



Indirect and Cumulative Impacts Technical Memorandum

MoPac (State Loop 1) Intersections, Austin District

From North of Slaughter Lane to South of La Crosse Avenue

CSJ: 3136-01-015

Travis County, Texas

June 2015

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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1.0 INDIRECT IMPACTS

This analysis is based on TxDOT's 2014 *Environmental Handbook on Indirect and Cumulative Impacts* (TxDOT 2014a) and supporting TxDOT resources on preparing indirect and cumulative impacts analyses. Additional guidance was derived from the 2002 National Cooperative Highway Research Program (NCHRP) Report 466 entitled *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* and the 2011 American Association of State Highway and Transportation Officials (AASHTO) *Practitioner's Handbook for Assessing Indirect Effects and Cumulative Impacts Under NEPA*.

The requirements for indirect and cumulative impacts analyses were established by the National Environmental Policy Act (NEPA) of 1969, which is administered by the Council on Environmental Quality (CEQ). CEQ regulations implementing NEPA define indirect effects as those "...which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects 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" (40 CFR §1508.8[b]).

In accordance with TxDOT guidance, this indirect effects analysis focuses on the potential of the proposed project to induce growth based on the nature of the proposed improvements and the economic, land use, and population trends of the surrounding area.

NCHRP Report 466 identifies project-influenced development and related effects as:

Project-influenced development effects. Sometimes called induced growth or the "land use effect." For transportation projects, induced growth effects are most often related to changes in accessibility to an area, which in turn affects the area's attractiveness for development.

Effects related to project-influenced development. These are impacts to the natural or human environment that may result from project-influenced changes in land use (NCHRP 2002).

1.1 INDUCED GROWTH EFFECTS

The potential of the proposed project to influence local and regional land use decisions is a central focus of the indirect effects analysis. In order to determine the likelihood of the proposed project to result in induced growth and related effects, this analysis relies on TxDOT's Induced Growth Indirect Impacts Decision Tree (TxDOT 2014b) and the Risk Assessment for Indirect Impacts (TxDOT 2014c). The decision tree and risk assessment questions and the proposed project's corresponding answers are listed below.

1. Does the need and purpose of the proposed project include economic development, or is the project proposed to serve a specific development?

No. The purpose of the proposed project is to reduce travel delay and enhance safety by improving intersection operation, which would address needs related to traffic congestion, increased delays and a high crash rate at both intersections and anticipated increases in future traffic volumes.

2. Is economic development or new opportunities for growth/development cited as a benefit of the proposed project?

No. The proposed project would reduce travel delay and safety of the existing intersections but would not promote economic development in the area. Future population growth and corresponding increases in congestion are anticipated to occur throughout Travis and Hays Counties. While the proposed operational improvements to the intersections would result in less congested, more efficient, and safer travel conditions, the proposed project would not create new opportunities for long-term growth or development that do not currently exist. The Build Alternative would be expected to result in beneficial effects to the local and regional economies in the form of employment opportunities and direct household earnings; however, these potential benefits would be temporary and would last about as long as the construction phase.

3. Is land in the area available for development and/or redevelopment?

Yes, but availability is very limited. The project area contains primarily residential development (including five neighborhoods) as well as commercial development and two schools. While small portions of the project area would potentially be available for further development, the majority of land within the surrounding area has already undergone development or is considered unlikely to develop due to its use as parkland or a preserve (including Circle C Ranch Metropolitan Park, Dick Nichols District Park, Sendera Mesa Park, Deer Park at Maple Run Preserve, and the Ladybird Johnson Wildflower Center), or due to its location within the 100-year floodplain. Therefore, development or redevelopment within and surrounding the project area would not be likely to result from the proposed improvements.

4. Does the project add capacity?

No. The proposed improvements would reduce travel delay and enhance safety at Slaughter Lane and La Crosse Avenue by constructing grade-separated intersections, with the mainlanes of MoPac travelling underneath the cross-streets. No additional through-travel lanes are included in the proposed project design.

5. Does the project substantially increase access or mobility in the project area?

No. The proposed project would reduce travel delay within and through the project area but would not result in substantial changes in access or mobility compared to the current condition. The proposed intersection improvements would not add capacity to the existing facility and would not provide new access to developed or undeveloped tracts of land.

As indicated by the answers above and in consideration of the nature of the proposed project (operational and safety improvements to intersections along an existing facility), the proposed project would not result in induced growth within the area, and an induced growth indirect impacts analysis is not required.

2.0 CUMULATIVE IMPACTS

The CEQ defines cumulative effects as the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions regardless of the agency (federal or non-federal) or person that undertakes such an action. These types of impacts “can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR §1508.7). FHWA states that the “cumulative effects of an action may be undetectable when viewed in the individual context of direct and even [indirect] impacts, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change” (FHWA 1992). In addition, CEQ guidance states that reasonably foreseeable future effects must be probable; effects which are considered possible rather than probable “may be excluded from consideration” (NCHRP 2002, 3).

According to the *Practitioner’s Handbook for Assessing Indirect Effects and Cumulative Impacts Under NEPA* (AASHTO 2011), analysis of cumulative effects is based on the impacts of the proposed action, the sensitivity of the resources that could be affected by the proposed action, and other actions and their impacts. In the absence of direct and indirect impacts, cumulative impacts to a resource would not likely occur (AASHTO 2011, 12).

In accordance with TxDOT guidance, a cumulative impacts analysis should focus on resources anticipated to be substantially impacted by the proposed project (either directly or indirectly), as well as resources that would be affected by the proposed project to any degree that are also considered at risk or in poor or declining health. In order to thoroughly assess the potential cumulative impacts to a resource, minor direct or indirect impacts to a resource considered to be at risk or in poor or declining health should be evaluated along with the effects of past, present, or reasonably foreseeable future actions to determine if such actions, when taken together, would pose a threat to the sustainability or health of that resource.

This analysis was developed using TxDOT’s *Cumulative Impacts Analysis Guidelines* (TxDOT 2014d) and TxDOT’s *Cumulative Impacts Decision Tree* (TxDOT 2014e), the answers for which are provided below.

1. Will the project have substantial direct or indirect impacts on any resource?

No. The proposed project would not result in substantial direct or indirect impacts to any resource. See **Table 1** for a summary of the anticipated direct and indirect impacts of the proposed project.

Table 1: Resources Considered in the Cumulative Effects Analysis

| Resource | Direct + Indirect Impacts | Issues Carried Forward |
|---|---|------------------------|
| Biological Resources (including Threatened and Endangered Species) | <p>The proposed project would result in removal and disturbance of vegetation within the existing right of way, which includes the following habitat types: Edwards Plateau: Savanna Grassland (13.28 acres), Edwards Plateau: Ashe Juniper Motte and Woodland (0.13 acres), Edwards Plateau: Deciduous Oak/Evergreen Motte and Woodland (2.62 acres), Edwards Plateau: Live Oak Motte and Woodland (0.28 acres), Edwards Plateau: Oak/Hardwood Motte and Woodland (0.17 acres), and Edwards Plateau: Post Oak Motte and Woodland (2.20 acres). Per the TxDOT-Texas Parks and Wildlife Department (TPWD) Memorandum of Understanding (MOU), these vegetation types convert to 18.68 acres of the Edwards Plateau Savanna, Woodland, and Shrubland vegetation type.</p> <p>The proposed project would have no effect on/impact to federally or state-listed listed threatened or endangered species.</p> <p>Up to approximately 19 acres of oak-juniper savanna within median areas would be cleared as a result of the proposed project. However, given the isolated and small patch size characteristics of the affected vegetation, coupled with the negative results in the 2014 presence-absence survey, no effects to the Golden-cheeked Warbler (<i>Setophaga chrysoparia</i>) are anticipated as a result of the proposed project.</p> | None |
| Water Resources | <p>The proposed project would result in a 7.7-acre increase in impervious cover, which could limit direct infiltration and direct and diffuse recharge of the Edwards Aquifer. However, impervious cover would be placed within the existing right of way. The proposed project would not require withdrawal or use of groundwater.</p> <p>In terms of water quality, the proposed project will comply with the Texas Commission on Environmental Quality's (TCEQ's) Edwards Aquifer Protection Rules. Implementation of Best Management Practices (BMPs) will be addressed in a TCEQ-approved Water Pollution Abatement Plan (WPAP), including post-construction run-off controls which would remove a minimum of 80% of the increase in total suspended solids (TSS) generated by increased impervious cover. The TCEQ-approved WPAP would also include a Geologic Assessment. Field investigations have identified the presence of one sensitive karst feature within the existing right of way. While the proposed project could result in an increased risk of impacts to the aquifer if voids connected to the aquifer or containing groundwater are intersected during the downcutting of</p> | None |

| Resource | Direct + Indirect Impacts | Issues Carried Forward |
|---|---|------------------------|
| | bedrock or other excavation activities during the construction phase, BMPs and other regulatory control measures would serve to avoid or minimize this risk. | |
| Socioeconomic Resources (including Traffic Noise Impacts) | <p>No impacts to community cohesion would occur as a result of the proposed project, and no displacements or relocations would be required for construction of the proposed improvements. Minor changes in travel patterns would occur, which would result in improved mobility within and through the project area. Minority or low-income populations would not undergo disproportionately high and adverse impacts as a result of the proposed project.</p> <p>Heavy machinery used in the construction phase of the proposed project would impact receivers along the project corridor. However, none of the receivers are anticipated to be exposed to noise for a long duration, and all construction would take place during daytime hours; therefore, no extended disruption of normal activities is expected. Traffic associated with the proposed project is anticipated to impact several receivers along the project corridor. Impacted receivers include both individual and groups of residential properties, parks, and Lady Bird Johnson Wildflower Center properties. Based on the <i>Traffic Noise Technical Memorandum</i>, three noise barriers were found to be both reasonable and feasible for incorporation into the Build Alternative.</p> | None |
| Air Quality | The proposed project is in an area considered to be in attainment for all the National Ambient Air Quality Standards (NAAQS). Potential minor increases in mobile source air toxics (MSAT) emissions under the Build Alternative would be offset by an overall decline in MSAT emissions anticipated to occur over the next several decades as a result of federal regulations for vehicle engines and fuels. Temporary increases in air pollution emissions (including MSAT emissions) during construction would be minimized through emission control measures and are not anticipated to result in substantial adverse effects to air quality. | None |
| Historic Resources | Any direct or indirect impacts to historic resources as a result of the proposed project are addressed through the coordination process under Section 106 of the National Historic Preservation Act (NHPA) of 1966. | None |
| Archeological Resources | Any direct or indirect impacts to archeological resources as a result of the proposed project are addressed through the Section 106 coordination process. | None |

2. Are any resources in the project area in poor or declining health?

Yes. The proposed project is located within an ecologically sensitive area in which groundwater quality within the Edwards Aquifer is considered to be “at risk.”

Federally and state-listed threatened and endangered species are, by definition, considered at-risk resources. However, as stated in the *Biological Resources Technical Memorandum*, the proposed project would have no direct or indirect effect on federally or state-listed threatened or endangered species. The potential for construction-phase impacts is discussed below as it relates to the proximity of habitat for the federally endangered Austin blind salamander (*Eurycea waterlooensis*) and Barton Springs salamander (*Eurycea sosorum*) and federally endangered karst invertebrates.

3. Will the project have ANY impact on a resource that is in poor or declining health?

No. Permanent direct or indirect impacts (including those related to induced growth) to sensitive resources are not anticipated to occur as a result of the proposed project. The only project-related actions that could possibly result in cumulative impacts to at-risk resources are construction-phase activities, adverse impacts of which are considered unlikely to occur. Based on TxDOT’s policy, the absence of direct and indirect impacts of a proposed project indicate that a cumulative impacts analysis is not required. Given the sensitive nature of the resources mentioned above, though, further discussion regarding the potential for construction-phase activities to result in any direct or indirect impact to at-risk resources is included below in order to more thoroughly examine if the project’s actions may push the ecosystem past its ability to sustain these at-risk resources.

The following considers the potential of any direct or indirect impacts that could occur during construction as well as the protections in place for these at-risk resources. However, based on the lack of any substantial direct or indirect impacts to any resource, along with the absence of any anticipated direct or indirect impacts to at-risk resources, cumulative effects are not anticipated.

Potential Construction-Related Effects to Groundwater and Federally Endangered Karst Species

Construction-related activities such as downcutting of bedrock below the current grade and other excavation activities could potentially result in discovery of voids connected to the Edwards Aquifer or containing groundwater. This could increase the potential for contamination of groundwater within the Edwards Aquifer, which feeds into Barton Springs and provides habitat for the federally endangered Barton Springs and Austin blind salamanders. Unanticipated discovery of voids could also increase the potential for impacts to federally endangered karst invertebrates, if habitat were present. However, these construction-phase impacts are considered merely possible, not probable, and are unlikely to occur given the BMPs and other regulatory procedures that would be in place for the proposed project. Based on the determinations made in the *Biological Resources Technical Memorandum*, the proposed project would have no effect on threatened or endangered species.

There is also potential for contaminants to reach sensitive habitat through Slaughter or Williamson Creeks or enter the aquifer via faults, fractures, or other unidentified recharge features. One karst feature was identified within the proposed project right of way: a zone of enlarged features considered to have high recharge potential within the bed of Slaughter Creek. Introduction of contaminants through this or other unidentified features could impact water quality within the subsurface drainage basin for Blowing Sink Cave, identified during City of

Austin delineations to be located within the proposed project area. Blowing Sink Cave contains a cave stream and provides habitat for the ground beetle (*Rhadine austinica*), a species of concern, and a recently identified probable population of the Barton Springs salamander (Chippindale 2014). However, as stated above, BMPs and other regulatory control measures would serve to avoid or minimize any potential risk to groundwater quality during the construction phase of the proposed project.

Avoidance and Minimization of Construction Impacts

Any impacts to groundwater would be negligible and would be further avoided or minimized through existing regulatory control measures. These include TCEQ's Edwards Aquifer Protection Rules, which require Edwards Aquifer Protection Plans to be submitted for all types of development where ground disturbance may have the potential to pollute the Edwards Aquifer and hydrologically connected surface streams (TCEQ 2005). A TCEQ-approved WPAP will be implemented for the proposed project and would include measures to address temporary and permanent erosion, sedimentation, and water quality.

The highest risk for negative ground water impacts is associated with the intersection of voids during roadway excavation. These impacts will be minimized and mitigated through project-wide awareness and education about the need to report void discoveries and implement protection measures to protect voids by covering them to prevent sediment introduction and desiccation. Permanent protection, if applicable, will be designed to maintain ground water flow to the extent practicable. Impacts to karst features will be closely monitored during construction.

If voids or water flow are encountered, 30 TAC 213.5(f)(2) requires that construction in the vicinity of the void cease. A geologist will evaluate the void and work with the design engineer, if necessary for structural concerns, to develop a void mitigation plan. The void mitigation plan must be certified by a geologist, submitted to TCEQ and approved prior to the implementation of mitigation and before continuing construction in the vicinity of the void. In addition, a Section 10(A)(1)(a) permitted scientist will inspect the site as soon as possible to evaluate potential for species habitat. If habitat for federally-listed endangered species is encountered, there may be an effect on those species. Construction will cease and coordination with USFWS will occur.

Overall, the Build Alternative would result in a net improvement in the amount of TSS removed from runoff leaving the project area when compared to the No-Build Alternative. In addition to existing hazardous materials traps, vertical sand filter systems, and extended detention basins, the Build Alternative would also incorporate new treatment measures from TCEQ's Low Impact Development Toolkit. Soil amendments intended to improve vegetation establishment, which would reduce the volume of runoff from the completed project, would be incorporated into the design of the proposed project. Also, four new clay-lined detention basins would be constructed to mitigate any increase in downstream flooding risks associated with the changes to drainage patterns and increases in impervious cover associated with the proposed improvements.

3.0 CONCLUSION

The construction-phase impacts discussed above are considered possible, but not probable, and are unlikely to occur given the BMPs and other regulatory procedures that would be in place for the proposed project. In the event that accidental void discovery does occur, the potential for adverse impacts to at-risk features would be avoided or minimized through the regulatory control measures discussed above, and it is unlikely that any impacts would exceed the carrying capacity of the ecosystem. Since the proposed project is not anticipated to result in direct or indirect impacts to at-risk resources, it is unlikely that the project would contribute to cumulative impacts to groundwater or federally or state-listed species, and no additional analysis is required.

4.0 REFERENCES

- American Association of State Highway and Transportation Officials (AASHTO). 2011. Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts Under NEPA. Center for Environmental Excellence by AASHTO. http://www.environment.transportation.org/pdf/programs/practitioners_handbook_12.pdf.
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