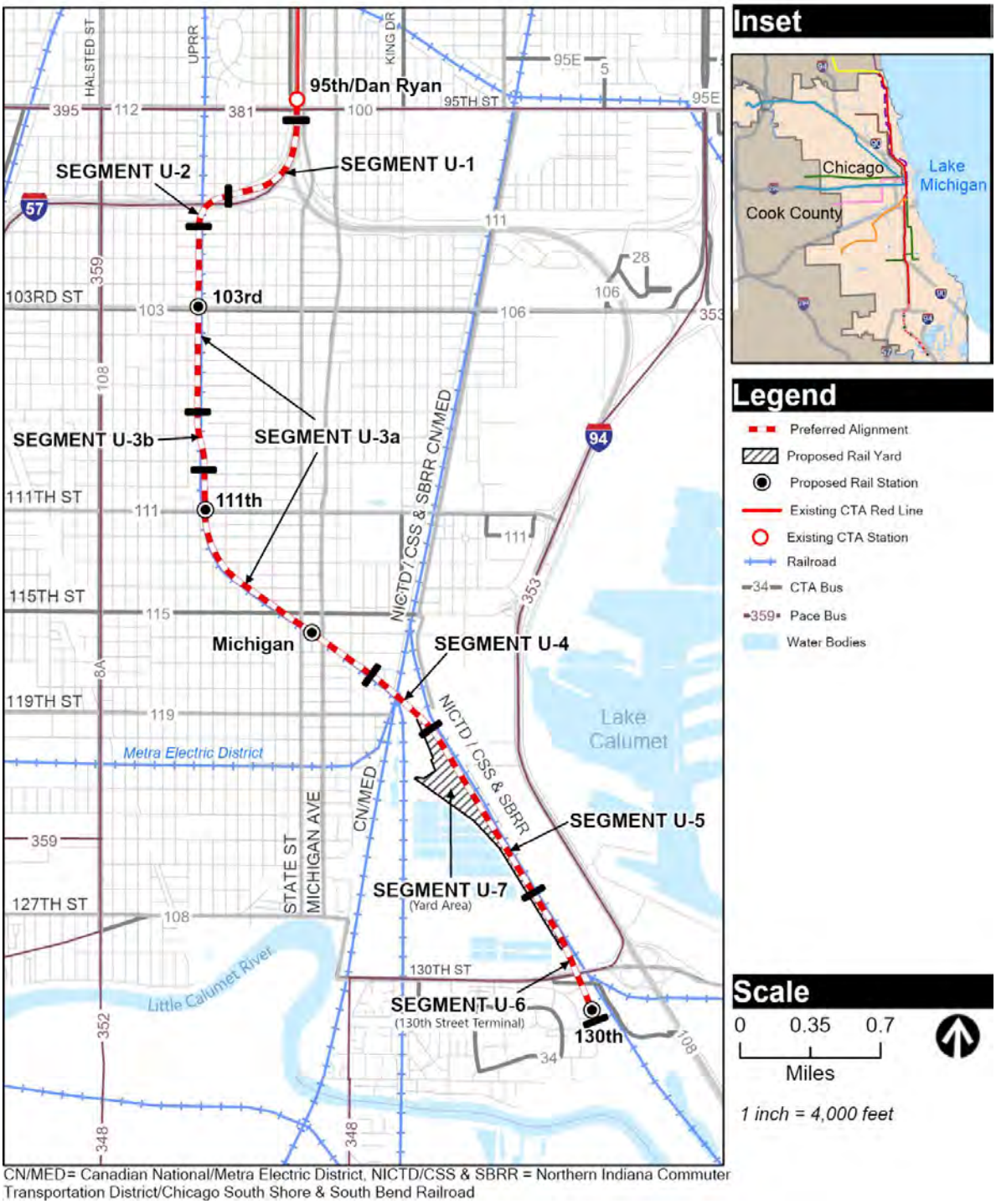
Prior to construction, advance work would be necessary to verify existing site conditions, relocate and protect utilities, provide any temporary modifications to signal and traction-powered systems including the 95th/Dan Ryan terminal as well as along or across any roadway crossings, and provide special or temporary trackwork at required construction interface zones.

Constructability is a key issue that must be coordinated with the design to ensure the ability to construct facilities in sequences and phases as required in facilitating CTA, UPRR, and highway operations.

3.1.2 Construction Segments

For the purposes of describing construction activities, the RLE Project has been divided into seven segments. The segments indicate similar construction activities and are not intended to indicate any sequencing or phasing. The seven construction segments for the Preferred Alignment are shown on **Figure 3-1**.

The construction segments and phasing plans are based on preliminary engineering completed to date and provide the greatest amount of flexibility for future design within a maximum envelope for evaluating environmental impacts. Construction activities and phasing would be determined during final design of the RLE Project, in coordination with the design-build contractor. Preliminary engineering plans (30 percent completion level) are provided in **Appendix F** and construction is anticipated to occur from 2025 through 2029.



CN/MED= Canadian National/Metra Electric District, NICTD/CSS & SBRR = Northern Indiana Commuter Transportation District/Chicago South Shore & South Bend Railroad

Figure 3-1: Construction Segments of the Preferred Alignment

3.1.3 Preferred Alignment

Construction work activities and phasing within the seven segments for the Preferred Alignment are described below.

Segment U-1: From the 95th/Dan Ryan terminal to the beginning of the horizontal curve at the UPRR crossing

Work Activities

- Install trackwork and signals to tie into the 95th/Dan Ryan terminal.
- Relocate trackwork between the 95th/Dan Ryan terminal and the 98th Street Yard and Shop.
- Construct approximately 500 feet of retained fill structure south of the 95th/Dan Ryan terminal within the CTA's right-of-way.
- Construct single-track, elevated structures over existing CTA tracks leading to the 98th Yard and Shop and over the existing CTA/southbound I-94 tunnel (IDOT SN 016-0073).
- Construct the dual-track, elevated structure through the I-94/I-57 interchange, across the westbound I-57 entrance ramp from southbound I-94, and north of the southbound I-57 lane.
- Replace the 95th Street substation with a new 96th Street substation.

Construction Phasing

It may be necessary to relocate trackwork leading from the 95th/Dan Ryan terminal to the 98th Street Yard and Shop to allow construction of proposed substructure within the CTA right-of-way. Tying proposed trackwork and structure into the existing trackwork at the 95th/Dan Ryan terminal would be sequenced to provide railcar access to the 98th Street Yard and Shop. Proposed structure construction would be sequenced to maintain operating routes from the 95th/Dan Ryan terminal to the 98th Street Yard and Shop, as well as to minimize impacts to traffic flow along I-94 through the tunnel at SN 016-0073.

Superstructure erection over CTA tracks and I-94, the I-57 ramp, and Wentworth Avenue would require temporary shutdown of operation and traffic. Work would be sequenced to minimize impacts on traffic flow on the I-57/I-94 interchange as well as in the I-57 corridor. Work zones adjacent to the expressway would require shoulder and possibly lane closures. Work activities may also affect traffic flow on the north frontage road to I-57 (also called Lafayette Avenue and 98th Place).

The existing 6.5-foot-diameter sewer underneath both 99th Street and 102nd Street would be protected during construction. See **Section 3.4** for more information regarding the protection of utilities during construction.

Segment U-2: The horizontal curve at the UPRR crossing

Work Activities

- Construct the dual-track, elevated structure spanning both lanes of I-57 and the UPRR mainline.

Construction Phasing

Work would be sequenced to minimize impacts on traffic flow on I-57 and UPRR operations. Work zones adjacent to the expressway would require temporary shoulder and possible lane closures. Superstructure erection over I-57 would require temporary shutdown of northbound traffic. Temporary closures would occur at nighttime and during low traffic volume intervals and would be coordinated with IDOT. Construction adjacent and across railroads would require flagging operations and scheduled track closures.

The existing 10-foot-diameter Stewart Avenue water tunnel would be protected during construction of the foundations. See **Section 3.4** for more information regarding the protection of utilities during construction.

Segments U-3a and U3b: From the end of the horizontal curve at the UPRR crossing to the CN/MED track crossing near 119th Street

Work Activities

- Demolish existing buildings and structures in the proposed right-of-way where necessary.
- Construct the dual-track, elevated structure along the UPRR corridor.
- Construct stations near 103rd Street, 111th Street, and Michigan Avenue.
- Construct parking lots/structures and bus turnarounds at stations.
- Construct three substations.
- Construct three signaled interlockings.

Construction Phasing

Work would be sequenced along the UPRR corridor to minimize impacts on UPRR operations. Construction adjacent to railroads would require flagging operations and possible scheduled track closures. Flagging operations would be needed to replace existing at-grade crossing gates and

signals during construction of the aerial guideway at the following at-grade UPRR crossings: 101st Street, 103rd Street, 107th Street, 109th Street, 111th Street, 115th Street, and State Street.

The underground pipes and vaults associated with the Roseland Pumping Station and the 10-foot-diameter sewer underneath Wentworth Avenue near 114th Street would be protected during construction.

All existing structures and underground utilities would be identified. All existing utilities would be protected or relocated. The following known existing utilities and structures would be protected during construction activities:

- 10-foot-diameter Stewart Avenue water tunnel along the UPRR corridor
- Former Griffith Natatorium
- Roseland Pumping Station and the associated underground pipes and vaults
- 10-foot-diameter sewer underneath Wentworth Avenue near 114th Street
- 17.5-foot, horseshoe shaped, Metropolitan Water Reclamation District of Greater Chicago (MWRD) Calumet Intercepting Sewer tunnel

Segment U-4: From the CN/MED track crossing near 119th Street to the at-grade track

Work Activities

- Demolish existing buildings and structures in the proposed right-of-way where necessary.
- Construct the dual-track, elevated structure along the UPRR corridor and over the CN/MED tracks near 119th Street.
- Construct the 120th Street yard and shop track tie-in.
- Construct retained embankment structure to carry the elevated structure grade.

Construction Phasing

Construction at the CN/Metra Electric crossing would be phased to minimize impacts on CN and Metra operations. Construction over and adjacent to the railroads would require flagging operations and potential limited track closures.

Segment U-5: From the end of the aerial structure crossing the CN/MED tracks near 119th Street to the south end of the yard test track near 124th Street

Work Activities

- Construct the track roadbed.

- Construct MWRD access road and bridge over the RLE tracks and the NICTD/CSS & SBRR crossing.

Construction Phasing

Coordination with MWRD is necessary to maintain operations during new track roadbed construction. If necessary, construction would be sequenced to construct the proposed access road and bridge over the CTA tracks first to allow MWRD facilities to continue operation.

Coordination with the NICTD/CSS & SBRR would be necessary as construction over and adjacent to the railroads would require flagging operations and scheduled track closures.

Segment U-6: From the yard test track to the south end of the project including the 130th Street station

Work Activities

- Construct the track roadbed.
- Construct the 130th Street station.
- Construct an underpass at 130th Street for track alignment.
- Construct the parking garage/lot for the 130th Street station.
- Construct bus bays and road access for the 130th Street station.
- Construct the MWRD access road to 130th Street.
- Construct the substation.
- Construct signaled interlocking.
- Construct direct fixation slab track at 130th Street station platform.

Construction Phasing

Coordination with MWRD would be necessary to maintain current operations during new track roadbed construction and during the new road access for the 130th Street station. If necessary, construction would be sequenced to construct the proposed MWRD access road to the west of the proposed station first, allowing MWRD facilities to continue operation. Coordination with the NICTD/CSS & SBRR also would be necessary as construction over and adjacent to the railroads would require flagging operations and scheduled track closures.

Segment U-7: 120th Street yard and shop

The overall schedule and coordination of construction for the 120th Street yard and shop would be scheduled to maintain operations at the MWRD facilities.

Work Activities

- Construct the yard and track.
- Construct the shop building.
- Construct the access road and CTA employee parking.
- Construct the substation.

Construction Phasing

Work would be sequenced to minimize impacts on adjacent roadways.

3.2 Potential Construction Staging Areas

Construction staging areas provide space to store equipment and materials, load trucks, and have workers perform parts of the construction process. Construction staging areas are currently anticipated to be within the project right-of-way or within property acquired for stations, park & ride facilities, and the yard and shop. Final staging would depend upon final design and the means and methods of the design builder. Staging and item assembly would be performed off-street to the fullest extent practicable, to minimize traffic and community disruption.

3.2.1 Construction Staging Criteria

Construction staging would be within the proposed right-of-way or within construction easements of stations and the alignment, as indicated in the *Plans and Profiles* (**Appendix F**). Construction staging areas are required to function for the following basic use criteria:

- Provide access to the construction work for construction personnel. Staging areas would include areas for office trailers, subcontractor site trailers, personnel facilities, and similar.
- Provide access to the construction work for construction equipment. This would include on-site storage of equipment being used on a continuous basis.
- Provide room for the construction personnel and equipment to perform the construction work.

- Provide access for trucks and associated loading equipment to remove materials generated on site, such as demolition salvaged materials and debris and excavation spoils. This type of material handling typically would require on-site segregation and interim on-site storage.
- Provide access, if possible, to store excavated material acceptable for reuse on the site.
- Provide access to receive and store permanent construction materials such as backfill and sub-base aggregates, steel reinforcing bars, and structural steel.
- Provide access to receive and store temporary construction materials such as concrete forms, shoring materials, scaffolding, and excavation support items.

Each construction site would have specific attributes to be accommodated, including the design of the proposed structure, existing conditions such as adjacent structures, and limited access from both an off-site and an on-site perspective. A productive and useful site access plan, with actual known requirements, would be developed after the proposed structure design is complete and adjacent property site conditions are known. Construction access is a critical contractor requirement that directly equates to an efficient construction process.

While the specific design and adjacent land uses at the time of construction would ultimately dictate the access plan, the following provides a general description of the types of properties typically targeted for construction staging in order to minimize impacts:

- CTA-acquired parcels, obtained for increased future infrastructure envelopes, may be used. Whole parcels or groups of parcels may be acquired and utilized during construction. After construction, residual property may be sold.
- Nearby parking lots may be used through the establishment of temporary construction easements.
- Abandoned adjacent parcels may be used through the establishment of temporary construction easements.

Because of limited available space adjacent to the construction site, off-site CTA, municipal, or privately owned storage yards may need to be provided for the contractor's use. This would allow secure storage of an equipment fleet or permanent materials needing large storage or assembly areas.

3.2.2 Construction Staging for Preferred Alignment

The anticipated construction staging needs under the Preferred Alignment have been identified for each of the seven segments, as shown in **Figure 3-1**.

Segment U-1: From the 95th/Dan Ryan terminal to the beginning of the horizontal curve at the UPRR crossing

Construction of segment U-1 may require the following:

- Numerous temporary construction easements on the adjacent expressway, requiring shoulder and lane closures as well as temporary shutdown of traffic.
- Off-site construction materials storage yards, due to limited space adjacent to the construction site. Storage yards may be located on parcels acquired for the project in adjacent construction segments to minimize disruptions to traffic and access within the surrounding neighborhoods and communities.

Segment U-2: The horizontal curve at the UPRR crossing

This construction segment may require the following:

- Numerous temporary construction easements on the adjacent expressway requiring lane closures as well as temporary shutdown of traffic.
- Off-site construction materials storage yards due to limited space adjacent to the construction site. Storage yards may be located on parcels acquired for the project in adjacent construction segments to minimize disruptions to traffic and access within the surrounding neighborhoods and communities.
- Numerous temporary construction easements on adjacent streets and parcels including parking lots, abandoned properties, and other adjacent properties. A 0.1-acre temporary construction easement would be needed in the northwest corner of Wendell Smith Park, which would not rise to the level of a Section 4(f) temporary occupancy (see *Section 4(f) Replacement Park Analysis*, **Addendum Y**).

Segments U-3a and U3b: From the end of the horizontal curve at the UPRR crossing to the CN/MED track crossing near 119th Street

Construction of Segments U-3a and U-3b may require the following:

- Numerous temporary construction easements on adjacent streets and parcels including parking lots, abandoned properties, and other adjacent properties.

Segment U-4: From the CN/MED track crossing near 119th Street to the at-grade track

This construction segment may require the following:

- Some of the parcels acquired for project right-of-way could be used for staging, site access, or storage of materials during construction.
- Temporary construction easements on adjacent parcels including abandoned properties, MWRD property, and other adjacent properties.

Segment U-5: From the end of the aerial structure crossing the CN/MED tracks near 119th Street to the south end of the yard test track near 124th Street

These construction segments may require the following:

- Some of the parcels acquired for project right-of-way could be used for staging, site access, or storage of materials during construction.
- A limited amount of temporary construction easements would be obtained on adjacent parcels including abandoned properties and MWRD property.

Segment U-6: From the yard test track to the south end of the project including the 130th Street station

These construction segments may require the following:

- Some of the parcels acquired for project right-of-way and stations could be used for staging, site access, or storage of materials during construction.
- A limited amount of temporary construction easements would be obtained on adjacent parcels including abandoned properties and MWRD property.

Segment U-7: 120th Street yard and shop

Possible staging area requirements for the yard and shop would be minimal. Parcels would be acquired by CTA in the area and would provide most construction area requirements.

3.3 Description of Anticipated Construction Activities and Methods

3.3.1 Basic Construction Activities and Methods

Off-site and staging yard assembly of construction items would be performed to the fullest extent possible, especially in Segments U-1 and U-2 based on site-specific access requirements. Construction activities and methods under the Preferred Alignment would be similar to the East and West Options evaluated in the Draft EIS (**Appendix G**).

3.3.2 Preconstruction Activities

Contractor preconstruction activities would include development of construction schedules, quality plans, and procurement schedules. Process plans would be developed for coordination of work activities to match construction constraints and site access. Existing conditions would be verified for design and construction interface criteria. Survey control establishment would be essential to the verification of site, existing conditions, and utility conflict/relocation information.

Utility protection/relocation information would be coordinated and verified in the sequence of scheduled construction, far in advance of the early construction activities.

Community notifications would be initiated by CTA and the contractor as early as possible to afford the community best-fit conditions for understanding the construction schedule, neighborhood conditions, and related environmental impacts.

Demolition and building permits would be obtained at the earliest opportunity. Office of Underground Coordination requirements (e.g., shoring designs, support of excavation, drilled shaft procedures) must all be coordinated and approved before permits are issued.

Portions of the Preferred Alignment are located in a residential area coexisting with various houses, parks, schools, and businesses. Therefore, construction activities would be evaluated locally to ensure that the local dynamics of the area and the needs of the property owners and businesses, as well as the end users, are incorporated into the project.

Construction activities would include new, at-grade, retained embankment, and elevated structure, station, substation, parking, yard, and access road construction. **Sections 3.3.3** through **3.3.8** provide details on construction activities would be expected for the infrastructure and station construction.

3.3.3 Traffic Rerouting

During construction, vehicles, pedestrians, and buses may need to be rerouted around the construction sites. Rerouting of traffic would be normally done by using detours and complete street closures. The street closures may include main streets, side streets, alleys, and access points. To help mitigate the impacts on traffic routes, station and aerial guideway construction activities would be sequenced around these street and alley closures. However, complete closure of streets may not always be possible because residents and businesses would still need access. Therefore, temporary traffic lanes, temporary access points, or staged construction would be used. The following activities would be part of the traffic rerouting activities:

- Construction signage and temporary traffic barriers
- Temporary reduction (from two to one) in the number of thru-traffic lanes in each direction, if feasible
- One-way traffic on a temporary basis
- Detours/complete street closures including alleys and access points
- Temporary traffic lanes
- Designated space for storage and staging of construction materials, equipment, and temporary facilities within and/or adjacent to the right-of-way
- Construction vehicle access points within and/or adjacent to the right-of-way
- Business, residential, and pedestrian impacts including limited parking or parking bans

3.3.4 Demolition

The Preferred Alignment would require complete removal or partial demolition of existing buildings or structures. The demolition process would result in increased noise and debris. Work would be performed in accordance with local ordinances for construction activities. In general, pedestrian, and vehicular traffic would not be allowed into demolition areas.

The demolition process may include concrete removal, requiring construction workers to saw cut, jackhammer, and/or knock out the existing concrete, cut or remove the existing reinforcement, or completely demolish existing concrete structures.

For removal of foundations and/or streets, to relocate existing utilities, or excavate existing ground, the contractor would excavate using bulldozers, compact tractors, or backhoes to dig and remove earth. The disposal material would be placed in dump trucks and trucked off-site. During excavation, temporary shoring may be required to protect adjacent buildings or structures.

Construction vehicles would access the construction site on a regular basis and would require special hauling routes to deliver materials and equipment to the site and remove the debris from the site. The routes may require complete street closures, temporary street shutdowns, or traffic rerouting. Depending on the type of material being removed, special handling of waste may be necessary. For example, older buildings with asbestos would require special handling. All materials would be disposed of in the proper manner, following federal, state, and local regulations.

3.3.5 Temporary Shoring

During demolition and excavation, temporary shoring may be required to protect adjacent property. The shoring would consist of steel sheet piling driven into the ground with a vibratory

pile driver. The rig may be located within the construction zone or outside the right-of-way depending on the space limitations and access points. The temporary shoring may require the use of tiebacks. Tiebacks are long rods that would be drilled through the sheet piling, embedded into sound rock, or other approved materials, and then grouted into place.

3.3.6 Foundations

Due to the variety of structures, including CTA elevated structure, buildings, and the parking garage, there would be a variety of foundation types used on the RLE Project. Foundations can consist of concrete spread footings, steel pile foundations, or concrete drilled shafts. Foundation type depends on site conditions and location. To determine the geotechnical properties of the soil, a geotechnical engineer would drill exploratory borings and take soil samples. The geotechnical engineer would then test the samples, determine soil properties, and make recommendations on the type of foundation to use, as part of the design process.

All types of spread or shallow-type foundations would require excavation and removal of earth to form the concrete footings. The use of bulldozers, bobcats, or backhoes would be used to dig and remove earth. The earth may be placed in dump trucks and shipped off-site or stored for use on the construction site for backfill. Materials shipped off-site for disposal would be handled through approved facilities.

Large cranes with pile driving leads that help guide the piles into position would be used for installation of pile foundations. A diesel hammer would drive the piles into the ground by impact. A test pile would be driven to test the pile length and capacity. Based on soil properties, the test pile would determine whether piles would be driven to a different elevation, designed to a different capacity, or would encounter rocks or boulders in the ground. Pile shoes or pile tips would be added to the end of the piles or a pre-drilled hole supported by a steel casing would be used to aid the pile installation process. It is important for the contractor to locate existing utilities such as sewer, or cable lines before excavation or pile installation to avoid damaging the services. Evaluation of nearby foundations may be required to prevent damage to existing structures during new foundation construction.

Drilled shaft construction is performed with a crane-mounted drill rig. An auger of the design diameter would be drilled into the ground and soil would be piled nearby for removal. As the auger advanced, extensions would be added to the supporting shaft. The drill hole would be fitted with a lining where required by unsuitable soils. A pre-formed reinforcement cage would be installed, and concrete would be placed to form the drilled shaft support.

To reduce construction noise and vibration levels, pile-driving would be avoided in the vicinity of the historic Roseland Pumping Station and sensitive receivers.

3.3.7 Concrete Placement

Part of the construction logistics and process plan would be to determine the concrete plant based on location and availability of the required concrete mix. The plant would supply and deliver the concrete to the site using concrete trucks. Temporary street closures and truck routes may need to be established to access the construction site. Coordination of multiple trucks may be necessary for large pours and may require special access and scheduling. The contractor may elect to create an on-site ready mix plant to supply the concrete if space limitations and location of the nearest concrete plant require it.

Before the concrete can be poured, all necessary reinforcement and concrete forms would need to be in place. The reinforcement would be delivered on large flatbed trucks and would be stored on-site in bundles. The contractor would assure that the number of bars (and the size of bars, spacing of bars, edge clearances, etc.) is per contract documents before the concrete is poured. The formwork may consist of large steel panels or plywood to hold the wet concrete in place. To maintain the weight of the concrete until it cures, the formwork would be braced or temporarily supported.

After arriving on-site, the truck would be positioned at the location required for the pour. If the truck could not access the location of the pour, the concrete would need to be placed by pump, conveyor system, or other method. Concrete would need to be poured within 1 to 1.5 hours after loading depending on the outside temperature and whether the truck has a retarder. During the pouring, workers would push and move the concrete into position. The concrete would be vibrated to eliminate any voids and smoothed to obtain a good finish. The concrete may need to cure for a week before forms can be removed. Concrete is typically not loaded for 28 days after placement.

3.3.8 Structural Steel and Concrete

Foundations for elevated structures and the parking garage would consist of concrete and steel footings or drilled concrete shafts, depending on site conditions. After placement of foundations for the elevated structures, reinforced cast-in-place concrete piers would be constructed. The superstructure would use steel or concrete beams with a concrete deck to support the tracks. Along at-grade segments, tracks would be placed on ballast and ties after grading and soil preparation

Standard structural steel erection would be required for the RLE Project. Structural steel can consist of plates, angles, girders, beams, columns, cross frames, and related elements. The steel can vary in

size, length, weight, and use. Steel members would be delivered to the site on large flatbed trucks or semi-trucks and could require special hauling permits. The construction zone would require special access areas so that the steel could be delivered, assembled on-site, stored, or moved into position. Cranes would be used to pick the pieces off the trucks, move the material overhead, and place into position. Iron workers would be located on the structure to help move the pieces into place by bolting or welding the members. The ironworkers would perform most of the steel erection procedures, which could consist of framing, bolting, welding, coping, cutting, hammering, and similar activities.

3.3.9 Construction and Equipment Definition

Demolition - Heavy equipment, efficiently sized to match available access and reach requirements, including cranes with a demolition ball, front-end loaders, shears mounted to backhoes, concrete breakers mounted to combination tractors or backhoes, dump trucks, and off- site tractors with dump trailers.

Excavation - Heavy equipment, efficiently sized to match available access and reach requirements, including backhoes, front-end loaders, concrete breakers mounted to combination tractors or backhoes, dump trucks, and off-site tractors with dump trailers.

On-site hoisting - Heavy equipment used to hoist or move materials about the construction site, efficiently sized to match available access and reach requirements, including telehandlers, front-end loaders, mobile cranes of varying sizes, crawler-mounted cranes, and track-mounted equipment.

Concrete Placement - Heavy equipment efficiently sized to match available access and reach requirements. If concrete trucks cannot directly access the pour location, concrete would typically be placed utilizing a truck/trailer mounted concrete pump(s) or truck/trailer mounted concrete/material type conveyors.

Steel Erection - Heavy equipment, efficiently sized to match available access and reach requirements, including truck cranes, all-terrain cranes, and mobile cranes of varying sizes. Crawler-mounted cranes would typically be used to hoist and erect steel members under normal conditions, while track-mounted equipment (rail-borne equipment) may be used where platform steel and precast materials, including canopy steel framing, track work materials, and similar cannot be reached from normal ground access locations or where there are limited staging area restrictions.

3.4 Methods for Protecting Nearby Utilities and Adjacent Structures

Methods for protecting nearby utilities and adjacent structures include standard industry practice techniques. These techniques include coordinating with existing utilities and field verifying locations. The Office of Underground Coordination (OUC) requires a review of foundations that are within two feet of the property line. Dig requests must be submitted to Chicago DIGGER (Chicago Utility Alert Network) for areas within the limits of the City of Chicago and JULIE (Joint Utility Locating Information for Excavators) for areas outside the City of Chicago limits before any excavation can begin.

3.4.1 Industry Practice

To protect nearby utilities and adjacent structures, construction of the Preferred Alignment would include the following standard industry-practice techniques:

- Identification of existing location (and condition) during preliminary engineering phase for foundation design. Development of review criteria for further coordination of new underground structures, for example, foundations, cable trenches, and ductwork.
- Coordination with existing utilities.
- Leave as is if no conflict.
- Field verification of locations, if a potential conflict exists, during preliminary design phase.
- Determination of the need to protect, redesign to clear, or relocate to allow completion of design. May require a cost impact analysis for redesign versus relocate costs.
- OUC Review.
- Department of Water Management Review with water review and sewer review.
- Preconstruction - with contractor identification and location.
- Utility contact with digger location.
- Relocation cost.
- Pothole at caisson location prior to placing temporary liner.
- Coordination with contractor and all parties.
- Identification and protection/relocation away from construction zone all known cables/systems (typically: cable TV, AT&T, gas, electric, Chicago sewer and water, fiber optic, CTA signals, CTA communications, CTA traction power, and similar). May need specific plan written into project specifications delineating contractor responsibility.

3.4.2 Adjacent Structures

New structure protection would be provided along the UPRR track for structures within 50 feet of the centerline of the adjacent UPRR track. Structure protection would be a crash wall running parallel to the UPRR track per the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual. If the proposed CTA structure would come within 18 to 25 feet of the centerline of the adjacent UPRR track, pier protection would be provided per the Manual for Railway Engineering (AREMA 2012) and Guidelines for Railroad Grade Separation Projects (BNSF Railway and UPRR, 2007).

For conflicts with existing adjacent structures, field verification of structure location during the design phase would be necessary to evaluate the potential conflicts.

3.4.3 Foundations at Interface Areas

An OUC review is required for foundations within two feet of the property line within the City of Chicago. Earth retention systems, with a named sheeting contractor and with sealed earth retention design, are to comply with OUC restrictions.

3.4.4 Monitoring of Adjacent Structures

Construction of the Preferred Alignment would include the following monitoring measures to evaluate potential construction effects on adjacent structures:

- The contractor would develop, obtain CTA approval for, and institute a program for monitoring settlement, noise, and vibration of buildings and structures on or adjacent to the right-of-way. Prior to mobilization, the contractor would survey (both physically and with photos and videos) existing conditions of all areas that are to be occupied, worked on, restored, or affected in any way. The contractor would be responsible for and must repair or replace any portions of such areas damaged by his acts.
- Monitoring for settlement, noise, and vibration of buildings and structures on or adjacent to the right-of-way would start prior to the start of excavation, foundation work, work requiring the use of heavy equipment, or work that may cause damage to CTA or adjacent structures. Monitoring would accommodate vertical and horizontal controls.
- Settlement and vibration monitoring programs for specific structures and locations would be defined during design.
- Special provisions would be included in the construction documents to ensure that all monitoring requirements are completely outlined for contractor clarity.

Section 4 - Project Schedule

The estimated project schedule to construct the Preferred Alignment is presented in **Attachment B**. The construction schedule is based on unconstrained funding and on the level of design work currently completed. The schedule assumes advance work that may take one to two years. The advance work would consist of utility relocations, land acquisition, and other work necessary prior to starting heavy construction work. The heavy construction work is estimated to require three years and could be phased according to construction in the work segments. Construction activities for the Preferred Alignment would occur for up to five years, including construction staging and utility relocations. Construction is anticipated to occur from 2025 through 2029.

Section 5 - References Cited

Chicago Transit Authority (CTA), 2016. Chicago Red Line Extension Draft Environmental Impact Statement and Section 4(f) Evaluation. Accessed at https://www.transitchicago.com/rle/drafteis/. Accessed on January 20, 2021.

Attachment A – Construction Activity Matrix for the Preferred Alignment

Preferred Alignment Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-1: 95th/Dan Ryan Terminal to the Beginning of the Horizontal Curve at the UPRR Crossing	**12-36**													
Advance Work														
Signal/cross-over installation; utility relocation; staging	12	x				x							1	5-10
At Grade														
Single Track	12-18	x		x	x	x		x	x	6,830	50	500	1	5-10
Retained Embankment														
Single Track	24	x	x	x	x	x	x	x	x	1,750	1,750	500	5-10	10-15
Elevated Concrete Structure														
Single Track - Rehab/Modify Existing CTA/IDOT tunnel	24	x	x	x	x	x	x	x	x	2,600	1,300	500	5-10	10-15
Elevated Steel Structure														
Single Track - Hammerhead Substructure	24	x	x	x	x	x	x	x	x	4,100	7,870	2,012,500	5-10	10-15
Double Track - Hammerhead Substructure	24-36	x	x	x	x	x	x	x	x	6,090	11,917	3,701,705	5-10	10-15
Segment U-2: Horizontal Curve at UPRR Crossing	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	600	1,174	364,700	5-10	10-15
Double Track - TPG, Hammerhead Substructure	24-30	x	x	x	x	x	x	x	x	1,000	2,070	1,825,800	5-10	10-15
Double Track - Straddle Bent Substructure	24-30	x	x	x	x	x	x	x	x	340	951	1,581,000	5-10	10-15
Segments U-3a and U-3b: End of Horizontal Curve at UPRR Crossing to CN/MED Track Crossing near 119th Street	**12-36**													
Advance Work														
Utility relocation; staging	12	x				x							1	5-10
Stations														
Construct - 103rd Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - 111th Street	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Construct - Michigan Avenue	24-36	x	x	x	x	x	x	x	x	9,000	11,767	4,030,800	5-10	20-30
Parking														
Construct - 103rd Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - 111th Street	12	x	x	x	x			x		9,300	3,100		2-5	5-10
Construct - Michigan Avenue	12	x	x	x	x			x		18,600	6,200		2-5	5-10
Elevated Steel Structure														
Double Track - Hammerhead Substructure	36	x	x	x	x	x	x	x	x	29,700	58,113	18,052,650	50-100	30-35
Traction Power														
Substation – 175+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15
Substation – 254+00	24	x	x	x	x	x		x	x	5,000	1,100	160,000	2-5	10-15

Preferred Alignment Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-4: CN/MED Track Crossing near 119th Street to At-Grade Track	**12-36**													
Advance Work														
Utility relocation; staging	12													
Retained Embankment														
Double Track	24	x	x	x	x	x	x	x	x	2,771	926		5-10	10-15
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24-36									5,700	11,153	3,464,650		
Double Track - TPG, Hammerhead Substructure	24-36									400	895	730,320		
Segment U-5: End of the Aerial Structure Crossing the CN/MED Tracks near 119th Street to the South End of the Yard Test Track near 124th Street	**12-36**													
Advance Work														
Utility relocation; staging	12													
At Grade														
Double Track	24-36									22,950				
Access Road														
Crossing proposed tracks at 357+00	12-24	x	x	x	x			x		6,778	2,260		5-10	5-10
Bridge for access Road, Crossing at 357+00	24	x	x	x	x	x		x	x	3,105	4,610	495,000	5-10	10-15
Connector access road, West of Proposed CTA tracks	12	x	x	x	x			x		717	239		5-10	5-10
Segment U-6: Yard Test Track to the South End of the Project including the 130th Street Station	**12-36**													
Advance Work														
Utility relocation; staging	24	x				x							1	5-10
Station														
Construct - 130th Street Station	24-36									6,773	2,653	696,305		
Parking														
Construct - 130th Street Station	24	x	x	x	x			x		13,900	4,700		2-5	5-10
At Grade														
Double Track	24-36								x	4,500				
Triple Track	24								x	7,700				
Access Road														
At 130th Street Station	12-24	x	x	x	x			x		5,778	1,926		5-10	5-10

Preferred Alignment Construction Activity	Duration (Months)	Construction Equipment								Soil (CY)	Concrete (CY)	Structural Steel (LB)	Avg Truck Trips Per Work Day	Avg Workers Per Work Day
		Haul Truck	Concrete Truck	Front End Loader	Excavator	Crane	Drill Rig	Compressor	Flatbed					
Segment U-7: 120th Street Yard and Shop	**12-36**													
Advance Work														
Utility relocation; staging	24													
Access Road														
Construct	12-24	x	x	x	x			x		10,977	3,659		5-10	5-10
At Grade														
Single Track	36	x		x	x	x		x	x	89,500	1,000		5-10	
Double Track	36	x		x	x	x		x	x	8,100			5-10	
Retained Embankment														
Double Track	24									2,771	926	500		
Elevated Steel Structure														
Double Track - Hammerhead Substructure	24									2,100	4,109	1,276,450		
Shop Facility														
Construct - Shop Building	24-36									10,380	3,114	1,038,000		
Parking														
Construct - Shop	24	x	x	x	x			x		9,300	3,100		2-5	5-10
Traction Power														
Substation - Yard	24									5,000	1,100	160,000		
Final Phase - 95th/Dan Ryan Terminal to 130th Street Station	**10-12**													
Signal/Communication														
Signal/Interlocking	10-12							x	x				2-5	10 - 20
Communication System	10-12							x	x				2-5	10 - 20

Conditions/Assumptions used in the Construction Matrix

The intent of this Construction Matrix is to provide a general level of construction activity that may occur with the Preferred Alignment, and is to be used for the NEPA process. The Construction Matrix identifies a range of potential impacts based on currently available information and is not intended to be used for scheduling construction nor is it intended to be used for cost estimating construction.

Activity

Segments and grouping of activities are based on Engineering Plan and Profile Drawings, April 2022.
Work elements are based on the Engineering Plans.
Stationing is based on the Engineering Plan and Profile Drawings.
Trackwork is included with the listed activity.

Duration (Months)

Estimate of the expected duration of work for the activity row.
Activities are not sequential except for Advance Work if required in the segment.
Construction implementation and maintaining operations will have a major effect on construction durations.

Construction Equipment

Possible types of construction equipment that may be used for some duration within an activity.

Soil (CY)

Represents the potential soil or aggregate that may be excavated, removed, or fill. Concrete removed is included in quantity.
Includes caisson and foundation excavation.

Concrete (CY)

Represents the potential quantity of new concrete including caissons.
Concrete at stations includes building and platforms. Concrete for track support included in Elevated Structure.

Structural Steel (LB)

Represents the potential quantity of new structural steel.
Structural Steel at stations includes building and platforms. Structural Steel for track support included in Elevated Structure.

Avg Truck Trips Per Workday

Estimated average number of truck trips for an activity per work day. Excludes minor vehiclesand worker vehicles.

Ave. Workers Per Workday

Estimated average number of workers for an activity per workday.

Attachment B - Construction Schedule for the Preferred Alignment

Preferred Alignment Construction Schedule	Duration (Months)	YEARS 1	2	3	4	5
Segment U-1: 95th/Dan Ryan Terminal to Beginning of Horizontal Curve at UPRR Crossing	**12-36**					
Advance Work						
Signal/cross-over installation; utility relocation; staging	12					
At Grade						
Single Track	12-18					
Retained Embankment						
Single Track	24					
Elevated Concrete Structure						
Single Track - Rehab/Modify Existing CTA/IDOT tunnel	24					
Elevated Steel Structure						
Single Track - Hammerhead Substructure	24					
Double Track - Hammerhead Substructure	24-36					
Segment U-2: Horizontal Curve at UPRR Crossing	**12-36**					
Advance Work						
Utility relocation; staging	12					
Elevated Steel Structure						
Double Track - Hammerhead Substructure	24-30					
Double Track - TPG, Hammerhead Substructure	24-30					
Double Track - Straddle Bent Substructure	24-30					
Segments U-3a and U-3b: End of Horizontal Curve at UPRR Crossing to CN/MED Crossing near 119th Street	**12-36**					
Advance Work						
Utility relocation; staging	12					
Stations						
Construct - 103rd Street	24-36					
Construct - 111th Street	24-36					
	24-36					
Parking						
Construct - 103rd Street	12					
Construct - 111th Street	12					
Construct - Michigan Avenue	12					
Elevated Steel Structure						
Double Track - Hammerhead Substructure	36					
Traction Power						
Substation	24					
Substation	24					
Segment U-4: CN/MED Track Crossing near 119th Street to At-Grade Track	**12-36**					
Advance Work						
Utility relocation; staging	12					
Retained Embankment						
Double Track	24-30					
Elevated Steel Structure						
Double Track - Hammerhead Substructure	24-36					
Double Track - TPG, Hammerhead Substructure	24-36					
Segment U-5: End of the Aerial Structure Crossing the CN/MED Tracks near 119th Street to the South End of the Yard Test Track near 124th Street	**12-36**					
Advance Work						
Utility relocation; staging	12					
At Grade						
Double Track	24-36					
Access Road						
Crossing proposed tracks	12-24					
Bridge for Access Road, Crossing	24					
Connector access road, West of Proposed CTA tracks	12					
Segment U-6: Yard Test Track to the South End of the Project including the 130th Street Station	**12-36**					
Advance Work						
Utility relocation; staging	24					
Station						
Construct - 130th Street Station	24-36					
Parking						
Construct - 130th Street Station	24					
At Grade						
Double Track	24-36					
Triple Track	24					
Access Road						
At 130th Street Station	12-24					
Segment U-7: 120th Street Yard and Shop	**12-36**					
Advance Work						
Utility relocation; staging	24					
Access Road						
Construct	12-24					
At Grade						
Single Track	36					
Double Track	36					
Retained Embankment						
Double Track	24					
Elevated Steel Structure						
Double Track - Hammerhead Substructure	24					
Shop Facility						
Construct - Shop Building	24-36					
Parking						
Construct - Shop	24					
Traction Power						
Substation - Yard	24					
Final Phase - 95th/Dan Ryan Terminal to 130th Street Station	**10 - 12**					
Signal/Communication						
Signal/Interlocking	10-12					
Communication System	10-12					