Appendix B

Technical Memoranda and Reports

Technical memoranda and reports were prepared as independent documents to support the preparation of the Draft Environmental Impact Statement (DEIS) for the Cotton Belt Corridor Regional Rail Project. Information from these documents was incorporated into the DEIS to provide information on existing conditions, and in some cases assess potential impacts to the resources. Information contained in the DEIS is the most current and supersedes information in the technical memoranda and reports.
B-15

Indirect and Cumulative Impacts Assessment and Mitigation Technical Memorandum
Technical Memorandum

Date: Wednesday, February 14, 2018
Project: Task Order 32 – Cotton Belt Corridor PE/EIS
To: John Hoppie, Project Manager, DART Capital Planning
From: Tom Shelton, GPC6 Program Manager
Subject: DART GPC VI – Contract C-2012668; Cotton Belt Corridor Environmental Indirect and Cumulative Impacts Assessment and Mitigation; HDR PN 10024656

Introduction: This Technical Memorandum identifies potential indirect and cumulative impacts associated with the proposed Build Alternative for the Dallas Area Rapid Transit (DART) Cotton Belt Corridor passenger rail project. The indirect and cumulative impacts assessments follow the methodology as described in the *Indirect and Cumulative Impacts Analysis Methodology Technical Memorandum* approved by DART for the proposed project.

Project Description: The 26-mile Cotton Belt Corridor extends from Dallas/Fort Worth International Airport (DFW Airport) to Shiloh Road in Plano, Texas. The alignment traverses seven cities: Grapevine, Coppell, Dallas, Carrollton, Addison, Richardson and Plano. The Cotton Belt Project’s primary purpose is to provide passenger rail connections and service that will improve mobility, accessibility and system linkages to major employment, population and activity centers in the northern part of the DART Service Area. The Cotton Belt Project would interface with three DART Light Rail Transit (LRT) lines: the Red Line in Richardson/Plano, the Green Line in Carrollton and the Orange Line at DFW Airport. Also at DFW Airport, the project would connect to the Fort Worth Transportation Authority’s (Trinity Metro) TEXRail Regional Rail Line to Fort Worth and the DFW Airport Skylink People Mover.

Objective: DART is preparing an Environmental Impact Statement to assess the impacts and benefits of rail passenger service on the Cotton Belt Corridor. Project oversight will be conducted by the Federal Transit Administration in cooperation with the Federal Railroad Administration and the Federal Aviation Administration.

Impact Assessment: Indirect impacts (i.e., effects) are defined as impacts that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” per the Council on Environmental Quality (CEQ) (40 CFR §1508.8) and may “include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” In addition, the CEQ (40 CFR §1508.7) defines cumulative impacts as “the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions.” The potential indirect and cumulative impacts of the proposed project are described...
below utilizing guidance from the 2016 American Association of State Highway and Transportation Officials (AASHTO) Practitioner’s Handbook on Assessing Indirect Effects and Cumulative Impacts Under NEPA.

**Indirect Impacts**

In addition to direct impacts, major transportation projects may also have indirect impacts on land use and the environment. For this analysis, the evaluation of indirect impacts is focused on induced growth impacts. Induced growth impacts are defined by AASHTO as “changes in the location, magnitude or pace of future development that result from changes in accessibility caused by the project.” An example of an induced growth impact is commercial development occurring around a new rail station and the environmental impacts associated with this development. The primary goal of the indirect impacts analysis is to understand the causal relationship between the proposed project, the induced growth and the resources potentially affected from the induced growth.

The indirect impacts study area, also known as the Area of Influence (AOI), is the same as the Cotton Belt Corridor Regional Rail Study Area, consisting of approximately 0.25 mile on either side of the proposed alignment and a 0.5-mile radius around each proposed rail station (Attachment 1). This AOI was delineated in consideration of typical induced growth and development likely to occur around the proposed stations and alignment. The AOI generally consists of highly developed, urban environments with a mixture of industrial, commercial and residential properties with intermittent pockets of undeveloped lands. The AOI covers approximately 12,496 acres which includes approximately 285 acres of existing rail right-of-way (ROW) and 158 acres of additional ROW for the proposed project. The temporal range for the indirect impacts analysis extends from 2017 to 2040, the horizon year of the current North Central Texas Council of Governments (NCTCOG) Mobility 2040 Metropolitan Transportation Plan (MTP).

The evaluation of potential indirect impacts resulting from the proposed Build Alternative follows the four-step process outlined in the Indirect and Cumulative Impacts Analysis Methodology Technical Memorandum (Appendix B). This section is organized by the following four steps of the indirect impacts analysis:

- **Step 1:** Assess the potential for increased accessibility;
- **Step 2:** Assess the potential for induced growth;
- **Step 3:** Assess the potential for impacts on sensitive resources; and
- **Step 4:** Assess potential minimization and mitigation measures.

**Step 1: Assess the potential for increased accessibility.**

Proposed access changes are evaluated to help assess the potential for increased accessibility within the AOI. Access changes within the project limits would result from the proposed stations that would provide new access to the proposed Cotton Belt rail line. All proposed stations would be sources of new, added accessibility to other areas in the region through the proposed Cotton Belt rail line or through connections to other existing rail lines. The Cotton Belt Project would interface with three DART Light Rail Transit (LRT) lines: the Red Line in Richardson/Plano, the Green Line in Carrollton, and the Orange Line at DFW Airport.
Also at the Dallas-Fort Worth International Airport (DFW Airport), the proposed project connects to Ft. Worth Transportation Authority (FWTA) TEXRail Regional Rail Line to Fort Worth and the DFW Airport Skylink People Mover. Table 1 provides the accessibility potential of each station.

<table>
<thead>
<tr>
<th>Proposed Station</th>
<th>Accessibility at the Station</th>
<th>Accessibility to other Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFW Terminal B</td>
<td>No proposed designated parking area.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project, interfaces with the DART LRT Orange Line and connects to TEXRail Regional Rail Line and the DFW Airport Skylink People Mover.</td>
</tr>
<tr>
<td>DFW North</td>
<td>Proposed parking area and bus bays.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>Cypress Waters/ North Lake</td>
<td>Proposed parking area and bus bays.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>Downtown Carrollton</td>
<td>Additional proposed parking area to supplement existing available parking.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project, interfaces with the DART LRT Green Line and to a potential extension of the DCTA A-Train from Trinity Mills to Downtown Carrollton.</td>
</tr>
<tr>
<td>Addison</td>
<td>Existing parking and bus bays at transit center.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>Knoll Trail</td>
<td>No parking or drop off areas.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>Preston Road</td>
<td>No parking or drop off areas.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>Coit Road</td>
<td>Proposed parking area and bus bays.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>UT Dallas</td>
<td>Proposed parking area and bus bays. UT Dallas Master Plan proposes to move surface parking to shared parking structure.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
<tr>
<td>CityLine/Bush</td>
<td>Existing parking, bus bays and drop off areas.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project and interfaces with the DART LRT Red Line.</td>
</tr>
<tr>
<td>12th Street</td>
<td>Proposed parking area, bus bays and drop off areas.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project and would interface with the DART LRT Red Line at proposed infill LRT 12th Street Station.</td>
</tr>
<tr>
<td>Shiloh Road</td>
<td>Proposed parking area and bus bays.</td>
<td>Connects to all other proposed stations for the Cotton Belt Project.</td>
</tr>
</tbody>
</table>


Although the connections to the other existing rail lines (DART LRT Green, Red and Orange lines, TEXRail, and potentially DCTA A-Train) are located at only four proposed stations (DFW Terminal B, Downtown Carrollton, City Line/Bush and 12th Street), these existing rail lines could be accessed by any of the proposed stations because they would all be connected by the proposed Cotton Belt rail line.

As shown in Table 1, most of the proposed stations have or would have parking areas available. Two stations (Knoll Trail and Preston Road) would not have any parking areas, but the Knoll Trail Station would
have drop off areas whereas the Preston Road Station would be accessed by pedestrians and bicyclists only which would limit its accessibility. The DFW Terminal B Station does not have a designated parking area, but is anticipated to be a destination station versus a boarding station as it shows more alightings than boardings in the 2040 ridership forecast. In other words, travelers are likely to board at a different station to get to this station and to DFW Airport.

All other proposed stations have existing or proposed parking areas which would enable rail users to drive to the station and board at these locations. As mentioned above, all proposed stations would be connected by the proposed Cotton Belt rail line which would result in increased accessibility for rail users. Rail users can access areas along the corridor from any of the proposed stations, as well as areas along the other existing rail line corridors through connections at three proposed stations. In addition, riders departing at the proposed stations could connect to bus options to reach a farther distance than from walking or biking; however, it is more likely that riders are attempting to reach destinations within walking distance to the stations.

The 2040 ridership forecast also determines ridership potential of the proposed project. The following summarizes the Cotton Belt Project ridership effects:

- Drive access would be the highest boarding mode (28% of all boardings) and highest at the DFW North Station (nearly 21% of all drives board here).
- Transfers from the DART LRT lines would provide the next highest boarding mode (22% of all boardings) and would occur most often at the Downtown Carrollton and CityLine/Bush stations.
- The Downtown Carrollton Station would have the highest overall station ridership, due in great measure to the transferring rail riders from the LRT lines at this location.
- Transfers to the Cotton Belt Project from DART LRT lines would occur as expected at the 12th Street Station Complex and CityLine/Bush Station (from the Red Line), the Downtown Carrollton Station (from the Green Line) and the DFW Terminal B Station (from the Orange Line).
- The Addison Station would be the second highest in overall ridership and would have the highest walk egress for all the stations. The Addison Transit Center is also one of the busiest transit centers in the DART system.
- DFW Terminal B Station provides access to a major activity center and the high rail ridership forecasted at this station reflects that – both for employees and passengers. It would primarily be a destination station (427 boardings versus 1903 alightings).

Although all proposed stations are interconnected through the proposed Cotton Belt rail line, once reaching the desired station, additional transportation modes may be needed to reach ultimate destinations. Destinations near or within walking distance from the proposed stations would receive the most benefit and result in an increase in accessibility. Conversely, destinations with distances greater than one mile from a proposed station would not experience an increase in accessibility because of the

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1 Source: DART Cotton Belt Alt 7 Model Run, December 2017.
additional transportation needs. In summary, the proposed project has the potential to increase accessibility at and near destinations within walking distance of the proposed station locations.

**Step 2: Assess the potential for induced growth.**

The purpose of Step 2 is to identify growth potential as a result of the proposed accessibility changes. Step 2 identifies changes in the type, location and pace of growth potentially resulting from implementation of the proposed project. Induced growth impacts are determined using information gathered on potential increased accessibility and access changes, as identified in Step 1.

To assess the potential for induced growth, feedback was gathered from local planners in April and May 2017 to get their professional opinion on potential areas of development and redevelopment. Using an indirect impacts questionnaire ([Attachment 2](#)), local planners and staff provided feedback and input on future developments planned or likely to occur, potential impacts of the proposed project, and induced growth within their jurisdiction. Input was received from the following municipalities: Town of Addison and the cities of Carrollton, Coppell, Dallas, Plano, and Richardson. The planners identified areas for development which are evaluated and included in this analysis. These areas are generally mixed-use developments near the proposed stations or within the study area and are primarily TOD because most of the cities have anticipated the construction of the Cotton Belt Project.

Using this feedback from local planners as well as information from the NCTCOG Regional Data Center, potential for induced growth was determined and areas of development and redevelopment identified. It is anticipated that the proposed project has the potential to induce development as well as increase the rate and intensity of potential development.

**Step 3: Assess the potential for impacts on sensitive resources.**

As a result of the induced growth areas identified in Step 2, it is anticipated that socioeconomic resources and ecological resources would be sensitive resources impacted by the induced growth. No adverse impacts are anticipated to socioeconomic resources; alternatively, positive effects to employment and businesses are anticipated along the corridor because of the potential for TOD. Providing additional access opportunities for employees and customers would positively impact business surrounding proposed stations. Providing services to accommodate the potential growing population and changing demographic in association with the TOD may impact local schools and community facilities. Emergency service providers in areas of high density development may also need to accommodate such increases of population and development. Generally though, development and redevelopment near the proposed stations would result in positive community effects and greater access to transit for environmental justice (EJ) populations. More focused development around project stations would also enhance accessibility and job opportunities for transit-dependent populations from throughout the service area.

Sensitive ecological resources include water and vegetation. These resources have the potential to be impacted from induced growth. Anticipated induced growth from redevelopment of existing structures and properties would not result in impacts to water and vegetation. For new development, conversion of undeveloped land would result in some water and vegetation impacts. Such areas are minor in the context of the 26-mile corridor where most of the area is already developed and converted to urbanized
land use. Surface water runoff which may transport sediment into water bodies could have the potential to impact impaired waters, nearby streams and water features. Structural columns within floodplain areas and construction of additional impervious surfaces could result in additional stormwater runoff which could contribute to erosion and sedimentation problems.

Step 4: Assess potential minimization and mitigation measures
As mentioned in Step 3, ecological and socioeconomic resources are sensitive resources that have the potential to be impacted by induced growth from the proposed project. Best management practices (BMPs) and Stormwater Pollution Prevention Plans (SWPPP) implemented in accordance with Texas Commission on Environmental Quality (TCEQ) requirements would alleviate any potential impacts resulting from activities that could result in erosion and sedimentation. Furthermore, water resources impacts would be mitigated through coordination with the United States Army Corps of Engineers (USACE) (through permits) and the NCTCOG (under the Section 214 program of the Water Resources Development Act) and in accordance with DART’s Mitigation Monitoring Program.

Impacts to socioeconomic resources could be minimized through continued monitoring of safety, access, traffic volumes and parking demands at and near proposed station locations. A mitigation plan could be developed if any issues arises. In addition, impacts to community resources would be minimized and mitigated through existing land use development regulations which would govern induced development projects within the AOI. Indirect impacts from the project, particularly potential land use redevelopment effects, are consistent with local goals and trends.

Cumulative Impacts
The purpose of the cumulative impacts analysis is to assess the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach evaluates the incremental impacts of the proposed project in respect to the overall health and abundance of selected resources.

Cumulative impacts are analyzed in terms of the specific resource being affected. Before initiating the cumulative impacts analysis, key resources/issues are identified and it is determined whether a cumulative analysis is warranted for each resource. The cumulative impacts analysis focuses on 1) those resources substantially impacted by the project (directly or indirectly) and 2) resources currently in poor or declining health or at risk even if project impacts (either direct or indirect) are relatively small. Table 2 lists each key resource and whether or not a cumulative impacts analysis is warranted.
### Table 2: Resources and Topics Considered for the Cumulative Impacts Analysis

<table>
<thead>
<tr>
<th>Resource/Issue</th>
<th>Would there be Direct and/or Indirect Impacts?</th>
<th>Would the Impacts be Considered Substantial?</th>
<th>Is Resource/Issue at Risk or in Poor or Declining Health?</th>
<th>Is Resource Included in Cumulative Impacts Analysis?</th>
<th>Reason for Including or Excluding for Cumulative Impacts Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Due to the likelihood of induced growth development and TOD, land use will be assessed for cumulative impacts.</td>
</tr>
<tr>
<td>Socioeconomic Resources</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Due to displacements and ROW acquisitions resulting from the proposed project, socioeconomic resources will be assessed for cumulative impacts.</td>
</tr>
<tr>
<td>EJ Populations</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No disproportionately high and adverse impacts would result from the proposed project; therefore, a cumulative analysis on EJ populations is not warranted.</td>
</tr>
<tr>
<td>Historic Resources</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Direct impacts are anticipated to the White Rock Creek Railroad Bridge; however, the bridge would be repurposed for the Cotton Belt Regional Trail, as coordinated with the THC, and the structure would retain its historic integrity. Therefore, no substantial impacts are anticipated and a cumulative analysis on historic resources is not warranted.</td>
</tr>
<tr>
<td>Archeological Resources</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No direct and indirect impacts are anticipated; therefore, a cumulative analysis on archeological resources is not warranted.</td>
</tr>
<tr>
<td>Visual and Aesthetics</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>The direct impacts are not substantial; therefore, a cumulative analysis on visual and aesthetics is not warranted.</td>
</tr>
<tr>
<td>Soils and Geology</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>The direct impacts are minor and not considered substantial; therefore, a cumulative analysis on soils and geology is not warranted.</td>
</tr>
<tr>
<td>Floodplains</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Coordination with the USACE, DFW Airport, and corridor cities would occur to permit and mitigate any potential direct impacts to floodplains. Furthermore, all developments must meet Federal Emergency Management Agency National Flood Insurance Program criteria. Such ordinances and permitting requirements would minimize any substantial impacts; therefore, a cumulative analysis on floodplains is not warranted.</td>
</tr>
<tr>
<td>Resource/Issue</td>
<td>Would there be Direct and/or Indirect Impacts?</td>
<td>Would the Impacts be Considered Substantial?</td>
<td>Is Resource/Issue at Risk or in Poor or Declining Health?</td>
<td>Is Resource Included in Cumulative Impacts Analysis?</td>
<td>Reason for Including or Excluding for Cumulative Impacts Analysis</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------------------------------------</td>
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<td>----------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>Groundwater and Surface Waters</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Through BMPs and compliance with the National Pollutant Discharge Elimination System, the proposed project would not result in substantial impacts; therefore, a cumulative analysis on groundwater and surface waters is not warranted.</td>
</tr>
<tr>
<td>Waters of the U.S., including Wetlands</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Potential direct impacts would require a permit coordinated with the USACE and are anticipated to be minimized through the permit process and further design refinement. These impacts would not be considered substantial because only 6 percent of the wetlands within the project corridor would be impacted; therefore, a cumulative analysis on waters of the U.S., including wetlands, is not warranted.</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Direct noise and vibration impacts are anticipated; however, impacts would be mitigated through quiet zones and noise barriers. Through mitigation, the direct impacts would not be substantial; therefore, a cumulative analysis is not warranted.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No direct or indirect impacts are anticipated; therefore, a cumulative analysis on air quality is not warranted.</td>
</tr>
<tr>
<td>Hazardous Materials</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Direct impacts are not considered substantial as intermediate/moderate/high risk sites have been identified and are anticipated to be avoided; therefore, a cumulative analysis on hazardous materials is not warranted.</td>
</tr>
<tr>
<td>Biological Resources</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Direct impacts to vegetation would predominantly occur in urban areas and are not considered substantial. Affected vegetation areas would be revegetated after construction if possible. Furthermore, wildlife habitat for threatened species would not be impacted; therefore, a cumulative analysis on biological resources is not warranted.</td>
</tr>
</tbody>
</table>
Table 2: Resources and Topics Considered for the Cumulative Impacts Analysis

<table>
<thead>
<tr>
<th>Resource/Issue</th>
<th>Would there be Direct and/or Indirect Impacts?</th>
<th>Would the Impacts be Considered Substantial?</th>
<th>Is Resource/Issue at Risk or in Poor or Declining Health?</th>
<th>Is Resource Included in Cumulative Impacts Analysis?</th>
<th>Reason for Including or Excluding for Cumulative Impacts Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 4(f)</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>The proposed direct impact to the White Rock Creek Railroad Bridge is not considered substantial because the proposed project would reuse the bridge as part of the Cotton Belt Regional Trail and the structure would retain its historic integrity. Any potential impacts would be coordinated with the THC; therefore, a cumulative analysis on Section 4(f) properties is not warranted. Spring Creek Trail will be reconstructed with a De Minimis impact.</td>
</tr>
<tr>
<td>Section 6(f)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No direct or indirect impacts are anticipated; therefore, a cumulative analysis on Section 6(f) properties is not warranted.</td>
</tr>
</tbody>
</table>

Source: GP6 Team, February 2018.

It was determined that the following resources warrant a cumulative impacts analysis: land use and socioeconomic resources. The evaluation of cumulative impacts resulting from the proposed Build Alternative follows the five-step process outlined in the *Indirect and Cumulative Impacts Analysis Methodology Technical Memorandum*. Each resource cumulative impacts analysis and findings followed this five-step process:

- **Step 1**: Describe resource conditions and trends;
- **Step 2**: Summarize effects of the proposed action on key resources;
- **Step 3**: Describe other actions and their effects on key resources;
- **Step 4**: Estimate combined effects on key resources; and
- **Step 5**: Consider minimization and mitigation.

The temporal boundary for the cumulative analyses extends from 1996 to 2040, the year DART opened its first rail line and the horizon year of the current NCTCOG *Mobility 2040 MTP*, respectively. The Resource Study Area (RSA) for land use and socioeconomic resources was determined to follow the general areas surrounding the proposed stations and proposed alignment. Like the AOI for indirect impacts, the RSA for the cumulative impacts analyses also consists of approximately 0.25 mile on either side of the proposed alignment and a 0.5-mile radius from the proposed stations (*Attachment 1*).

**Land Use**
Land uses within the RSA are stable and improving. Land use development and redevelopment has been occurring at a steady pace, reflecting local goals and trends.
Step 2: No adverse impacts are anticipated to socioeconomic resources; alternatively, positive effects to employment and businesses are anticipated along the corridor because of the potential for TOD. Providing additional access opportunities for employees and customers would positively impact business surrounding proposed stations. Providing services to accommodate the potential growing population and changing demographic in association with the TOD may impact local schools and community facilities. Emergency service providers in areas of high density development may also need to accommodate such increases of population and development. Generally though, development and redevelopment near the proposed stations would result in positive community effects and greater access to transit for environmental justice (EJ) populations.

Past and present actions include extensive development and redevelopment of land uses, as the proposed project traverses seven cities and towns within three growing counties, Tarrant, Dallas and Collin counties. There are several reasonably foreseeable development and transportation projects that would take place generally in the same timeframe as the proposed action’s construction. Various local development plans are discussed in more detail in the Land Use Existing Conditions Technical Memorandum. In addition, **Attachment 1** shows 19 development projects, identified through the NCTCOG Regional Data Center, that are either announced, in the conceptual phase of planning or under construction within the RSA. These developments are mostly multi-family apartment complexes, but also include single-family residential, industrial and office commercial developments. Key transportation projects in progress within the RSA are listed in **Table 3** and include highway, tollway and rail projects sponsored by the Texas Department of Transportation (TxDOT), the North Texas Tollway Authority (NTTA) and FWTA.

<table>
<thead>
<tr>
<th>Roadway/Rail Project</th>
<th>Description of Project</th>
<th>Project Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Highway (SH) 26 (Tarrant County)</td>
<td>Improve traffic signals</td>
<td>Finalizing for construction</td>
</tr>
<tr>
<td>SH 114 (Tarrant County)</td>
<td>Reconstruction</td>
<td>Planning</td>
</tr>
<tr>
<td>Interstate Highway (IH) 635 (Dallas County)</td>
<td>Various construction activities including reconstruction projects, shoulder improvements, and other enhancements</td>
<td>Ranges from under development to finalizing for construction</td>
</tr>
<tr>
<td>IH 35E (Dallas County)</td>
<td>Reconstruction</td>
<td>Development</td>
</tr>
<tr>
<td>President George Bush Turnpike (Dallas and Collin counties)</td>
<td>Adding one additional toll lane in each direction</td>
<td>Ranges from finalizing for construction to under construction</td>
</tr>
<tr>
<td>U.S. Highway (US) 75 (Collin County)</td>
<td>Various construction activities including widening, repair, and maintenance projects</td>
<td>Ranges from planning to finalizing for construction</td>
</tr>
<tr>
<td>TEXRail (Tarrant County)</td>
<td>New commuter rail service</td>
<td>Under construction</td>
</tr>
</tbody>
</table>


These reasonably foreseeable development and transportation projects would result in the continued development and redevelopment of land, as the cities along the Cotton Belt Corridor proceed toward the goals articulated in their various land use plans. The proposed project may influence investment in redevelopment projects, such that redevelopment may occur at a somewhat accelerated pace. Utility
service and infrastructure demands may increase. From a larger perspective, the proposed project, in addition to these other reasonably foreseeable transportation projects, supports the goals of the NCTCOG Mobility 2040 MTP: congestion relief, improved safety, air quality, quality of life, enhanced economic opportunities, and streamlined project delivery. These projects are also aligned with U.S. Department of Transportation Livability Principles, such as providing more transportation choices, improving economic competitiveness, supporting existing communities, and enhancing the unique characteristics of a community. Compact development that allows people to lead a transit-focused lifestyle, with shorter commutes between residences and workplaces, is ultimately a more environmentally friendly land use development pattern.

The Cotton Belt Project has been developed in conjunction with planned public transportation and roadway improvements as well as regional and local land use plans and projects. It is anticipated that the Cotton Belt Project would encourage TOD, which would support local land use plans and projects. Current land uses surrounding potential station locations are compatible with these objectives. The proposed project would not contribute to cumulative adverse local land use impacts that could result from development of the surrounding areas, but rather would benefit corridor communities by supporting more efficient land use development. Therefore, the proposed action in addition to other development and transportation projects, implemented within existing land use development regulations and other environmental regulatory protections, would not result in substantial, adverse, cumulative impacts.

Socioeconomic Resources
Overall, the Study Area has a total number of 71,853 households; the median household income is $70,366; and 5 percent of the households have no vehicle available. The City of Dallas has the lowest median household income of the cities located within the Study Area and has the highest percentage of households with no vehicle available that rely on transit services for their mobility.

The proposed project would have long-term benefits for the communities it traverses as it would further goals and policies for revitalization and investment within the RSA and broader regional economies. The fiscal benefits of operation would have a long-term impact for the communities. It is anticipated that the possible loss of tax revenue would be offset by increased development near stations and along the alignment. Therefore, once operational, the proposed project would not result in any adverse cumulative impacts and would have an economically beneficial effect on the surrounding communities.

Construction activities associated with the proposed project could result in community disruptions. These disruptions may result in temporary, short-term economic impacts on local businesses. The construction activities would, however, result in overall beneficial impacts as increases in employment and spending would offset any short-term economic impacts. Community disruptions could also result from other development projects also occurring in the RSA as a result of TOD. This may result in a longer duration of noise and dust from construction, and greater traffic delays and obstructions. The combined impact may heighten the perception of disruption experienced by the local communities. These impacts may be concentrated in some locations at different times during construction, but would diminish as the project concludes. The resulting benefits to the communities and businesses would outweigh the temporary
disruptions.

Property acquisitions (both full and partial) would result from implementation of the proposed project. These proposed acquisitions would produce impacts across the RSA through the displacement of one local residence and 11 businesses; however, relocation services would be provided in accordance with federal policies and guidelines. With the anticipated TOD, suitable employment could be found by affected employees in the general area. It is further anticipated that local residents would be relocated into houses that are decent, safe and sanitary, with adequate living space to accommodate the displaced household which would be within the household’s financial limits. With the anticipated potential TOD and relocation assistance, the cumulative impact from displacements would not be substantial.

Traditionally, neighborhoods and communities within the RSA have been built around existing rail ROW and other major transportation corridors such as the Dallas North Tollway, US 75, IH 35 and the President George Bush Turnpike. It is anticipated that the proposed project, when considered in conjunction with other current and future projects, would enhance the neighborhoods as an option for transport to and from community facilities. These community facilities include medical centers, places of worship, police and fire stations, libraries, schools, and universities. Therefore, the proposed project would have a positive cumulative impact both within the RSA and the broader metropolitan context as accessibility would be enhanced which in turn, benefits access to local businesses and improves potential for economic development.

Conclusions

Indirect Impacts
It is anticipated that the proposed project could induce development as well as increase the rate and intensity of future development. The induced growth could result in impacts to socioeconomic and ecological resources. Impacts to community resources would be minimized and mitigated through existing land use development regulations. In addition, positive impacts to employment and businesses are anticipated along the corridor because of the potential of TOD, providing additional access opportunities for employees and customers that would positively impact business surrounding proposed stations of the project. For ecological resources, BMPs and SWPPP requirements would alleviate any potential impacts. In the context of the 26-mile corridor, most of the study area is already developed and converted to urbanized land use; therefore, induced growth impacts would not be substantial and would be outweighed by the positive impacts to the community and economic development of the cities along the proposed project. As a result, no mitigation is proposed for induced growth impacts.

Cumulative Impacts
The incremental impact of the proposed action when added to past, present, and reasonably foreseeable future actions is not anticipated to be substantial. In general, the implementation of a passenger rail line would have a positive impact on existing and proposed projects thus offsetting potential cumulative impacts. Some of the direct benefits of transit include improved access, reduced parking requirements and reduced traffic congestion. Passenger rail construction has also been demonstrated to have a positive impact on land use through TODs which align with local plans.
No substantial environmental impacts have been identified for the proposed project. DART continues to work closely with local municipalities, agencies, developers, and businesses to develop a passenger rail line that fits well within the existing and future environment thereby reducing the potential for incremental impacts to other past, present, and reasonably foreseeable future actions. Additionally, the proposed action utilizes 2040 traffic projections and demographic forecasts, accounting for much of the foreseeable development and any associated impacts.

Based on the cumulative impacts assessment, no substantial impact would result from any projected incremental impacts of the proposed project combined with other past, present and reasonably foreseeable future actions; therefore, no mitigation is proposed.

**Attachments:**

Attachment 1 – Area of Influence and Resource Study Area
Attachment 2 – Indirect Impacts Questionnaire
Attachment 1
Area of Influence and Resource Study Area

DFW Airport to Shiloh Road in Plano

Collin, Dallas, and Tarrant Counties, Texas

Sources: Aerial imagery, ESRI, 2015; development locations, NCTCOG, 2017; study area and alignment, GP6 Team, 2017.

Legend

- Station
- Proposed Alignment
- Study Area (AOI and RSA)
- County Boundary

Major Developments Identified in NCTCOG Database
- Announced
- Conceptual
- Under Construction

* Note: The DFW Terminal B Station is part of a separate project and not included in this proposed project.
Questions & Discussion Topics

1) Please summarize the development trends and land use changes within your jurisdiction during the past 5-10 years. If possible, please provide examples.

2) In your opinion, would the proposed project induce development in your jurisdiction or planning area and why? If so, would this development occur alone or in conjunction with other factors?

3) In your opinion, would the proposed project prohibit development in your jurisdiction or planning area and why?

4) In your opinion, would any redevelopment occur as a result of the proposed project? If so, where?

5) What future development would you not expect to be dependent on the proposed project?

6) Using a scale of 1 to 5, please indicate if you think the proposed project would affect the rate and intensity of development within your jurisdiction?

Scale based on: 1 = No Influence

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7) In your opinion, would the proposed project affect or change the type of development within your jurisdiction?
Introduction: This Technical Memorandum describes the methodology to be used to assess the potential indirect and cumulative impacts associated with the proposed Dallas Area Rapid Transit (DART) Cotton Belt Corridor passenger rail project. The methodology for the project is consistent with DART, Federal Transit Administration (FTA), and Council on Environmental Quality (CEQ) guidance regarding indirect and cumulative impacts assessments.

Project Description: The 26-mile Cotton Belt Corridor extends between the Dallas/Fort Worth International Airport (DFW Airport) and Shiloh Road in Plano, Texas. The alignment traverses seven cities: Grapevine, Coppell, Dallas, Carrollton, Addison, Richardson and Plano. The Cotton Belt Project’s primary purpose is to provide passenger rail connections and service that will improve mobility, accessibility and system linkages to major employment, population and activity centers in the northern part of the DART Service Area. The Cotton Belt Project would interface with three DART Light Rail Transit (LRT) lines: the Red Line in Richardson/Plano, the Green Line in Carrollton and the Orange Line at DFW Airport. Also at DFW Airport, the project would connect to Fort Worth Transit Authority’s TEX Rail Regional Rail Line to Fort Worth and the DFW Airport Skylink People Mover.

Objective: DART is preparing an Environmental Impact Statement to assess the impacts and benefits of rail passenger service on the Cotton Belt Corridor. Project oversight will be conducted by the FTA in cooperation with the Federal Railroad Administration and the Federal Aviation Administration.

Methodology: The CEQ requires that potential indirect and cumulative impacts be considered during the National Environmental Policy Act (NEPA) process.

Indirect impacts are defined as impacts that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” per the CEQ (40 CFR §1508.8) and may “include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” In addition, the CEQ (40 CFR §1508.7) defines cumulative impacts (i.e., effects) as “the impact on the environment which results from the incremental impact of the proposed action when added to other past, present and reasonably foreseeable future actions.”
The indirect and cumulative impacts analyses will be performed using the methodology described in the following sections.

**Indirect Impacts Analysis**

Induced growth impacts are changes in the location, magnitude or pace of future development that result from changes in accessibility caused by the project. An example of an induced growth impact is commercial development occurring around a new rail station and the environmental impacts associated with this development. The primary goal of the indirect impacts analysis will be to understand the causal relationship between the proposed project, the induced growth and changes in land use that could potentially result from the proposed project and the resulting impacts from that induced growth.

The initial stages of the indirect impacts analysis include information gathering and determination of the indirect impacts study area, also called the area of influence (AOI), and time frame for the analysis. Types of information to be gathered may include the potential for increased accessibility, growth trends and projections, land use plans, development constraints and the identification of sensitive resources (i.e., protected, impaired or threatened). Interviews will be conducted with local city planners, whose expertise will assist in the identification of potential induced growth impacts and the magnitude of these impacts. In addition, the determination of the AOI will be coordinated with the city planners. The AOI will be broad enough to account for the extent of potential induced growth impacts. The temporal range for the indirect impacts analysis will extend from 2017 to 2040, the horizon year of the Metropolitan Transportation Plan.

The indirect impacts analysis will be performed utilizing the below four-step approach as outlined in the American Association of State Highway and Transportation Officials (AASHTO) Practitioner’s Handbook on *Assessing Indirect Effects and Cumulative Impacts Under NEPA*.

- **Step 1**: Assess the potential for increased accessibility;
- **Step 2**: Assess the potential for induced growth;
- **Step 3**: Assess the potential for impacts on sensitive resources; and
- **Step 4**: Assess potential minimization and mitigation measures.

**Step 1** will gather information on potential access changes and increased accessibility. Utilizing the Cotton Belt Project schematic plans, potential access changes within the project limits will be identified and mapped for ease of understanding. Existing year traffic volumes and design year predicted traffic volumes will also be utilized, as available, to determine accessibility changes for geographic areas outside the project limits, thereby identifying the extent of the potential indirect impacts.

**Step 2** will identify changes in the type, location and pace of growth potentially resulting from implementation of the proposed project. Induced growth impacts are determined using information gathered on potential increased accessibility and access changes, as identified in Step 1. Included in this approach will be coordination with city planners through interviews to determine land use policies, potential development, future projects and reasonably foreseeable indirect impacts. A map of the proposed project will be utilized in the interviews to identify potential induced growth. Interviews with
city planners will also facilitate a better understanding of area growth trends, any existing city policies limiting growth or restricting land use, presence or non-presence of necessary infrastructure to accommodate development (e.g., water, sewer) and local government sentiment regarding potential development. Information received from the interviews will be incorporated into the overall indirect impacts analysis.

**Step 3** will evaluate how project-induced growth could potentially impact resources. To the extent with which the potential location(s) of induced growth are identified in Step 2, the types of resources located in those areas will be described and impacts will be quantified using geographic information system (GIS) analysis of land cover and land use within these areas of induced growth.

**Step 4** will consider potential, reasonable minimization and mitigation measures for indirect impacts. Because implementation of some measures may be outside the purview of DART, the agency with the authority to enact such measures will be identified.

The indirect impacts analysis will conclude with a summary of the evaluation and determinations.

**Cumulative Impacts Analysis**

The purpose of the cumulative impacts analysis is to assess the direct and indirect impacts of the proposed project within the larger context of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future. This approach evaluates the incremental impacts of the proposed project in respect to the overall health and abundance of selected resources.

Cumulative impacts are analyzed in terms of the specific resource being affected. Before the cumulative impacts analysis begins, the key resources of the analysis will be identified. The cumulative impacts analysis will focus on 1) those resources substantially impacted by the project (directly or indirectly) and 2) resources currently in poor or declining health or at risk even if project impacts (either direct or indirect) are relatively small. A table will identify which resources will be carried through the cumulative impacts analysis, which resources will not be carried through, and why.

The five-step approach described below will be used for each resource to be included in the cumulative impacts analysis as outlined in the AASHTO Practitioner’s Handbook on *Assessing Indirect Effects and Cumulative Impacts Under NEPA*.

- **Step 1**: Describe resource conditions and trends;
- **Step 2**: Summarize effects of the proposed action on key resources;
- **Step 3**: Describe other actions and their effects on key resources;
- **Step 4**: Estimate combined effects on key resources; and
- **Step 5**: Consider minimization and mitigation.

**Step 1** will first identify and describe the composition of the study area for the resource being evaluated (also called the resource study area or RSA), as well as the study time-frame for considering future and past impacts for each resource. Additionally, this step will provide the context/baseline for evaluating
potential impacts by understanding the current conditions or health of the resource and the historical and forecasted trends to discern changes in the resource over time.

**Step 2** will summarize the potential direct and indirect impacts associated with the proposed project for each resource of the cumulative impacts evaluation.

**Step 3** will identify reasonably foreseeable actions within the RSA and their potential impacts on the resource under evaluation. Reasonably foreseeable actions will include both major transportation projects (e.g., new or large widening roadway and transit projects) and other major development projects. The interviews conducted as part of the indirect impacts analysis will also request planner input on reasonably foreseeable actions and estimations of that action’s footprint if that information is available. In such situations, GIS analysis will be utilized to quantify potential impacts resulting from the reasonably foreseeable action to the subject resource. If available, projects with environmental documents will be reviewed for impact analyses. Qualitative evaluations, based on the best information available, will be utilized in the absence of quantitative data.

**Step 4** will compile the potential direct impacts, indirect impacts and impacts resulting from reasonably foreseeable actions to ascertain the combined or cumulative impacts on each resource under evaluation. Cumulative impacts will be quantified to the extent practicable, qualitatively discussed with assumptions documented when quantification is not possible and presented in a reader friendly format, such as a table, for ease of understanding.

**Step 5** will consider minimization and mitigation measures for the identified cumulative impacts. Minimization and mitigation measures for the proposed project (direct and indirect impacts) will be documented. Minimization and mitigation measures for reasonably foreseeable actions will be discussed as measures that could be adopted by the implementing entities of those actions, along with the likelihood of their implementation.

The cumulative impacts analysis will conclude with a summary of the evaluation and determinations.

**Source Information and References:** The following resources will be utilized for the indirect and cumulative impacts analyses.


Texas Department of Transportation. 2016. *Indirect Impacts Analysis Guidance*.

Texas Department of Transportation. 2016. *Cumulative Impacts Analysis Guidelines*. 