FINAL Environmental Impact Statement and Record of Decision

OAK HILL PARKWAY

U.S. Highway (US) 290/State Highway (SH) 71
West from State Loop 1 (MoPac) to West of
Ranch-to-Market Road (RM) 1826 and from US
290 to Silvermine Drive
Travis County, Texas
CSJ # 0113-08-060 and 0700-03-077

December 2018

Texas Department of Transportation

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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OAK HILL PARKWAY IMPROVEMENT PROJECT

U.S. HIGHWAY (US) 290/STATE HIGHWAY (SH) 71 WEST

FROM STATE LOOP 1 (MOPAC) TO WEST OF

RANCH-TO-MARKET ROAD (RM) 1826 AND FROM US 290 TO SILVERMINE DRIVE

TRAVIS COUNTY, TEXAS

CSJ: 0113-08-060 AND 0700-03-077

FINAL ENVIRONMENTAL IMPACT STATEMENT AND RECORD OF DECISION

Prepared by the

Texas Department of Transportation

Cooperating Agencies:
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service

12/21/2018

Date of Approval

Director, Environmental Affairs Division
Texas Department of Transportation

December 2018

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ABSTRACT: The Final Environmental Impact Statement (Final EIS) and Record of Decision (ROD) for this action has been prepared in compliance with 23 Code of Federal Regulations (CFR) §771, 23 CFR §774, 40 CFR §§1500–1508, and the requirements of the National Environmental Policy Act (NEPA), as amended. The Texas Department of Transportation (TxDOT) is proposing to improve U.S. Highway (US) 290/State Highway (SH) 71 West from State Loop 1 (MoPac) to west of Ranch-to-Market Road (RM) 1826 and from US 290 to Silvermine Drive in Travis County, Texas. The proposed project, known as the Oak Hill Parkway (OHP) Project, proposes improvements that include direct connectors at the intersection of US 290 and SH 71, controlled access along both highways in Oak Hill, and an overpass for US 290 at William Cannon Drive. The mainlanes would be three lanes in each direction with adjacent one-way, two- to three-lane frontage roads in each direction. Aesthetic enhancements and bicycle/pedestrian facilities along the corridor are also proposed. The *Preferred Alternative* for the OHP Project was identified as *Alternative A* as documented in the Draft EIS and has undergone minor refinements since the release of that document. *Alternative A* is the *Preferred Alternative* based on its ability to best accomplish the need for and purpose of the transportation improvements while minimizing impacts to social, economic, and environmental resources. The *Preferred Alternative* would require the taking of new right-of-way. It is estimated that approximately one single-family residence and four commercial displacements would be required. The evaluation of impacts to two federally listed salamanders is complete, including consultation with the U.S. Fish and Wildlife Service. A public hearing was conducted on May 24, 2018, which resulted in minor design changes to the *Preferred Alternative*. The Final EIS evaluates the social, economic, and environmental effects of the proposed roadway and includes an assessment of the impact of the proposed project on resources such as land use, farmlands, socioeconomics, air quality, noise, wetlands, floodplains, water quality, biological resources, cultural resources, hazardous/regulated materials, and visual aesthetics.

Under MAP-21 section 1319, TxDOT has issued a combined Final EIS and ROD. Therefore, the 30-day wait/review period under NEPA does not apply to this action.

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RECORD OF DECISION

1.0 Introduction

Pursuant to 23 United States Code (U.S.C.) 327 and the Memorandum of Understanding (MOU) executed by the Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT) (dated December 16, 2014), this Record of Decision (ROD) documents selection of the preferred alternative described in the Final Environmental Impact Statement (Final EIS) for the Oak Hill Parkway Project (OHP Project), also known as the U.S. Highway (US) 290/State Highway (SH) 71 West Project. The OHP Project would extend from State Loop 1 (MoPac) to west of Ranch-to-Market Road (RM) 1826 and from US 290 to Silvermine Drive. As shown on **Figure ROD-1**, *Alternative A* has been identified as the *Selected Alternative* for the OHP Project ROD.

Based on the Capital Area Metropolitan Planning Organization (CAMPO) Regional Transportation Plan (RTP), the total project cost is $545.30 million. The estimated construction cost is $440 million. Funding from the city of Austin's 2016 Mobility Bond is planned to be invested in several projects within the project area. The bond would also provide $8 million in funding for a regional mobility project in the project area and for the design and replacement of the Old Bee Cave Road bridge crossing Williamson Creek. The project will not be tolled.

The Final EIS discusses the need and purpose for the OHP Project in **Section 2**; the alternatives considered throughout the environmental analysis process in **Section 3**; notable environmental resources and consequences and indirect and cumulative effects of the OHP Project in **Sections 4–6**; and public and agency coordination in **Section 7**. The Final EIS also documents TxDOT's response to comments received on the Draft Environmental Impact Statement (Draft EIS) from the participating agencies, cooperating agencies, and the public, where applicable.

Selection of *Alternative A* as the *Selected Alternative* is based upon its ability to best meet the need and purpose of the project. The *Selected Alternative* has been refined through public and agency input in an effort to minimize and avoid impacts to the natural and human environment, including indirect and cumulative impacts.

The basis for this ROD is supported by the information provided in the following documents:

- Oak Hill Parkway Draft EIS (April 2018)
- Oak Hill Parkway Final EIS (December 2018)
- All technical reports and supporting documentation incorporated by reference into the Draft EIS and Final EIS
- Associated administrative record
- Public Hearing Summary Report which includes input received from the public and from local, state, and federal agencies

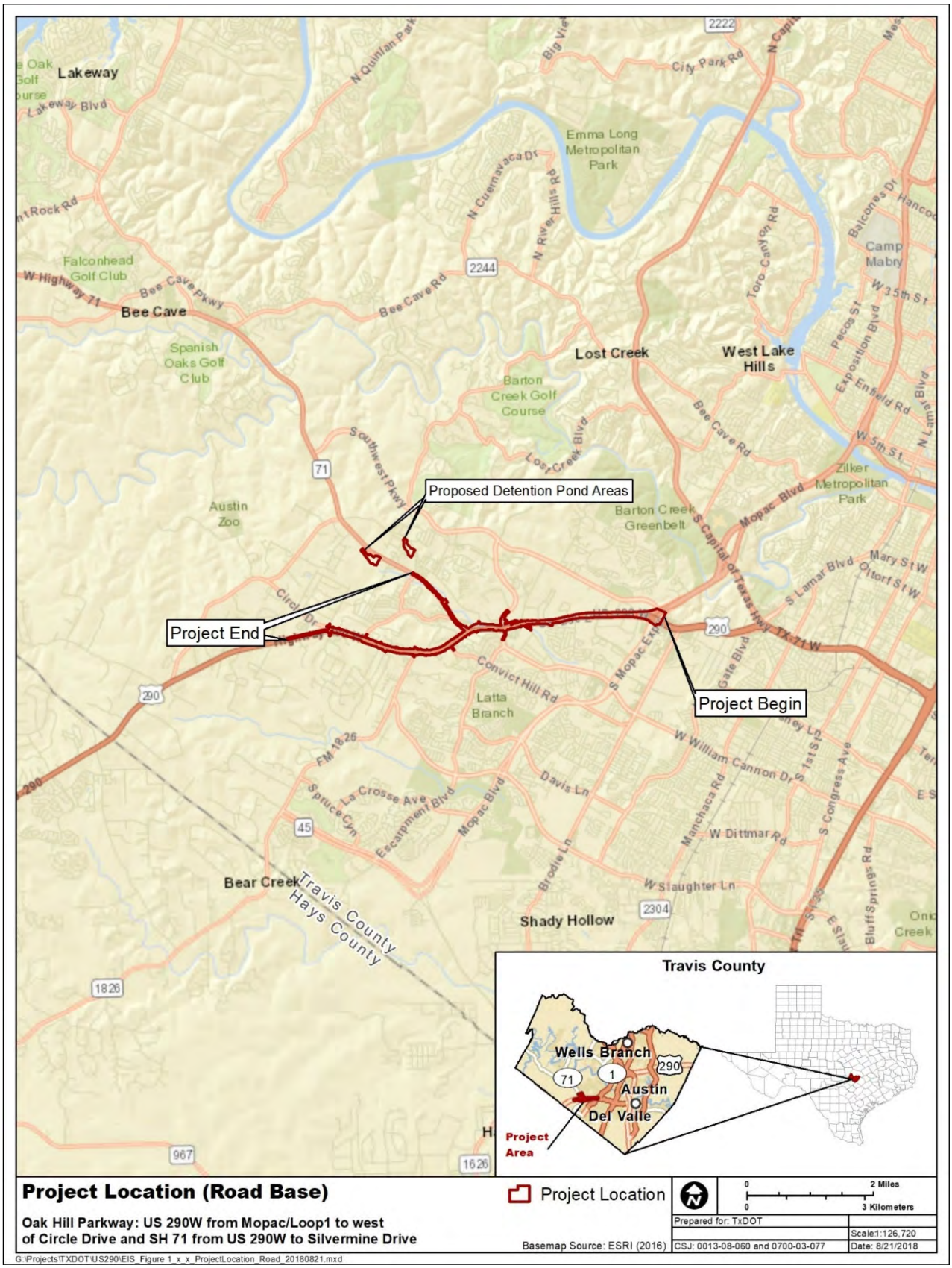

Figure ROD-1. OHP Project area.

TxDOT has determined that a combined Final EIS/ROD is appropriate for this project because the Final EIS does not (1) make substantial changes to the proposed action that are relevant to environmental or safety concerns, or (2) include significant new circumstances or information relevant to environmental concerns that bear on the proposed action or the impacts of the proposed action.

In combining the Final EIS and ROD to meet the statutory provisions and expedite project delivery under the Moving Ahead for Progress in the 21st Century Act (MAP-21) (Pub. L 112–141, 126 Stat 405, Section 1319[b]), TxDOT has considered the facts and circumstances relevant to the EIS process. In doing so, TxDOT has determined that (1) there are no additional coordination activities that were not already known when the Draft EIS was available; (2) there are no unresolved interagency disagreements over issues that need identification in the Final EIS under 23 Code of Federal Regulations (CFR) 771.125(a)(2); (3) the Draft EIS identified a properly evaluated *Selected Alternative*; and (4) there is no compliance issue with any substantive requirement that must be resolved before issuance of the ROD, or that TxDOT wants to resolve before signing the ROD, that would merit deferring issuance of the Final EIS.

In accordance with 40 CFR 1505.2(b), a ROD must identify the alternative or alternatives that were considered to be environmentally preferable. As explained by the Council on Environmental Quality (CEQ), the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act (NEPA). Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources. (See the definition of "environmentally preferable alternative," Question 6a, published in the CEQ's "Forty Most Asked Questions" [46 *Federal Register* 18026, March 23, 1981].) As discussed in **Section 3** of the Final EIS, TxDOT evaluated each of the alternatives and identified the environmental impacts associated with each alternative. The *Selected Alternative* must:

- Best manage the projected CAMPO traffic projections in 2040
- Best meet the purpose and need of the project
- Must not have adverse effects on historical properties, endangered species, or parkland
- Meet state water quality standards
- Abate noise where it is reasonable and feasible
- Meet safety standards set by FHWA

Having considered the environmental record noted above, the mitigation measures as required herein, the public and agency comments on this record, and the written responses to these comments, TxDOT has determined that *Alternative A*, as presented in the Draft EIS, is also the *Environmentally Preferred Alternative* because *Alternative A* has fewer social, economic, and environmental impacts than the other evaluated alternatives. Measures of

effectiveness are identified by alternative in **Section 3**. In summary, among the alternatives evaluated, *Alternative A* includes the following:

- Adds fewer at-grade crossings of shared-use path and streets, and therefore minimizes conflicts between pedestrians/bicyclists and motor vehicles
- Proposes fewer linear feet of access points in/out, and therefore minimizes impacts to community cohesion/access
- Proposes fewer linear feet of elevated structures, and therefore minimizes aesthetic and visual impacts
- Affects fewer streams and water bodies within the right-of-way

For these reasons, *Alternative A* was chosen as the *Selected Alternative* for the OHP Project. TxDOT has found that all practicable measures to minimize environmental harm have been incorporated into the design of the *Selected Alternative*. TxDOT will ensure that the commitments outlined herein will be implemented as part of the design, construction, and post-construction monitoring phases. TxDOT has also determined that this decision is in the best overall interest of the public.

2.0 Purpose and Need

Congestion has reduced mobility and the quality of life in Oak Hill and surrounding communities. Oak Hill is the location of the intersection of two major highways, US 290 and SH 71; the neighborhood is a gateway to southwest Travis County and serves as a key route between Central Austin and fast-growing suburban and rural communities such as Lakeway, Bee Cave, Dripping Springs, and Johnson City. US 290 is one of Texas' most congested highway corridors, and due to a lack of reliable connectivity, US 290 has become an unreliable route for both transit and emergency vehicles.

The proposed project is needed because population growth in Travis County has increased roadway congestion, which has caused a decreased level of service and increase in travel time throughout the US 290/SH 71 project area. The proposed project is also needed to increase safety for the traveling public and create a more reliable connection through the corridor for citizens, transit, and emergency vehicles.

The purpose of the proposed project is to improve mobility and operational efficiency, facilitate long-term congestion management in the corridor by accommodating the movement of people and goods for multiple modes of travel, and improve safety and emergency response throughout the project area. See **Section 2** in the Final EIS and Section 2 of the Draft EIS for a detailed discussion of the proposed project's purpose and need.

3.0 Alternatives Considered

The alternative analysis approach developed for the Draft EIS allowed for a full comparison and evaluation of alternatives through an iterative series of phases which led to the selection

of a single *Selected Alternative.* This alternative would best meet the need and purpose of the proposed OHP Project and would best avoid or minimize environmental impacts in the project area. The project team developed mobility improvement concepts and a methodology for screening the concepts through a collaborative approach with the public. The concepts represented a range of reasonable alternatives as required by NEPA. The preliminary concepts were presented to the public during numerous public involvement activities. This process involved initial scoping discussions, collaboration on concepts to be evaluated and the project's purpose and need, evaluation of the concepts through a screening process, and carrying forward for further study the concepts that best met the purpose and need. Through these collaborative efforts with the community as well as ongoing technical analysis, the mobility concepts were narrowed from 12 to 2. *Alternatives A* and *C* were reevaluated in detail in the Draft EIS. The *No Build Alternative*, or "Do Nothing Alternative," was also carried forward and served as a baseline for analysis, as required by NEPA.

Beginning in 2012, TxDOT and the Central Texas Regional Mobility Authority (Mobility Authority) held a series of public meetings, online open houses, stakeholder meetings, and workshops to encourage the public to provide input concerning the development of concepts for the proposed project and to ensure that the screening criteria for selecting alternatives were appropriate. An initial 12 concepts and the draft screening criteria were presented to the public during an open house in October 2013. **Table ROD-1** summarizes the concepts that were developed as possible alternatives for the proposed project. Since March 2018, when TxDOT decided to move forward with the OHP Project as a non-tolled project, the Mobility Authority has transitioned from a co-lead agency with TxDOT to a participating agency for the remainder of the project.

The project team utilized a three-phased approach to narrow the initial 12 concepts down to the *Selected Alternative*. Phase 1 focused on whether a concept met the project's purpose and need, and based on input from the public, eliminated 4 of the initial 12 concepts. Phase 2 evaluation assessed the 8 remaining concepts by using detailed traffic modeling techniques and quantifiable impacts such as the number of displacements, impacts on transit, access modifications, preliminary cost, and right-of-way needs. This effort resulted in the reduction of the number of remaining concepts from 8 to 3 (**Table ROD-1**), including Concept A, Concept C (hereafter referred to as *Alternative A* and *Alternative C*), and the *No Build Alternative*. Phase 3 evaluated the remaining three concepts using equivalent levels of detail, including performance measures to address mobility, cost, human environment, cultural, and natural resource impacts. This third set of criteria was presented to the public and the participating agencies for comment in June 2014 and January 2015. The project team further refined the third set of criteria once the technical studies had been completed and used this information to help select the *Selected Alternative*.

Table ROD-1. Summary of Possible Alternative Concepts

Concept Name	Description	Evaluation Results
NEPA-Required No Build Alternative		
No Build Alternative	Includes the continuous-flow intersections constructed by the city of Austin and TxDOT and all other projects in the CAMPO 2040 transportation plan.	Carried forward through all phases as required under NEPA.
2007 Alternative		
2007 Alternative	Conventional highway with frontage roads and direct connectors at the US 290/SH 71 intersection (the "Y"). This alternative was developed from the Mediation Process.	Eliminated from consideration in Phase 2.
Non-Capital-Intensive Strategies		
Transportation System Management (TSM)	Includes a collection of low-cost (non-capital-intensive) strategies to enhance safety, reduce congestion, and improve traffic flow. Specific strategies include traffic signal synchronization, freeway operations improvements (changeable message signs and ramp metering), and incident management (clearing accidents and breakdowns quickly to allow traffic to move more smoothly). Other methods can include bus pullouts (to remove stopped buses from the traffic stream), intersection improvements (signal priority for transit vehicles), and queue jumper lanes (to get transit vehicles to the front of the line at intersections). Would not increase the overall capacity of US 290 or SH 71, although it would address some access/egress issues and other minor safety and operational issues. TSM could be incorporated as an enhancement into any of the other build concepts.	Eliminated from consideration in Phase 1.
Transportation Demand Management (TDM)	Includes managing or decreasing the demand for auto-related travel by using a variety of measures to increase the operating efficiency of transportation facilities. This typically includes alternatives to single-occupant vehicles (transit, carpool, vanpool, bicycle), incentives/disincentives (congestion pricing, High-Occupancy Vehicle [HOV] lanes, travel-time advantages for HOVs), alternative work environments (telecommuting and flex time), and parking management. TDM strategies would improve the existing transportation system. This concept would not increase the overall capacity of US 290 and SH 71, though it would address some issues associated with access/egress and other minor safety and operational issues. TDM could be incorporated as an enhancement in any of the other build concepts.	Eliminated from consideration in Phase 1.

Concept Name	Description	Evaluation Results
Controlled-Access Concepts		
Concept A	US 290 depressed mainlanes • Conventional controlled-access highway with frontage roads • Westbound US 290 frontage road west of William Cannon Drive on the north side of Williamson Creek • Depressed US 290 mainlanes under SH 71 • Direct connector ramps at the "Y" • Single-point flying-T intersection for the frontage roads at the "Y"	Carried forward through all phases. One of two concepts that best meets all aspects of the project's purpose and need.
Concept B	US 290 mainlanes north of creek without direct connectors • Conventional controlled-access highway with frontage roads • US 290 mainlanes west of William Cannon Drive on the north side of Williamson Creek • US 290 frontage roads between William Cannon Drive and the "Y" along existing US 290 • The continuous-flow intersection at William Cannon Drive and US 290 would remain • No direct connector ramps at the "Y" • Single-point flying-T intersection for the frontage roads at the "Y"	Eliminated from consideration in Phase 2.
Concept C	US 290 mainlanes north of creek with direct connector ramps • Same as Concept B except direct connector ramps are added at the "Y"	Carried forward through all phases. One of two concepts that best meets all aspects of the project's purpose and need.
Concept D	US 290 express lanes with frontage roads • Two lanes in each direction constructed in the center of what would ultimately be a controlled-access facility • The express lanes would extend from MoPac to the west end of the project with access limited to each end and possibly one other location for special use, such as access for the Capital Metropolitan Transportation Authority's (Capital Metro's) new park and ride, Austin Community College (ACC), and Seton Southwest Hospital in the vicinity of RM 1826/Convict Hill Road • Express lanes would be grade separated from the crossing streets • Single-point flying-T intersection for the frontage roads at the "Y"	Eliminated from consideration in Phase 2.
Minimum Improvement Concepts		
Concept E-1	Focus on providing US 290 grade separations at William Cannon Drive and improvements for SH 71. Would include studying William Cannon Drive over US 290.	Eliminated from consideration in Phase 1.
Concept E-2	Focus on providing US 290 grade separations at William Cannon Drive. Would include studying William Cannon Drive over US 290.	Eliminated from consideration in Phase 1.

Concept Name	Description	Evaluation Results
Parkway Concept		
Concept F	Developed based on input from the public • Non-continuous frontage roads • An at-grade intersection at SH 71	Eliminated from consideration in Phase 2.
Localized Design Options		
Option 1	Extend west transition past Circle Drive • Can be included with Concepts A through D and Concept F	Incorporated into the design concepts carried forward.
Option 2	Provide a westbound US 290 exit ramp to RM 1826 that is braided with an entrance from SH 71 • Would provide better access for ACC • Can be included with Concepts A, B, C, and F	Incorporated into the design concepts carried forward.

Source: Project Team, 2017.

4.0 *Selected Alternative*

The two *Build Alternatives* (*Alternatives A* and *C*) and the *No Build Alternative* were evaluated throughout the Draft EIS process in terms of their effects on the natural and human environments, as well as their ability to meet the proposed project's purpose and need.

Alternative A was identified as the *Selected Alternative* for implementation because it meets the purpose and need of the proposed project by: facilitating long-term congestion management along the US 290/SH 71 corridor by accommodating the movement of people and goods for multiple modes of travel, improving mobility and operational efficiency, and improving safety and emergency response time. In addition to meeting the purpose and need, *Alternative A* has fewer social and environmental impacts than *Alternative C*. Measures of effectiveness are identified by alternative in **Section 3** of the Final EIS.

5.0 Measures to Minimize Harm

Efforts have been made in the planning process to avoid adverse impacts to the natural and human environment. The process included engaging the public and stakeholders in the planning and design phases of the OHP Project. **Table ROD-2** summarizes the environmental impacts, commitments, and measures to minimize or avoid harm related to construction of the OHP Project *Selected Alternative*. The results summarized in the table are expanded upon throughout the Final EIS.

Table ROD-2. Summary of Environmental Consequences, Commitments, and Measures to Minimize or Avoid Harm for the *Selected Alternative*

Resource	Impact	Permits, Commitments, and Mitigation
Transportation System	The Oak Hill Park & Ride will no longer operate or provide service at its existing location at US 290/SH 71 and William Cannon Drive. Access to and from some area roadways and neighborhoods onto US 290 and SH 71 would change with implementation of the *Selected Alternative*, and the function of some driveways would be eliminated or changed (two-way access to the facility changing to one-way access). Local travel times are not anticipated to increase by more than two to three minutes at certain locations. Overall travel times through the corridor are anticipated to decrease due to the additional roadway capacity and reduction of traffic congestion.	New park and ride locations are being identified by Capital Metro as part of their initiative to develop park and ride facilities throughout the Austin region. At this time, only dedicated bus turnouts are part of the project
Geologic and Soil Resources	A total of six geologic features, four of which were evaluated as sensitive, were documented within the *Selected Alternative* alignment. Construction activities may expose geologic units encountered during construction to erosion. Several prime farmland soils are mapped within the proposed alignment. The project area is located within a census-designated urbanized area (U.S. Census Bureau, 2010); therefore, this project is not subject to the conditions of the Farmland Protection Policy Act, and no regulatory protection of prime farmlands is afforded. The proposed project would not result in any impact to hydric soils.	Due to the net decrease in annual total suspended solids (TSS) loading that will occur with the *Selected Alternative*, some water quality impacts could be mitigated. A Water Pollution Abatement Plan (WPAP) would be required for the proposed project and would address potential impacts to water quality and quantity associated with karst features. Approval of the WPAP by the Texas Commission on Environmental Quality (TCEQ) would be required before initiation of project construction. Best management practices (BMPs) would minimize impacts to soil compaction, erosion, or sedimentation. A stormwater pollution prevention plan will be prepared prior to construction.

Resource	Impact	Permits, Commitments, and Mitigation
Relocations	It is estimated that approximately one single-family residence and four commercial properties would be displaced.	TxDOT offers relocation counseling and financial assistance to residences and businesses that are displaced by the acquisition of highway right-of-way in accordance with the Federal Uniform Relocation and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).
Environmental Justice	The *Selected Alternative* would not be expected to change the demographics of the project area or disproportionately or adversely affect environmental justice communities.	None.
Community Facilities and Cohesion	The *Selected Alternative* would not be expected to negatively affect community cohesion.	The addition of a shared-use path throughout the corridor would improve access for pedestrians and bicyclists.
Bicycle and Pedestrians	The *Selected Alternative* would add 19 at-grade crossings of shared-use path and streets.	The *Selected Alternative* will accommodate all existing and anticipated future crossings for both pedestrians and bicyclists at intersections, bridges, and over/underpasses. Striped bicycle lanes on cross streets would be implemented to allow for safe travel across US 290 at Circle Drive, Scenic Brook Drive, Convict Hill Road, William Cannon Drive, and RM 1826. There would be a similar bicycle lane at SH 71 and Scenic Brook Drive. Additionally, the project would provide approximately 7 miles of 6-foot-wide continuous sidewalks along the corridor; these sidewalks would be compliant with requirements in the Americans with Disabilities Act.
Air Quality	Local concentrations of carbon monoxide are not expected to exceed national standards at any time. Mobile source air toxics emissions are expected to decrease by 76 percent from 2015 to 2040 with the *Selected Alternative*. Based on the nature of greenhouse gas (GHG) emissions and small potential GHG impacts of the project, the *Selected Alternative* would not result in reasonably foreseeable significant adverse impacts on the human environment.	The potential impacts of PM emissions would be minimized by using fugitive dust control measures contained in standard specifications, as appropriate. The construction contract requires compliance with any applicable air quality regulatory requirements that apply to construction activities.

Resource	Impact	Permits, Commitments, and Mitigation
Traffic Noise	Traffic noise impacts would occur at 122 representative receivers in the project area.	Four traffic noise barriers are proposed to mitigate traffic noise for 50 representative receivers, benefiting an estimated 97 receivers. The noise barrier walls will be presented to the affected property owners during a noise workshop, and property owners will have the opportunity to vote for or against the proposed walls.
Water Quality	The *Selected Alternative* would result in a 74-acre increase in impervious surface over the water quality study area. It is anticipated to cross 11 surface streams or tributaries. Preliminary design indicates that the *Selected Alternative* would require the placement of approximately 167 columns within the Recharge Zone. Columns would reach depths between 19 and 33 feet and have limited potential to reach the aquifer. One U.S. Geological Survey (USGS) surface water monitoring station (Williamson Creek) would be relocated as a result of construction of the *Selected Alternative*. The *Selected Alternative* would have a nominal impact to regional groundwater resources and is not anticipated to impact any known groundwater wells.	TxDOT has committed to achieving a net decrease in annual TSS loading for the OHP Project. In the preliminary design of the preferred alternative, 2 upstream detention ponds, up to 17 water quality ponds, and permeable friction course pavement are proposed. During final design, the ultimate number and configuration of BMPs may be revised as necessary to maintain the commitment to a net decrease. As a result of on-going coordination with the city of Austin, TxDOT has also committed to working with the city of Austin during the final design phase of water quality facilities for the project to investigate possible enhancements to water quality. The contractor will work with the city of Austin and the USGS to identify a new location for the Williamson Creek monitoring station.
Wetlands and Other Waters of the U.S.	The *Selected Alternative* may impact up to 0.03 acres of wetlands and would cross 11 potentially jurisdictional streams/tributaries. A total of approximately 3.58 acres of linear waters/ponds occurs within the alignment. The *Selected Alternative* would not impact any navigable waterways or waters subject to the ebb and flow of the tide.	Efforts made during the planning stages to avoid impacts to waters of the U.S would continue during final design. Larger waters of the U.S. would likely be bridged, and smaller waters of the U.S. could either be bridged or placed within culverts. Exact fill types and amounts would be determined once design is finalized and would likely be authorized under a nationwide permit from the U.S. Army Corps of Engineers (USACE). Once design has been advanced and right-of-entry is obtained, a final wetland/waters of the U.S. delineation would be conducted to identify the appropriate level of USACE permitting and determine whether mitigation would be required. A water quality certification, as required by Section 401 of the Clean Water Act, would be assessed by the TCEQ as part of USACE's permit review process.

Resource	Impact	Permits, Commitments, and Mitigation
Floodplains	The *Selected Alternative* intersects the 100-year floodplains designated by the Federal Emergency Management Agency (FEMA) associated with Devil's Pen Creek and Williamson Creek and its tributaries. There are approximately 69.32 acres of FEMA-mapped floodplains within the *Selected Alternative* alignment. It is anticipated that approximately 2,933 cubic yards of concrete would be removed from the 25-year floodplain of Williamson Creek.	Two upstream detention ponds are included in the *Selected Alternative* design. It is anticipated that all bridge support structures (e.g., piers and abutments), roadways, and culverts would be designed to avoid causing an increase in the base flood elevation that would violate applicable floodplain regulations. Coordination with the local floodplain administrator would be required. The project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. The hydraulic design would be in accordance with current TxDOT and FHWA policies and standards.
Vegetation and Wildlife	Construction of the *Selected Alternative* would unavoidably impact vegetative communities. An analysis of the vegetation types as mapped by the Texas Parks and Wildlife Department's (TPWD) Ecological Mapping Systems of Texas revealed that approximately 50 percent of the proposed OHP Project area is listed as Urban and 50 percent is a mixture of mixed woodlands, grassland, riparian vegetation, and native invasive shrublands. The *Selected Alternative* would convert approximately 120.55 acres of non-urban vegetation to transportation use. Construction activities would permanently remove both the urban and non-urban vegetation communities within the limits of construction and replace each with additional impervious surface and maintained herbaceous species. A number of large trees throughout the existing and proposed right-of-way would be removed in order to accommodate the *Selected Alternative*. Construction of the *Selected Alternative* would directly impact any animals that reside within the path of the proposed roadway improvements. As with the vegetation, wildlife communities would be impacted by the permanent loss of habitat.	TxDOT coordinated with the TPWD during the Draft EIS process pursuant to the TxDOT-TPWD MOU. TxDOT has committed to minimizing impacts to vegetation as practicable throughout the project area. Native plant species would be used in landscaping and in the seed mixes where practicable following construction activities. Soil disturbance would be minimized in the right-of-way in order to minimize invasive species establishment. Following construction, landscaping of the area would be in accordance with Executive Order 13112 on invasive species and the Executive Memorandum on beneficial landscaping. Vegetation within the project right-of-way would be maintained according to standard TxDOT practices. TxDOT is committed to protecting the following iconic trees: "Beckett Grove Tree," "Grandmother Oak," "Grandfather Oak," and "the Nieces" during construction of the *Selected Alternative*. TxDOT will coordinate with the city of Austin arborist on tree and natural area protection requirements and include these and other BMPs in the Aesthetics Guidelines package. Impacts to wildlife and habitat resources will be minimized through the use of a combination of landscaping and preservation recommendations and BMPs.

Resource	Impact	Permits, Commitments, and Mitigation
Migratory Bird Treaty Act	Suitable habitat for migratory birds occurs within the woodland, grassland, riparian, and urban landscapes of the project area. Evidence of nesting birds was noted in several culverts and under bridges within the project area.	All efforts will be taken to avoid protected birds, active nests, eggs and young in the construction process. Unavoidable vegetation should only be removed between September 16 and February 28. Contractors will be prepared to prevent migratory birds from building nest structures on bridges between March 1 and September 15.
Threatened and Endangered Species	Potential habitat for state and federally threatened and endangered species could occur in or near the project area. TxDOT concluded that the project had the potential to affect, but not adversely affect the Barton Springs salamander (BSS; *Eurycea sosorum*) and Austin blind salamander (ABS; *Eurycea waterlooensis*). TxDOT completed informal consultation in December 2017 with the U.S. Fish and Wildlife Service (USFWS) and received concurrence on the above effect determinations. No state-listed or federally listed species were identified within the project area during field investigations.	According to the December 20, 2017, concurrence letter from the USFWS, no further endangered species consultation will be required unless: (1) the identified action is subsequently modified in a manner that causes an adverse effect on any listed species or designated critical habitat, (2) new information reveals that the identified action may affect federally protected species or designated critical habitat in a manner or to an extent not previously considered, (3) a new species is listed or a critical habitat is designated under the Endangered Species Act that may be affected by the identified action, (4) additional federally protected species are identified in the project area, or (5) the project is not completed within four years of the date of the consultation. Several voluntary conservation measures were identified to minimize or avoid effects to listed species and would be included in the final project design. New information regarding the distribution of the BSS was published in March 2018 and TxDOT coordinated with the USFWS regarding this new occurrence data in November and December 2018. In light of this new information and TxDOT's commitment to the net reduction of TSS leaving the site, USFWS agreed that their December 20, 2017 concurrence letter remains valid. For state-listed species, TPWD reviewed and commented on the Draft EIS, which served as coordination under the TxDOT-TPWD MOU. BMPs to minimize impacts to state-listed species were identified during coordination and would be included in the final project design. Prior to construction, additional field reconnaissance would be conducted to assess whether any species or rare habitat communities would be impacted in areas that had not been previously studied.

Resource	Impact	Permits, Commitments, and Mitigation
Cultural Resources	In all, 54 archaeological sites are located within the 1-kilometer (0.62-mile) archeological project area (including 4 sites within the area of potential effects [APE]), and 6 cemeteries. There is little to no potential for encountering intact archeological deposits within the existing right-of-way or accessible portions of proposed right-of-way. In all, 51 historic-age resources (constructed prior to 1974) located on 39 parcels within the variable APE were documented. Three resources and one historic district were determined eligible for National Register of Historic Places (NRHP) listing. There would be no direct and no adverse indirect effects to the NRHP eligible properties and historic district. The 1969 historical marker for Oak Hill would be impacted by the proposed project.	The Texas State Historic Preservation Office (SHPO) has concurred with TxDOT recommendations that no further work or consultation is required for the surveyed portion of the APE. Due to right-of-way issues, approximately 52.10 acres still require an archeological assessment. TxDOT shall ensure that all archeological assessments as well as Section 106 and Antiquities Code of Texas consultation are completed prior to the commencement of construction within the remaining unsurveyed acres of proposed new right-of-way/easements. Additional Section 106 consultation will be required for areas where right-of-entry was not previously allowed. The SHPO has concurred with TxDOT determinations regarding NRHP eligibility and effects to historic properties. The THC has approved TxDOT's request to relocate the 1969 historical marker for Oak Hill to a new location approximately 500 feet east along the shared-use path near the northwest corner of US 290 and William Cannon Drive.
Hazardous Materials	The proposed project has the potential to impact 13 sites. One of the commercial properties, the Speedy Stop gas station and convenience store (Circle K 3276), is listed in the Petroleum Storage Tank and Leaking Petroleum Storage Tank databases. It is anticipated that contaminated soil and/or contaminated groundwater could be encountered during construction.	Special provisions or contingency language will be included in the project's plans, specifications, and estimates to handle hazardous materials and/or petroleum contamination according to applicable federal and state regulations. The underground storage tanks would be addressed during the right-of-way acquisition process following normal TxDOT right-of-way procedures. It is recommended that a Phase I Environmental Site Assessment conforming to American Society for Testing and Materials standards be completed prior to any property acquisition. For any structures that may have asbestos-containing materials, asbestos inspections, specification, notification, license, accreditation, abatement, and disposal will comply with state and federal regulations and will be addressed during the right-of-way acquisition process.

Resource	Impact	Permits, Commitments, and Mitigation
Visual and Aesthetic Qualities	Certain design characteristics (e.g., elevated structures/bridges, signs, and lights) could have a visual/aesthetic impact on the surrounding area. The *Selected Alternative* would alter the appearance of the wooded and suburban setting of the project area. The most visually significant impact of the *Selected Alternative* is located at the US 290/SH 71 interchange where the US 290 mainlanes would be depressed. Overall, the proposed OHP Project would be as aesthetically pleasing as possible to minimize any perceived visual intrusion.	Design and construction of the *Selected Alternative* would be consistent with TxDOT design standards and would incorporate several context sensitive solutions identified during public outreach opportunities. A project-specific Aesthetics Guidelines package will be prepared.
Energy	The *Recommended Alternative* would increase access, decrease travel times, and ease congestion in nearby areas to offset any initial construction energy use.	None.

Construction Impacts	Detours and Access Construction activities would temporarily affect vehicular traffic along US 290, SH 71, RM 1826, all intersecting and adjacent roadways, and driveways, and could also cause delays.	The contractor will maintain the necessary number of barricades, signs, flags, and traffic barriers to direct vehicular traffic away from construction areas. Changes in traffic patterns would be communicated by roadside signs and displays and communicated to emergency responders (police, fire, EMS, and others) and public service providers prior to implementation. A detailed traffic control plan will be developed to minimize traffic disruption and describe how access would be maintained for vehicles, pedestrians, and bicyclists during construction. Access to adjacent properties would remain open through all phases of construction. Existing traffic lanes would remain open at all times with the exception of short-term, off-peak periods as necessary to provide for the safe implementation of traffic control devices or short-term construction activities. Expedited bridge building techniques such as prefabrication and night-time working hours can be used if necessary. At this time, only minor detours between existing roadways and new pavement are anticipated; however, if extensive detours are determined to be necessary, approval from TxDOT would be obtained prior to implementation. Traffic control during construction will follow the Texas Manual on Uniform Traffic Control Devices and TxDOT's Work Zone Standards.
	Utilities Construction may temporarily affect utilities (i.e., water, sewer, electrical, and natural gas lines).	The contractor would contact the appropriate local officials to identify and locate all utility lines within the right-of-way and construction staging areas. The contractor would also coordinate a work schedule that would avoid and minimize any disruption to utility services during construction.
	Geology A total of six geologic features, four of which were evaluated as sensitive, were documented within the *Selected Alternative* alignment. Construction activities may expose geologic units encountered during construction to erosion.	A WPAP would address potential impacts to water quality and quantity associated with karst features. Approval of the WPAP by the TCEQ would be required before initiation of project construction. Best management practices (BMPs) would minimize impacts to soil compaction, erosion, or sedimentation.
	Air Temporary increases in particulate matter (PM) and mobile source air toxics (MSAT) emissions may occur from construction activities. The primary construction-related emissions of PM are fugitive dust from site preparation. The primary construction-related emissions of MSAT are diesel PM from diesel-powered construction equipment and vehicles.	The potential impacts of PM emissions would be minimized by using fugitive dust control measures contained in standard specifications, as appropriate. The Texas Emissions Reduction Plan (TERP) provides financial incentives to reduce emissions from vehicles and equipment. TxDOT encourages construction contractors to use this and other local and federal incentive programs to the fullest extent possible to minimize diesel emissions. Information about the TERP program can be found at: http://www.tceq.state.tx.us/implementation/air/terp/.

Resource	Impact	Permits, Commitments, and Mitigation
	Noise Heavy machinery is a major source of noise in construction; however, it is temporary and would normally only be experienced during daylight hours. None of the modeled noise receivers would be expected to be exposed to an inordinate amount of noise as a result of construction activities.	The contractor would make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of construction equipment.
Indirect and Cumulative Effects	The proposed project is not anticipated to generate significant induced development. Based on input from planning professionals and a cartographic assessment, approximately 10,192 acres of land have indirect induced growth potential within the Area of Influence (AOI); this future development is considered possible but not necessarily probable. The identified indirect effects do not conflict with the various goals of planning and conservation entities in the AOI; are not expected to substantially worsen the condition of a sensitive resource; would not delay or interfere with habitat conservation planning efforts or species recovery efforts for sensitive species; would not eliminate a valued, unique, or vulnerable feature; and are not inconsistent with applicable laws. Implementation of the *Selected Alternative* would add a total of approximately 74 acres of impervious cover within the water quality study area. The proposed project, in conjunction with other past, present, and reasonably foreseeable future projects, may contribute to cumulative impacts but is not likely to cause significant cumulative impacts to the resources assessed in this analysis—water quality (surface water and groundwater) and federally threatened and endangered species.	None.

Source: The Oak Hill Parkway Project Team, 2018.

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6.0 Monitoring and Enforcement

TxDOT is ultimately responsible for monitoring and enforcing mitigation measures. In addition, TxDOT and the contractor are responsible for compliance assurance of all related commitments and regulatory permit conditions made or obtained for the *Selected Alternative*. TxDOT will require the contractor to prepare an Environmental Compliance Management Plan to ensure compliance with all applicable environmental rules and commitments. A third-party environmental compliance manager will be required; this manager will monitor the contractor's daily activities and will oversee those aspects of construction that may result in offsite impacts. The environmental compliance manager will report to TxDOT (the project owner) rather than the contractor.

7.0 Section 4(f)

Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 prohibits the Federal Transit Authority and other USDOT agencies from using land from publicly owned parks, recreation areas (including recreational trails), wildlife and waterfowl refuges, or public and private historic properties, unless there is no feasible and prudent alternative to that use and the action includes all possible planning to minimize harm to the property resulting from such a use (see 23 CFR Part 774). Section 4(f) protected resources within the project area were evaluated and found not to have any bearing on the proposed project; as such, a Section 4(f) analysis was not required.

8.0 Conclusion

The environmental record for this decision includes the following documents:

- The Oak Hill Parkway Draft EIS (April 2018)
- The Oak Hill Parkway Final EIS (December 2018)
- All technical reports and supporting documentation incorporated by reference into the Draft EIS and Final EIS

These documents, incorporated here by reference, constitute the statements required by NEPA and Title 23 of the U.S.C. on the following topics:

- The environmental impacts of the project
- The adverse environmental effects that cannot be avoided should the project be implemented
- Alternatives to the proposed project
- Irreversible and irretrievable impacts on the environment that may be involved with the project should it be implemented

Having carefully considered the environmental record noted above, the mitigation measures as required herein, the written and oral comments offered by other agencies and the public on this record, and the written responses to the comments, TxDOT has determined that the *Preferred Alternative* identified in the Draft and Final EIS is also the *Selected Alternative*. The *Selected Alternative* represents the best option for the OHP Project. TxDOT finds that all practicable measures to minimize environmental harm have been incorporated into the design of the *Selected Alternative*. TxDOT will ensure that the commitments outlined herein will be implemented as part of final design, construction contract, and post-construction monitoring. TxDOT also determines that this decision is in the best overall public interest. A notice of availability of the OHP Project Final EIS/ROD will be published in the *Federal Register.*

Final Environmental Impact Statement

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

A list of acronyms and abbreviations used in this document is provided below.

Acronym/Abbreviation	Full Definition
AADT	Annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ABS	Austin blind salamander
ACC	Austin Community College
ACS	American Community Survey
ADA	Americans with Disabilities Act
amsl	Above mean sea level
AOI	Area of Influence
APE	Area of potential effects
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
BMPs	Best management practices
BSEACD	Barton Springs/Edwards Aquifer Conservation District
BSS	Barton Springs salamander
CAMPO	Capital Area Metropolitan Planning Organization
Capital Metro	Capital Metropolitan Transportation Authority
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO TAQA	Carbon monoxide traffic air quality analysis
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COA	City of Austin
CSS	Context Sensitive Solutions
CWA	Clean Water Act
CY	Cubic yards
dB	Decibels
dB(A)	A-weighted decibels
DBH	Diameter at breast height
Draft EIS	Draft environmental impact statement
Edwards Aquifer	Edwards Balcones Fault Zone Aquifer
EIS	Environmental impact statement
EJ	Environmental justice

Acronym/Abbreviation	Full Definition
EMS	Emergency medical services
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ETJ	Extra-territorial jurisdiction
Final EIS	Final environmental impact statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FM	Farm-to-Market Road
FPPA	Farmland Protection Policy Act
FTA	Federal Transit Authority
FY	Fiscal year
GA	Geologic Assessment
GHG	Greenhouse gas
GIS	Geographic information system
HDR	HDR Engineering, Inc.
HOV	High-occupancy vehicle
IH	Interstate highway
IPCC	Intergovernmental Panel on Climate Change
ISA	Initial site assessment
KFA	K Friese & Associates, Inc.
Kgru	Upper member of the Glen Rose limestone
Kk	Kainer Formation
KOP	Key observation point
Leq	Average or equivalent sound level
Loop 1	State Loop 1, referred to as MoPac
LPST	Leaking petroleum storage tank
LU	Landscape unit
MMT	Million metric tons
Mobility Authority	Central Texas Regional Mobility Authority
MoPac	State Loop 1
MOU	Memorandum of Understanding
MOVES2014	Motor Vehicle Emissions Simulator 2014
MSAT	Mobile source air toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise abatement criteria
NBI	National Bridge Inventory
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act

Acronym/Abbreviation	Full Definition
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWP	Nationwide Permit
OHP	Oak Hill Parkway
OHP Project	Oak Hill Parkway Project
OHWM	Ordinary High Water Mark
PM	Particulate matter
ppm	Parts per million
PS&E	Plans, specifications, and estimates
PST	Petroleum storage tank
Qal	Quaternary alluvium
Qhg	Quaternary fluviatile terrace deposits
RM	Ranch-to-Market Road
ROD	Record of Decision
RSA	Resource study area
RTG	Rodriguez Transportation Group
RTP	Regional Transportation Plan
SGCN	Species of Greatest Conservation Need
SH	State Highway
SHPO	State Historic Preservation Office
SW3P	Stormwater Pollution Prevention Plan
TAQA	Traffic Air Quality Analysis
TCEQ	Texas Commission on Environmental Quality
TDM	Transportation demand management
TERP	Texas Emissions Reduction Plan
the “Y”	Intersection of US 290/SH 71
TIP	Transportation Improvement Program
TP&P	Transportation Planning and Programming Division
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TSM	Transportation system management
TSS	Total suspended solids
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
U.S.C.	U.S. Code
US	U.S. Highway

Acronym/Abbreviation	Full Definition
US 290	U.S. Highway 290
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
UST	Underground storage tank
VCP	Voluntary cleanup program
VFS	Vegetated filter strips
VMT	Vehicle miles traveled
WPAP	Water Pollution Abatement Plan
WQPL	Water quality protection lands
YBC	“Y” at Oak Hill to Barton Creek urban trail

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1. INTRODUCTION

The Texas Department of Transportation (TxDOT) is proposing improvements to U.S. Highway (US) 290/State Highway (SH) 71 West through Oak Hill (the Oak Hill Parkway, or the OHP Project). The project corridor extends along US 290 from State Loop 1 (Loop 1 or MoPac) to west of Ranch-to-Market Road (RM) 1826 for a distance of approximately 6.15 miles, which includes a transition to the west of Circle Drive. The project also includes the interchange on SH 71 from US 290 to Silvermine Drive, a distance of approximately 1.31 miles. Bicycle and pedestrian facilities would be provided via a shared-use path and/or sidewalks along the entire project length. Two upstream detention ponds and up to 17 water quality treatment ponds are proposed within the OHP Project corridor. The schematics of the *Preferred Alternative* are included as **Appendix A**. The proposed project corridor is within the city of Austin (COA), Travis County, Texas.

In compliance with the National Environmental Policy Act (NEPA), TxDOT is conducting an environmental study to examine the potential impacts to the social and natural environment. In addition to evaluating the potential environmental effects, TxDOT is committed to studying transportation needs of the public in reaching a decision that is in the best overall public interest. The NEPA project development process is an approach to balanced transportation decision-making that takes into account the potential impacts on the human and natural environment and the public's need for safe and efficient transportation; this process is documented through the completion of an environmental impact statement (EIS).

A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* and the *Texas Register* in October 2012. A Draft Environmental Impact Statement (Draft EIS) was released on May 4, 2018, which evaluated the *Build Alternatives* in detail and identified *Alternative A* as the *Preferred Alternative*. A detailed project history is described in Section 1.2 of the Draft EIS. Agencies and the public reviewed the Draft EIS and other related information and provided comments to TxDOT on or before June 29, 2018. A public hearing for the Draft EIS was held on May 24, 2018. The OHP project team reviewed the comments received and conducted additional coordination and studies to update the impact analysis for the *Preferred Alternative* and to further define mitigation measures to be incorporated in the proposed OHP Project. The activities, additional technical analyses, and minor updates that have occurred since the Draft EIS are summarized in this Final EIS.

1.1 Project Modifications Following Release of the Draft EIS

After release of the Draft EIS in May 2018, changes to the project design, project funding, and agency involvement have been made; public comments have been addressed; and technical corrections have been made. All such changes are addressed in this Final EIS and are summarized below:

- Since 2012, TxDOT and the Central Texas Regional Mobility Authority (Mobility Authority) served as joint lead agencies (state and local agencies, respectively) for the planning,

public involvement, design, and environmental analysis of the OHP Project. In March 2018, TxDOT decided to move forward with the OHP Project as a non-tolled project. Without the toll component, the OHP Project no longer required the Mobility Authority to act as a lead agency. Due to the Mobility Authority's joint leadership since 2012 and their continued support for the project, their role has transitioned to that of a participating agency for the remainder of the project.

- The OHP Project is included in the Capital Area Metropolitan Planning Organization (CAMPO) 2040 Regional Transportation Plan (RTP) and in CAMPO's fiscal year (FY) 2017–2020 Transportation Improvement Program (TIP) as a controlled access highway with frontage roads along US 290 and a divided highway with direct connecters along SH 71. The CAMPO 2040 RTP was locally adopted by the Transportation Policy Board on May 11, 2015, and the TIP with amendments was adopted on July 6, 2016. Following TxDOT's decision to move forward as a non-tolled project in March 2018, both the RTP and TIP were modified on July 18, 2018, to reflect the non-tolled facility. These modifications were approved by CAMPO on August 13, 2018, and can be reviewed at: https://47kzwj6dn1447gy9z7do16an-wpengine.netdna-ssl.com/wp-content/uploads/2018/08/Aug-13-2018-TPB-Meeting-Packet.pdf. Environmental studies, traffic and revenue studies, and final engineering for the proposed project are listed in the FY *2017–2020 Statewide Transportation Improvement Program*, which was approved by the Federal Highway Administration (FHWA) on December 19, 2016. Based on the CAMPO 2040 RTP, the total project cost is $545.30 million. The estimated construction cost is $440 million. The proposed OHP Project is classified as Categories 2, 4, and 12 funding and would be 80 percent federally funded and 20 percent state funded.
- The CAMPO 2040 travel demand model for the project was modified to reflect the proposed non-tolled facility. The results and details of this change, found in **Appendix B**, indicate an increase of less than 1 percent in traffic on the mainlanes and frontage roads in the corridor. Changing from a tolled to a non-tolled facility resulted in no change in the design of the *Preferred Alternative*. Frontage roads would still be required to adequately handle the projected corridor travel demand, anticipated to be over 152,000 vehicles per day in 2040, and to maintain access for adjacent properties. The schematics of the *Preferred Alternative* were updated to show the new traffic projections (**Appendix A**). As a result of the decision to move forward with a non-tolled facility, the Noise Analysis Technical Report was revised and is attached to the Final EIS in **Appendix C.**
- In addition to the water quality control measures presented in the Draft EIS, additional measures were evaluated in the *Oak Hill Parkway TSS Removal Load Memorandum* (**Appendix D**) in an effort to ensure that the project could achieve a net decrease in annual total suspended solids (TSS) loading as described in the 2017 consultation with the U.S. Fish and Wildlife Service (USFWS). These additional measures were discussed in communications with the USFWS in November and December of 2018 in which TxDOT reaffirmed the commitment to achieve a net decrease in TSS loading for the project and agreed to provide a copy of the final Water Pollution Abatement Plan (WPAP) to the USFWS

at the same time it is submitted to the Texas Commission on Environmental Quality (TCEQ) for approval. The *Oak Hill Parkway TSS Removal Load Memorandum* and additional communication with the USFWS are included in **Appendix D: Supplemental Water Quality Documentation and Agency Coordination**.

- The junction point and accompanying control of access line between the US 290 westbound frontage road and the US 290 westbound entrance ramp from Scenic Brook Drive was shifted approximately 25 feet in response to public comment at the hearing (**Figure 1-1**).
- The control of access line for the US 290 eastbound frontage road immediately east of RM 1826 was corrected (**Figure 1-1**).
- Right-of-way adjustments were made as a result of refinements in the *Preferred Alternative* designs (**Figure 1-1**):
    - New right-of-way was added behind the proposed noise barrier just west of Westcreek Drive along the US 290 eastbound frontage road, which would benefit impacted residences at the Holiday Mobile Home Park. Additionally, a permanent drainage easement was added to the same location.
    - The total right-of-way requirements at the two upstream detention ponds were decreased by approximately 1.28 acres.
    - Additional right-of-way acquisition was identified at two parcels to account for additional sound barrier wall width along US 290 near the western project terminus.
- The *Preferred Alternative* design was advanced to show the location of temporary, permanent, and driveway easements throughout the alignment (**Appendix A**).
- A right-of-way correction was made between William Cannon Drive and Patton Ranch Road at the businesses on the north side of US 290/SH 71. The Draft EIS incorrectly identified this area as proposed right-of-way, when it should have been excluded from acreage calculations for proposed right-of-way within the project area (**Figure 1-1**).

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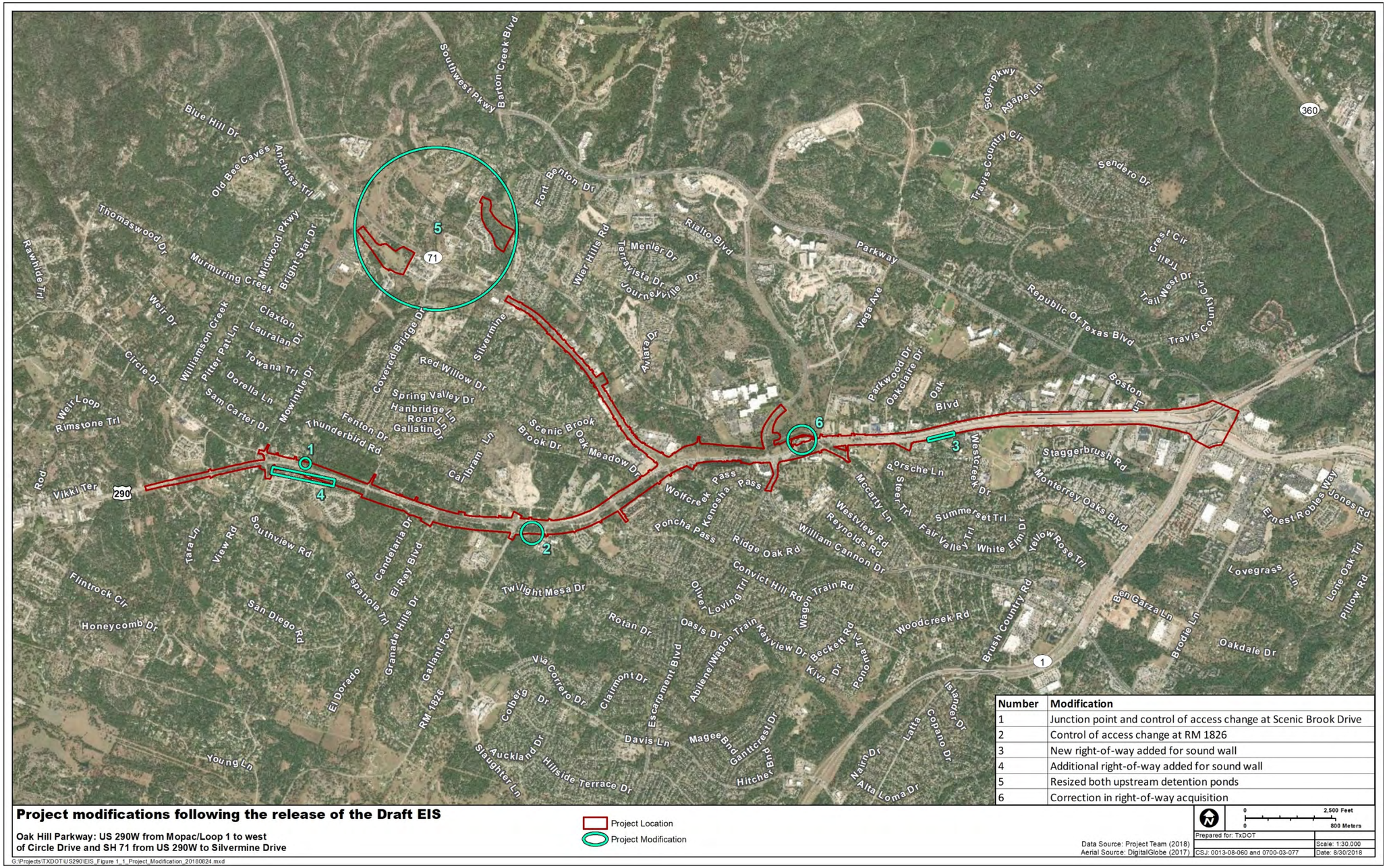

Number	Modification
1	Junction point and control of access change at Scenic Brook Drive
2	Control of access change at RM 1826
3	New right-of-way added for sound wall
4	Additional right-of-way added for sound wall
5	Resized both upstream detention ponds
6	Correction in right-of-way acquisition

Project modifications following the release of the Draft EIS

Oak Hill Parkway: US 290W from Mopac/Loop 1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Project Location
Project Modification

Data Source: Project Team (2018)
Aerial Source: DigitalGlobe (2017)

0 2,500 Feet
0 800 Meters

Prepared for: TxDOT
Scale: 1:30,000
CSJ: 0013-08-060 and 0700-03-077
Date: 8/30/2018

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Figure 1-1: Project modifications following the release of the Draft EIS.

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1.2 Independent Utility and Logical Termini

Federal regulations require that, to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the project studied must meet certain standards. As explained below, a project must have rational beginning and end points. The end points may not be created in a manner which purposefully avoids proper analysis of environmental impacts.

A project must have independent utility and be a reasonable expenditure even if no other transportation improvements are made in the area (23 CFR 771.111(f)(2)). This means a project must be able to provide benefit by itself and not compel further expenditures to make the project useful. Stated another way, a project must be able to satisfy its purpose and need with no other projects being built. The OHP Project's purpose and need is discussed in detail in Section 2.

A project must have logical termini and be of sufficient length to address environmental matters on a broad scope (23 Code of Federal Regulations [CFR] 771.111(f)(1)). This means that a project must have rational beginning and end points. The termini of the proposed project are MoPac and RM 1826 with a transition to Circle Drive and SH 71 from US 290 to Silvermine Drive. MoPac is a major crossroad in southwest Austin, and therefore is a logical eastern endpoint for the project. RM 1826 serves as a major traffic generator along US 290 due to the proximity of the Seton Southwest Hospital and Austin Community College (ACC): Pinnacle Campus, and therefore is the logical western endpoint. However, to accommodate the required transition from a freeway to a non-freeway facility along US 290, the transition from RM 1826 to Circle Drive was included in the project design. Similarly, Silvermine Drive serves as the northern logical endpoint along SH 71 due to the distance required for transition of direct connectors originating from US 290 east of the intersection of US 290 and SH 71, locally known as the "Y."

The length of the OHP Project was developed to ensure that, whatever was the outcome of the analysis, the selected *Preferred Alternative* would function properly without requiring additional improvements in the area. This is shown by the broad scope of environmental issues analyzed in the Draft EIS and summarized in this Final EIS. It was CAMPO, as part of its directions to thoroughly analyze the corridor and determine the best approach for improving mobility throughout Oak Hill, that selected the study boundaries for use by the project team. The proposed project was analyzed for indirect and cumulative impacts to ensure all projects are considered collectively as well as individually. Both the Area of Influence (AOI) and the Resource Study Area (RSA) were sized to accommodate consideration of regional impacts in the context of the proposed project. The AOI for the indirect impacts analysis encompasses approximately 85,281 acres and includes some or all of the cities of Austin, Bee Cave, Bear Creek, Dripping Springs, and Sunset Valley. The cumulative impacts analysis considered the Austin Blind and Barton Springs salamanders' habitats, in addition to groundwater and surface water resources, and identified a combined RSA boundary for these resources of over 260,000 acres. Past, present, and reasonably foreseeable actions were identified through

research, interviews, and cartographic analysis. The construction of the proposed project was considered in conjunction with these other actions to consider cumulative impacts.

Finally, a project must not restrict consideration of alternatives for other reasonably foreseeable transportation improvements (23 CFR 771.111(f)(3)). This means that a project must not dictate or restrict any future roadway alternatives. Here, constructing the proposed project between the termini described above would result in a useable transportation improvement and a reasonable expenditure of public funds even if no additional roadway improvements are constructed in the area. The project will not irretrievably commit federal funds to any other project.

The OHP Project would stand alone, be independently functional, and serve a substantial public purpose by itself. It would not predetermine locations and types of future transportation improvements or force future sections of projects or alignments. Therefore, the project has both independent utility and logical termini, and because the project stands alone, it cannot and does not irretrievably commit federal funds. There have been no changes to the logical termini for the proposed OHP Project since the release of the Draft EIS.

1.3 Description of the Oak Hill Parkway Corridor

The proposed project corridor includes approximately 6.15 miles along US 290 (from MoPac to west of RM 1826) and an approximately 1.31-mile interchange along SH 71 (from US 290 to Silvermine Drive) as shown on **Figure 1-2**. The project would primarily serve commuters and residents of southwest Austin, Oak Hill, southwestern Travis County, northern Hays County, and Dripping Springs traveling to and from Austin. The proposed project would also benefit regional and statewide users of the facility.

Along US 290 between MoPac and Circle Drive are a variety of land uses. Major components include a Target shopping center, At Home retail store, Clint Small Jr. Middle School, West Creek subdivision, Legend Oaks subdivision, multi-family residential housing, Seton Southwest Hospital and Medical Center, ACC—Pinnacle Campus, H-E-B and Oak Hill Plaza shopping centers, and NXP Semiconductors Corporate Headquarters. Many other smaller strip retail centers, businesses, and smaller residential neighborhoods are also adjacent to the project corridor. SH 71 serves as a primary access point for residents of southwest Austin to the cities of Bee Cave, Lakeway, Marble Falls, and beyond. Recreational destinations accessed from SH 71 include the Hill Country Galleria, the Backyard at Bee Cave, and access to Lake Travis. Development has increased in the Dripping Springs community and areas along US 290 west of the project corridor. Several master-planned communities have been developed along US 290 west of the project corridor including Belterra, Highpointe, Ledge Stone, and Sawyer Ranch.

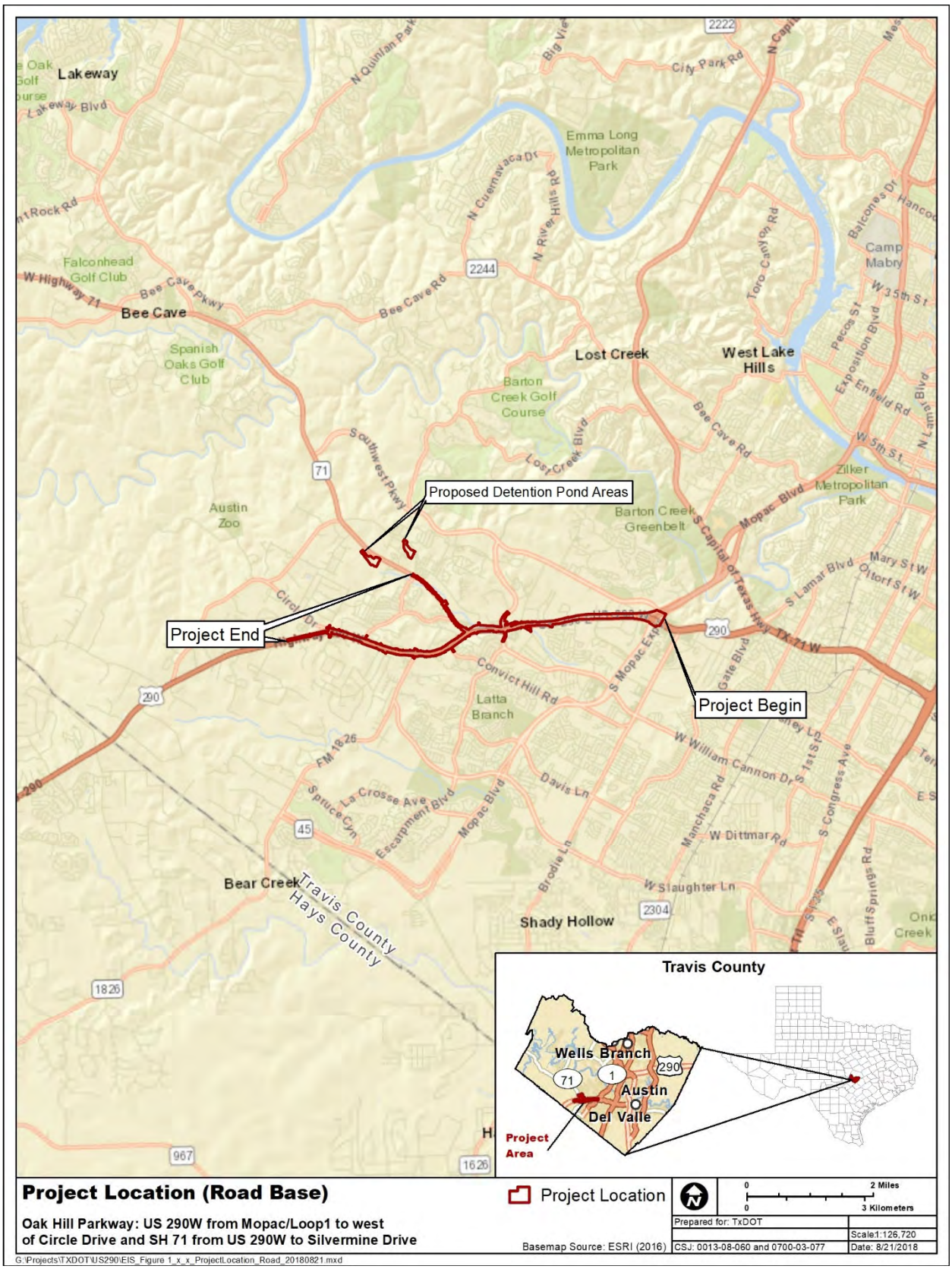

Figure 1-2. Project location (road base).

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2. PURPOSE AND NEED

Congestion has reduced mobility and quality of life in Oak Hill and surrounding communities. The intersection of two major state highways, US 290 and SH 71, in Oak Hill is a gateway to southwest Travis County and serves as a key route between central Austin and fast-growing suburban and rural communities such as Lakeway, Bee Cave, Dripping Springs, and Johnson City. US 290 is one of Texas's most congested highway corridors, and due to a lack of reliable connectivity, US 290 has also become an unreliable route for both transit and emergency vehicles. The need and purpose for the OHP Project is summarized below. Section 2 of the Draft EIS provides a complete description of these components and includes supporting data used in the analysis.

2.1 Need for the Proposed Project

The need for the proposed project was identified through background research as well as comments expressed by the lead agency, cooperating and participating agencies, stakeholder workgroups, and the public. Several distinct but interrelated needs have been identified for the OHP Project:

- Congestion within the corridor has increased because of steady population growth in the Austin metropolitan area.
- Congestion is causing unreliable traffic operations within the project limits. The term *reliability* refers to the ability of travelers, including emergency responders and transit vehicles, to travel through the corridor in a timely fashion with dependable travel times, regardless of the time of day. According to the FHWA (2005), the term *reliability* is defined as "how much travel times vary over the course of time."
- Congestion is causing travel-time delays and a poor level of service along the roadway.
- Traffic and congestion affect emergency response and transit times within the corridor.
- US 290 and SH 71 lack reliable connectivity to Austin metropolitan area roadways and areas west and south of the project area under current conditions.
- Within the proposed project corridor, 925 crashes were reported on US 290 between 2010 and 2016 and 283 crashes were reported on SH 71 during the same time period (Crash Records Information System, 2015, 2017).
- As indicated in **Section 1.1**, the CAMPO 2040 travel demand model was modified to reflect the proposed non-tolled facility; this modification resulted in a slight increase in traffic on both mainlanes and frontage roads. Thus, both mainlanes and frontage roads are required to accommodate the demand and to maintain existing access to adjacent properties.

2.2 Statement of Purpose

The regional vision, promulgated by CAMPO in the CAMPO 2040 RTP, calls for improving the overall livability of the region by balancing the need to move traffic with our need to build quality communities (CAMPO, 2015). In order to achieve this balance, the CAMPO plan recommends considering not only the movement of vehicles but the mobility of people, the sustainability of the system, and the impact of the future investments on land use and growth patterns.

The proposed project has three main purposes:

- Improve mobility and operational efficiency
- Facilitate long-term congestion management in the corridor by accommodating the movement of people and goods via multiple modes of travel
- Improve safety and emergency response

2.3 Goals and Objectives

The proposed project goals and objectives include measures to ensure the project is consistent with the overall regional plan and community values while maintaining and enhancing the community character and the natural setting. The project goals and objectives include the following:

- Promoting sustainable growth
- Maintaining consistency with local and regional plans and policies
- Developing facilities for multi-modal transportation
- Enhancing air quality
- Avoiding/minimizing water quality impacts
- Avoiding/minimizing impacts to wildlife habitat
- Minimizing noise impacts
- Avoiding/minimizing adverse social and economic impacts
- Providing for aesthetics and landscaping
- Reducing conflict between local and through traffic
- Facilitating the development of a small activity center in Oak Hill in accordance with the CAMPO Centers map in the 2040 CAMPO Plan or the redevelopment of an activity center as identified in *Imagine Austin*

3. ALTERNATIVES ANALYSIS

The alternative alignments evaluated in the Draft EIS allowed for a full comparison and evaluation of alternatives through an iterative series of phases. The process led to the selection of a single *Preferred Alternative* that would best meet the need and purpose of the proposed OHP Project and would best avoid or minimize environmental impacts in the project area. Stakeholder input and environmental analyses completed since the study launched in 2012 show that congestion is reducing mobility and quality of life in Oak Hill and surrounding communities. The project team developed mobility improvement concepts and a methodology for screening the concepts through a collaborative approach with the public. The concepts represented a range of reasonable alternatives as required by NEPA. The preliminary concepts were presented to the public during numerous public involvement activities. This iterative process involved initial scoping discussions, collaboration regarding concepts to be evaluated and the project's purpose and need, evaluation of the concepts through a screening process, and carrying forward for further study the concepts that best met the project purpose and need. The information provided in the subsections below is an abbreviated summary of the alternatives analysis for the OHP Project. For the comprehensive analysis of the alternative evaluation process see Section 3 of the Draft EIS.

3.1 Preliminary Alternatives

Since 2012, the project team has held six open houses as well as numerous workshops and stakeholder meetings to ensure that two-way communication has been ongoing between the team and the community. Twelve initial concepts and the draft screening criteria were presented to the public during an open house in October 2013.

See **Table 3-1** below for a summary of the concepts that were developed as possible alternatives for the proposed project.

Table 3-1. Initial US 290/SH 71 Transportation Concepts and Evaluation Results

Concept Name	Description	Evaluation Results
NEPA-Required No Build Alternative		
No Build Alternative	Includes the continuous-flow intersections constructed by the COA and TxDOT and all other projects in the CAMPO 2040 transportation plan.	Carried forward through all phases as required under NEPA.
2007 Alternative		
2007 Alternative	Conventional highway with frontage roads and direct connectors at the "Y." This alternative was developed from the Mediation Process.	Eliminated from consideration in Phase 2.

Concept Name	Description	Evaluation Results
Non-Capital-Intensive Strategies		
Transportation System Management (TSM)	Includes a collection of low-cost (non-capital-intensive) strategies to enhance safety, reduce congestion, and improve traffic flow. Specific strategies include traffic signal synchronization, freeway operations improvements (changeable message signs and ramp metering), and incident management (clearing accidents and breakdowns quickly to allow traffic to move more smoothly). Other methods can include bus pullouts (to remove stopped buses from the traffic stream), intersection improvements (signal priority for transit vehicles), and queue jumper lanes (to get transit vehicles to the front of the line at intersections). Would not increase the overall capacity of US 290 or SH 71, although it would address some access/egress issues and other minor safety and operational issues. TSM could be incorporated as an enhancement into any of the other build concepts.	Eliminated from consideration in Phase 1.
Transportation Demand Management (TDM)	Includes managing or decreasing the demand for auto-related travel by using a variety of measures to increase the operating efficiency of transportation facilities. This typically includes alternatives to single-occupant vehicles (transit, carpool, vanpool, bicycle), incentives/disincentives (congestion pricing, High-Occupancy Vehicle [HOV] lanes, travel time advantages for HOVs), alternative work environments (telecommuting and flex time), and parking management. TDM strategies would improve the existing transportation system. This concept would not increase the overall capacity of US 290 and SH 71, though it would address some issues associated with access/egress and other minor safety and operational issues. TDM could be incorporated as an enhancement in any of the other build concepts.	Eliminated from consideration in Phase 1.
Controlled-Access Concepts		
Concept A	US 290 depressed mainlanes • Conventional controlled-access highway with frontage roads • Westbound US 290 frontage road west of William Cannon Drive on the north side of Williamson Creek • Depressed US 290 mainlanes under SH 71 • Direct connector ramps at the "Y" • Single-point flying-T intersection for the frontage roads at the "Y"	Carried forward through all phases. One of two concepts that best meets all aspects of the project's purpose and need.

Concept Name	Description	Evaluation Results
Concept B	US 290 mainlanes north of creek without direct connectors • Conventional controlled-access highway with frontage roads • US 290 mainlanes west of William Cannon Drive on the north side of Williamson Creek • US 290 frontage roads between William Cannon Drive and the "Y" along existing US 290 • The continuous-flow intersection at William Cannon Drive and US 290 would remain • No direct connector ramps at the "Y" • Single-point flying-T intersection for the frontage roads at the "Y"	Eliminated from consideration in Phase 2.
Concept C	US 290 mainlanes north of creek with direct connector ramps • Same as Concept B except direct connector ramps are added at the "Y"	Carried forward through all phases. One of two concepts that best meets all aspects of the project's purpose and need.
Concept D	US 290 express lanes with frontage roads • Two lanes in each direction constructed in the center of what would ultimately be a controlled-access facility • The express lanes would extend from MoPac to the west end of the project with access limited to each end and possibly one other location for special use, such as access for the Capital Metropolitan Transportation Authority's (Capital Metro's) new park and ride, ACC, and Seton Southwest Hospital in the vicinity of RM 1826/Convict Hill Road • Express lanes would be grade separated from the crossing streets • Single-point flying-T intersection for the frontage roads at the "Y"	Eliminated from consideration in Phase 2.
Minimum Improvement Concepts		
Concept E-1	Focus on providing US 290 grade separations at William Cannon Drive and improvements for SH 71. Would include studying William Cannon Drive over US 290.	Eliminated from consideration in Phase 1.
Concept E-2	Focus on providing US 290 grade separations at William Cannon Drive and would include studying William Cannon Drive over US 290.	Eliminated from consideration in Phase 1.
Parkway Concept		
Concept F	Developed based on input from the public • Non-continuous frontage roads • An at-grade intersection at SH 71	Eliminated from consideration in Phase 2.
Localized Design Options		
Option 1	Extend west transition past Circle Drive • Can be included with Concepts A through D and Concept F	Incorporated into the design concepts carried forward.

Concept Name	Description	Evaluation Results
Option 2	Provide a westbound US 290 exit ramp to RM 1826 that is braided with an entrance from SH 71 • Would provide better access for ACC • Can be included with Concepts A, B, C, and F	Incorporated into the design concepts carried forward.

Source: Project Team, 2017.

The project team utilized a three-phased approach to narrow the initial 12 concepts down to the *Preferred Alternative*. Phase 1 evaluation criteria focused on whether or not a concept met the project's purpose and need. These criteria included three major performance criteria: (1) improve mobility and operational efficiency, (2) increase multimodal travel options for people and goods, and (3) improve safety and emergency response. Based on input from the public, 4 of the initial 12 concepts evaluated were eliminated from further study because they did not meet the project's purpose and need (**Table 3-1**).

The Phase 2 evaluation criteria assessed the eight remaining concepts carried forward after the Phase 1 evaluation. This second evaluation, utilizing detailed traffic modeling techniques, included a deeper analysis of how well each concept met the project's purpose and need. Phase 2 screening also evaluated quantifiable impacts such as the number of residential and commercial displacements, impacts on transit, access modifications, preliminary cost, and the amount of additional right-of-way that would be required for each concept. In June 2014, all remaining concepts were screened using the Phase 2 criteria with input from the public. This effort resulted in the reduction of the remaining concepts from eight to three (**Table 3-1**). Concept A, Concept C (hereafter referred to as *Alternative A* and *Alternative C*), and the *No Build Alternative* were carried forward into schematic development and environmental evaluation in the Draft EIS.

3.2 Build Alternatives Analyzed in the Draft EIS

In Phase 3, a third set of evaluation criteria was developed during the Draft EIS process to evaluate and compare *Alternative A*, *Alternative C*, and the *No Build Alternative* using equivalent levels of detail. This third set of criteria was presented to the public and the participating agencies for comment in June 2014 and January 2015. The project team further refined the third set of criteria once the technical studies had been completed and utilized this information to aid in their selection of the *Preferred Alternative*. The Phase 3 criteria included performance measures to address mobility, cost, human environment, cultural, and natural resource impacts by comparing evaluation parameters such as travel time, change in access, pedestrian and bicyclist connectivity, and water quality treatment measures. The Phase 3 criteria are included in **Table 3-2** below. Each performance measure was broken into measurable parameters that were compared among alternatives to determine which had the least impact (Better), the most impact (Worse), or if there was virtually no discernable difference (No Difference). The Deciding Parameters, those outlined in red, were selected due to their discernable difference in impact when comparing alternatives.

Table 3-2. Phase 3 Screening Evaluation Table

Key: Deciding Parameters, Better +, Worse -, No Difference							
	Performance Measures	Criterion	Evaluation Parameters	Evaluation Parameters (Units)	Alternative A	Alternative C	No Build Alternative
Mobility							
	Improve mobility and operational efficiency	Improves US 290 operational efficiency—increases roadway capacity and reduces travel time during peak hour for 2040 traffic	Through 2040 volume of US 290 mainlanes and frontage roads	Vehicles/day	152,030	151,120	61,400
			WESTBOUND MAINLANES: Travel time along WB US 290 mainlanes Old Fredericksburg Road to Circle Drive, pm peak	Minutes	3.5	3.4	9.5
			WESTBOUND FRONTAGE ROADS: Travel time along WB US 290 frontage road from Old Fredericksburg Road to Circle Drive, pm peak	Minutes	7.7	7.5	9.5
			EASTBOUND MAINLANES: Travel time along EB US 290 mainlanes from Circle Drive to Old Fredericksburg Road, am peak	Minutes	3.5	3.5	7.9
			EASTBOUND FRONTAGE ROAD: Travel time along EB US 290 frontage road from Circle Drive to Old Fredericksburg Road, am peak	Minutes	7.9	7.7	8.4
		Improves SH 71 operational efficiency—increases roadway capacity and reduces travel time during peak hour for 2040 traffic	Through 2040 volume of SH 71	Vehicles/day	57,760	62,040	41,750
			WESTBOUND MAINLANES: Travel time along WB US 290 and SH 71 from Old Fredericksburg Road to Silvermine Drive, pm peak	Minutes	2.8	2.9	5.7
			WESTBOUND FRONTAGE ROADS: Travel time along WB US 290 and SH 71 from Old Fredericksburg Road to Silvermine Drive, pm peak	Minutes	5.4	4.9	5.7

Key: Deciding Parameters, Better +, Worse -, No Difference						
Performance Measures	**Criterion**	**Evaluation Parameters**	**Evaluation Parameters (Units)**	**Alternative A**	**Alternative C**	**No Build Alternative**
		EASTBOUND MAINLANES: Travel time along EB SH 71 and US 290 from Silvermine Drive to Old Fredericksburg Road, am peak	Minutes	2.8	2.9	6.2
		EASTBOUND FRONTAGE ROAD: Travel time along EB SH 71 and US 290 from Silvermine Drive to Old Fredericksburg Road, am peak	Minutes	6.5	5.6	6.7
	Minimize conflicts between pedestrians/bicyclists and motor vehicles	Number of at-grade crossings of the shared-use path and streets	Number	19	23	N/A
Cost and Human Impacts						
Potential property impacts	Minimize residential relocations	Number of residential relocations	Each	1	1	N/A
	Minimize commercial displacements	Number of commercial displacements	Each	4	4	N/A
	Changes in access	Control of access purchased	Length of control of access to be purchased	10,480	10,890	N/A
Potential noise impacts	Minimize noise impacts to sensitive receivers	Average noise levels (*No Build* 2013 and *Build* 2040 with noise walls)	Decibels	61.5	62.1	61.4
		Number of potential noise impacts (*No Build* shows noise impacts as of 2013. *Build Alternatives A* and *C* show projected impacts)	Each	176	172	98
		Average decibel (dB) increase for all residents	Decibels	0.1	0.7	N/A

Key: Deciding Parameters, Better +, Worse -, No Difference						
Performance Measures	**Criterion**	**Evaluation Parameters**	**Evaluation Parameters (Units)**	**Alternative A**	**Alternative C**	**No Build Alternative**
Potential air quality impacts	Minimize impacts to air quality	Reduces mobile source air toxics (MSAT)?	Yes/No	Yes	Yes	Yes
		Exceeds carbon monoxide (CO) threshold?	Yes/No	No	No	No
Community impacts	Minimize impacts to environmental justice (EJ) communities	Are there EJ communities with disproportionate impacts?	Yes/No	No	No	No
	Minimize impacts to community cohesion/access	Change in length of access—SB Patton Ranch Road to EB US 290	Length	2,700	1,070	0*
		Change in length of access—SB Old Bee Cave Road to EB US 290	Length	2,000	4,950	0*
		Change in length of access—WB US 290 to McCarty Lane	Length	2,500	1,100	0*
		Change in length of access—NB drive (Jim's Restaurant) to WB SH 71	Length	0	1,350	0
		Change in length of access—EB SH 71 to SB drive (McDonald's)	Length	0	1,450	0
		Change in length of access—WB SH 71 to NB drive (McDonald's)	Length	0	1,400	0
		Change in length of access—WB SH 71 to NB drive (Jim's Restaurant)	Length	0	1,400	0
		Total change in the length of access points in/out where there is a difference between *Alternatives A* and *C*	Length	7,200	12,720	0

Key: Deciding Parameters, Better +, Worse -, No Difference						
Performance Measures	**Criterion**	**Evaluation Parameters**	**Evaluation Parameters (Units)**	**Alternative A**	**Alternative C**	**No Build Alternative**
Aesthetics and visual impacts	Community values	Feet of elevated structure	Linear Feet	10,840	14,000	0
		Area of Williamson Creek disturbance/restoration (including reconstruction of Old Bee Cave Road, William Cannon, and US 290 bridges)	Acres	0.84	0.69	N/A
		Volume of concrete bridges and culverts within floodplain removed	Cubic Yards	2,933	2,933	N/A
Preliminary project cost	Minimize construction cost	Preliminary total implementation cost estimate	$ Million	536	542	N/A
	Minimize right-of-way cost	Right-of-way area	Acres	74.58	75.19	N/A
		Preliminary right-of-way estimated cost	$ Million	26.5	26.8	N/A
	Minimize utility relocation cost	Preliminary utility relocation cost	$ Million	7.7	7.7	N/A
Cultural Resources Impacts						
Cultural resources	Minimize impacts to National Register of Historic Places (NRHP) structures	Number of NHRP structures or properties affected by the project	Each	0	0	N/A
	Minimize impacts to recorded archeological sites	Number of recorded archeological sites affected by the project	Each	4	4	4
	Avoid impacts to Section 6(f) and 4(f) properties	Number of Section 6(f) and 4(f) properties affected by the project	Each	0	0	N/A

Key: Deciding Parameters, Better +, Worse -, No Difference							
	Performance Measures	**Criterion**	**Evaluation Parameters**	**Evaluation Parameters (Units)**	**Alternative A**	**Alternative C**	**No Build Alternative**
	Natural Resource Impacts						
	Potential water resources impacts	Minimize Edwards Aquifer Recharge Zone and Contributing Zone impacts	Acres of additional impervious cover in the water quality study area*	Acres	74.0	73.6	N/A
		Minimize 100-year floodplain Federal Emergency Management Agency (FEMA) impacts	Acres of floodplain within proposed right-of-way	Acres	70.72	70.96	58.16
		Minimize flood-stage flow in Williamson Creek	100-year flow rate of Williamson Creek at William Cannon Drive	Cubic Feet per second	10,114	10,114	11,159
		Minimize recharge features affected	Number of known recharge features filled	Each	1	1	N/A
		Minimize stream/creek crossings	Acres of streams and water bodies within right-of-way	Acres	3.40	4.78	2.73
		Maximize improvement of water quality	Total suspended solids (TSS) removal*	Pounds per Year	82,837	83,220	18,428
			Number of water quality ponds constructed	Each	17	15	0
		Minimize impacts to wetlands	Acres of wetland impacted	Acres	0.03	0.03	0
	Threatened and endangered species potential impacts	Minimize endangered songbird impacts	Acres of potential habitat within proposed right-of-way	Acres	0	0	0
		Minimize endangered karst species impacts	Presence/absence within the proposed right-of-way	Yes/No	No	No	No
		Minimize endangered salamander species impacts	Is water quality improved?	Yes/No	Yes	Yes	No
	Vegetation impacts	Minimize riparian woodland impacts	Area of riparian woodlands removed by the project	Acres	6.06	5.2	0
		Minimize impacts to large trees (larger than 35-inch diameter at breast height [DBH])	Number of trees (all species) removed (greater than 35-inch DBH)	Number	29	26	0

Key: Deciding Parameters, Better +, Worse -, No Difference						
Performance Measures	Criterion	Evaluation Parameters	Evaluation Parameters (Units)	Alternative A	Alternative C	No Build Alternative
DOES THE ALTERNATIVE MEET THE STATED PURPOSE AND NEED				YES	YES	NO
PREFERRED ALTERNATIVE?				YES	NO	NO

*These calculations and delineation of the water quality study area were based on the *Preliminary Water Quality Analysis and Design Report* (K Friese & Associates, Inc. [KFA], 2017). Calculations for TSS load removal from the *Preferred Alternative* are included in the *Oak Hill Parkway TSS Removal Load Memorandum* (KFA, 2018).

3.2.1 Alternative A

Alternative A is a conventional controlled-access highway with frontage roads. New construction on roadway improvements would begin just east of Joe Tanner Lane where the existing mainlanes transition to an urban highway. With *Alternative A*, the mainlanes would be elevated over William Cannon Drive, and the westbound mainlanes and frontage road would be located north of Williamson Creek. The mainlanes would be depressed under SH 71, and direct connectors would be provided connecting eastbound SH 71 with US 290 and westbound US 290 to SH 71. Mainlanes would vary from four near William Cannon Drive to two near the western project limit. Grade-separated intersections would be constructed at Convict Hill Road, RM 1826, Scenic Brook Drive, and Circle Drive (South View Road). Mainlanes would generally be 12 feet wide with 10-foot-wide shoulders. Texas turnarounds, which allow vehicles traveling on a frontage road to U-turn onto the opposite frontage road, would be constructed on US 290 frontage roads at Scenic Brook Drive, RM 1826, Convict Hill Drive, and William Cannon Drive.

Along SH 71, the direct connector ramps would extend past Scenic Brook Drive where the mainlanes would transition to a five-lane (three lanes northbound, two lanes southbound) rural highway with Texas turnarounds. Bicycle and pedestrian facilities would be provided via a shared-use path which would be provided along the entire project length.

Alternative A was selected as the *Preferred Alternative*.

3.2.2 Alternative C

Alternative C is a controlled-access highway with frontage roads. New construction on roadway improvements would begin just east of Joe Tanner Lane where the existing mainlanes transition to an urban highway. With *Alternative C*, the mainlanes would be elevated over William Cannon Drive with eastbound and westbound mainlanes located north of Williamson Creek. The frontage roads would be parallel to the existing highway. The mainlanes would remain elevated over the intersection with SH 71. West of SH 71, *Alternatives A* and *C* share the same design, and grade-separated intersections would be constructed at Convict Hill Road, RM 1826, Scenic Brook Drive, and Circle Drive (South View Road). Direct connectors would allow drivers to access westbound SH 71 and eastbound US 290. US 290 would consist of two to four 12-foot-wide lanes with 10-foot-wide shoulders. Texas turnarounds would be constructed on US 290 frontage roads at Scenic Brook Drive, RM 1826, and Convict Hill Drive.

Along SH 71, the direct connector ramps would extend past Scenic Brook Drive where the mainlanes would transition to a five-lane (three lanes northbound, two lanes southbound) rural highway with Texas turnarounds. Bicycle and pedestrian facilities would be provided via a shared-use path which would be provided along the entire project length.

3.2.3 No Build Alternative

Consistent with the requirements of NEPA and FHWA guidelines, the Draft EIS analysis included a *No Build Alternative*, or one that assessed environmental effects if the proposed

project were not built. The *No Build Alternative* included the routine maintenance improvements of the existing roads in the study area and the currently programmed, committed, and funded roadway projects. While the *No Build Alternative* was determined early on to not meet the project needs, it provided a baseline condition to compare and measure the effects of the two *Build Alternatives* in the Draft EIS.

3.2.3.1 Environmental Least Harm Analysis

Alternative A was determined to meet the purpose and need of the proposed project by facilitating long-term congestion management along the US 290/SH 71 corridor by accommodating the movement of people and goods via multiple modes of travel. This alternative also met the purpose and need of the proposed project by improving mobility and operational efficiency as well as safety and emergency response time. In addition to meeting the purpose and need, *Alternative A* had fewer social, economic, and environmental impacts than *Alternative C*. Measures of effectiveness were identified and discussed by alternative in Section 3.3 of the Draft EIS. In summary, *Alternative A:*

- adds 19 at-grade crossings of shared-use path and streets, which is 4 fewer than *Alternative C*;
- adds 7,200 linear feet of total change in the length of access points in/out, which is 5,520 linear feet less than *Alternative C*;
- proposes 10,840 linear feet of elevated structures, which is 3,160 less than *Alternative C*; and
- includes approximately 3.40 acres of streams and water bodies within the right-of-way compared to 4.78 under *Alternative C*.

For these reasons, *Alternative A* was selected as the environmentally preferred alternative for the OHP Project.

3.2.3.2 Engineering and Constructability Analysis

Alternatives A and *C* were developed to satisfy the purpose and need for the project. This required the development of freeway mainlanes with grade separations at key intersecting roadways for through traffic, along with one-way frontage roads to accommodate the local traffic needs. In addition, each alternative included shared-use paths and sidewalks throughout the project limits, consideration for bus pull-outs along frontage roads, and possible accommodation for future transit in the corridor. Both alternatives were similar but had differences that were measurable using performance metrics such as traffic projections, level of service, travel time evaluation, changes in access, and constructability. These were discussed in detail in Section 3.3 of the Draft EIS.

The construction sequencing concept for *Alternative A* (*Preferred Alternative*) could begin with construction of the new frontage roads, intersecting streets, and storm drainage trunk lines while the traffic flows on the existing facilities. The intersecting streets would require multiple steps to construct while accommodating traffic movements. After traffic is switched to the

new frontage roads, the existing facility would be removed and the new mainlanes would be constructed in the middle. **Figure 3-1** through **Figure 3-3** are conceptual illustrations of the proposed construction phases. The *Preferred Alternative* could include construction phasing; the frontage roads could be constructed first, which would improve some traffic and safety issues in the corridor (see **Figure 3-1** and **Figure 3-2**). Construction of the mainlanes (**Figure 3-3**) would be done next, followed by construction of the direct connector ramps between US 290 and SH 71.

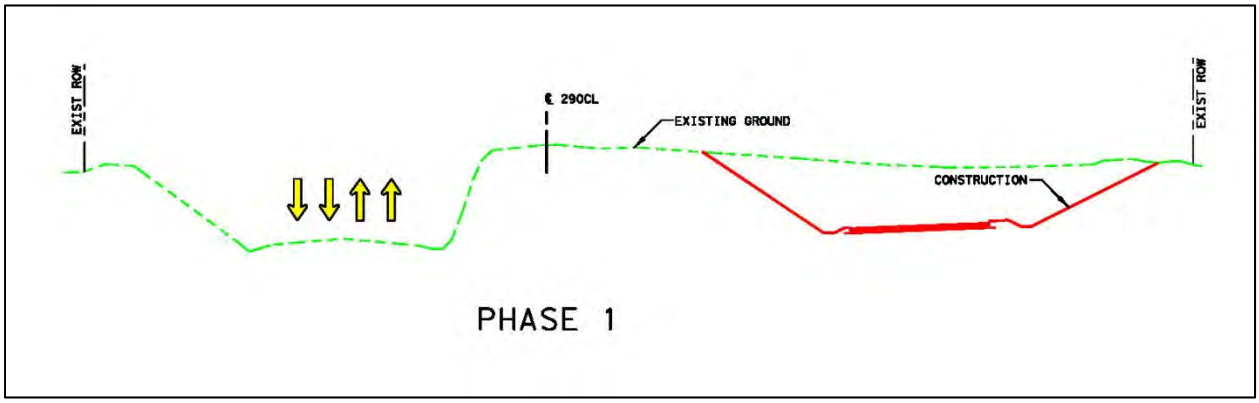

Figure 3-1. Phase 1 could consist of construction of the US 290 eastbound frontage roads.

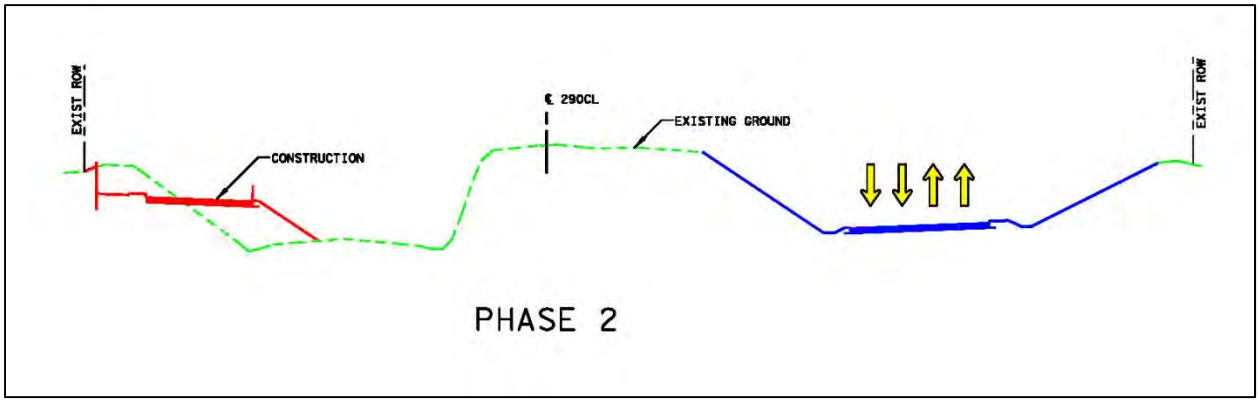

Figure 3-2. Phase 2 could consist of construction of the US 290 westbound frontage roads.

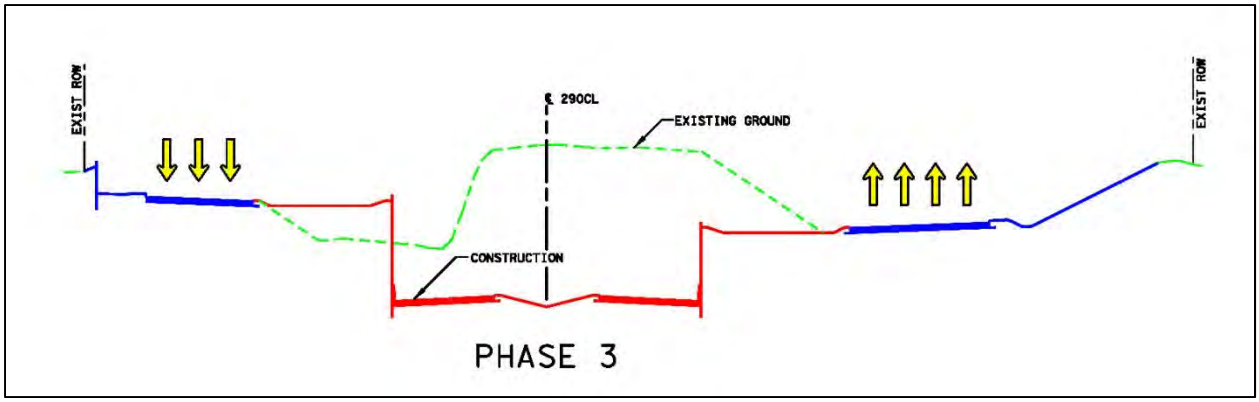

Figure 3-3. Phase 3 could consist of construction of the mainlanes.

3.3 *Preferred Alternative* Analyzed in the Final EIS

The *Preferred Alternative* was evaluated along with the other two alternatives in the Draft EIS and presented to the public during a public hearing on May 24, 2018. Minor changes to the *Preferred Alternative* design have been made since its presentation to the public in May 2018. These changes are listed in **Section 1.1** and summarized below and are further analyzed in subsequent sections of this Final EIS and associated technical reports.

The design changes included shifting the junction point and accompanying control of access line between the US 290 westbound frontage road and the US 290 westbound entrance ramp from Scenic Brook Drive by approximately 25 feet. Additionally, the control of access line for the US 290 eastbound frontage road immediately east of RM 1826 was corrected.

Additional right-of-way and a permanent drainage easement were added behind the proposed noise barrier just west of Westcreek Drive along the US 290 eastbound frontage road, which would benefit impacted residences at the Holiday Mobile Home Park. In addition to other minor refinements, the right-of-way requirements were changed at the two upstream detention ponds. Easements (temporary, permanent, and driveways) have been incorporated into the design of the *Preferred Alternative*. The *Preferred Alternative* schematic design is included as **Appendix A**.

4. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Section 4 of the Draft EIS described the existing conditions and anticipated direct impacts to the natural and human environments from the proposed project. Encroachment-alteration effects that may result from the proposed project were also discussed for each resource or condition. Since the publication of the Draft EIS, updates to the setting, impacts, and mitigation have occurred. The following resources were reviewed and updated to reflect impacts related to the proposed *Preferred Alternative*. Upon reanalysis, many of the resource impacts did not change from what was presented in the Draft EIS. This is noted in the following sections where applicable.

4.1 Resources Eliminated from Further Study

As described in the Draft EIS, the following issues were evaluated and found not to have any bearing on the proposed project; as such, they would not affect a decision regarding the proposed project:

- Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966
- Section 6(f) of the Land and Water Conservation Act
- Chapter 26 of the Parks and Wildlife Code
- Airway-highway clearance
- U.S. Coast Guard permits
- Coastal zone management and coastal barriers
- Magnuson-Stevens Fishery Conservation and Management Act
- Marine Mammal Protection Act
- Bald and Golden Eagle Protection Act
- Trinity River Corridor Development Certification
- International Boundary and Water Commission
- Wild and Scenic Rivers
- Native American Concerns

4.2 Land Use

This section describes current land use patterns in the project area and the project's potential effect on land uses within the existing transportation corridor. Land uses were identified on parcels adjacent to the proposed right-of-way for the *Preferred Alternative*. Direct impacts have been estimated using the revised proposed right-of-way for the *Preferred Alternative*.

To assess environmental impacts related to land use, information was collected such as local and regional land use plans and geographic information system (GIS) database resources, including the 2012 COA Land Use GIS dataset. For this analysis, land uses were organized into 11 dominant land use categories: cemetery, commercial, community facility, education, health care, institutional/infrastructure, place of worship, light industrial, multi-family residential, single-family residential, and undeveloped lands. A designation of "undeveloped" indicates that these parcels lack buildings or on-site services; undeveloped properties include a range of COA zoning designations.

Existing land uses were field verified in October 2018 to confirm they corresponded with COA zoning designations; where appropriate, GIS information was modified based on observed conditions (**Figure 4-1a** through **Figure 4-1h**). Site visits and aerial photographs were used to assess land use compatibility and to identify sensitive land uses such as single-family residences and schools. GIS tools were used for the quantitative analysis of direct impacts related to conversion of existing lands to a transportation-related use.

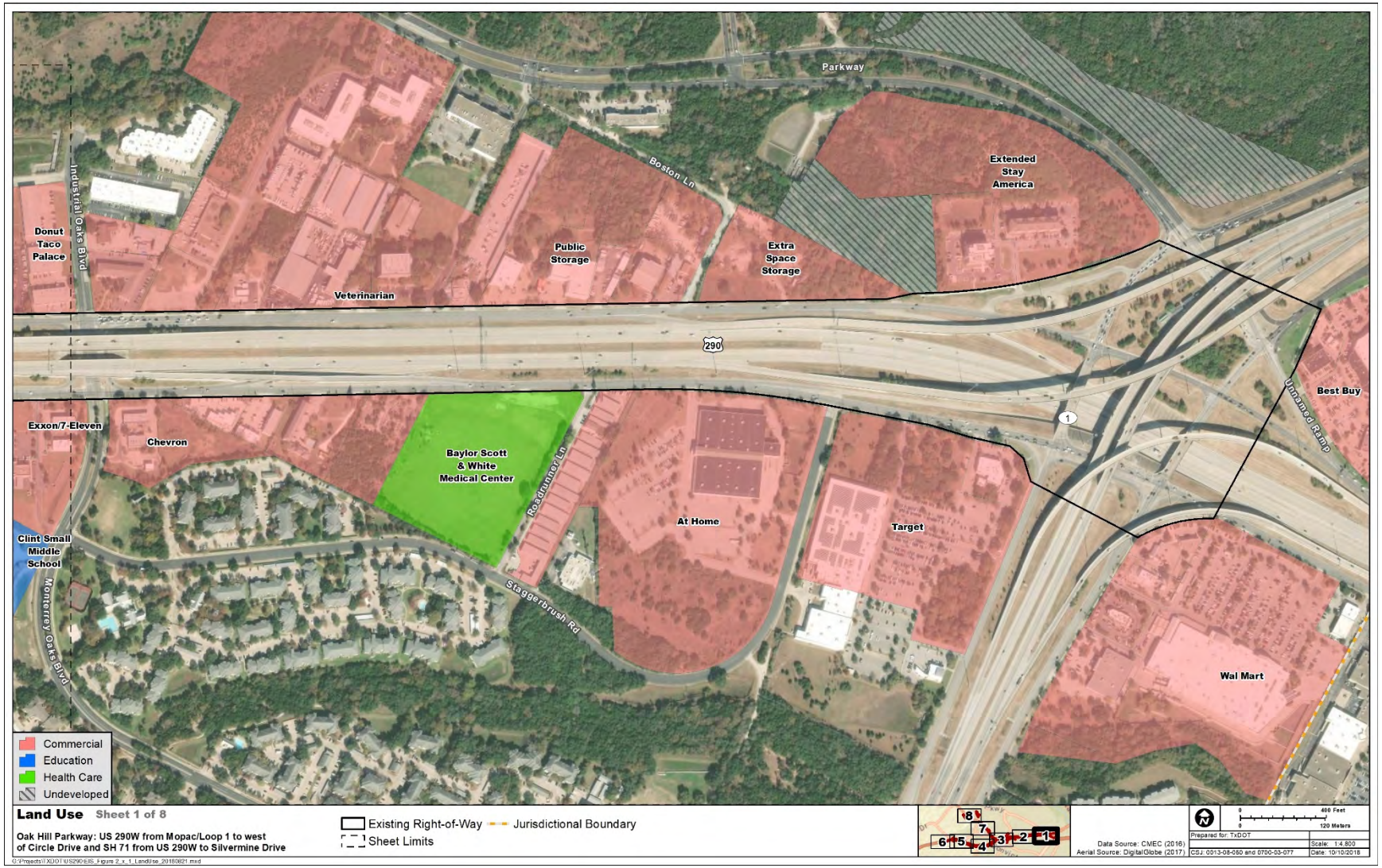

Figure 4-1a. Existing land uses in the OHP Project area.

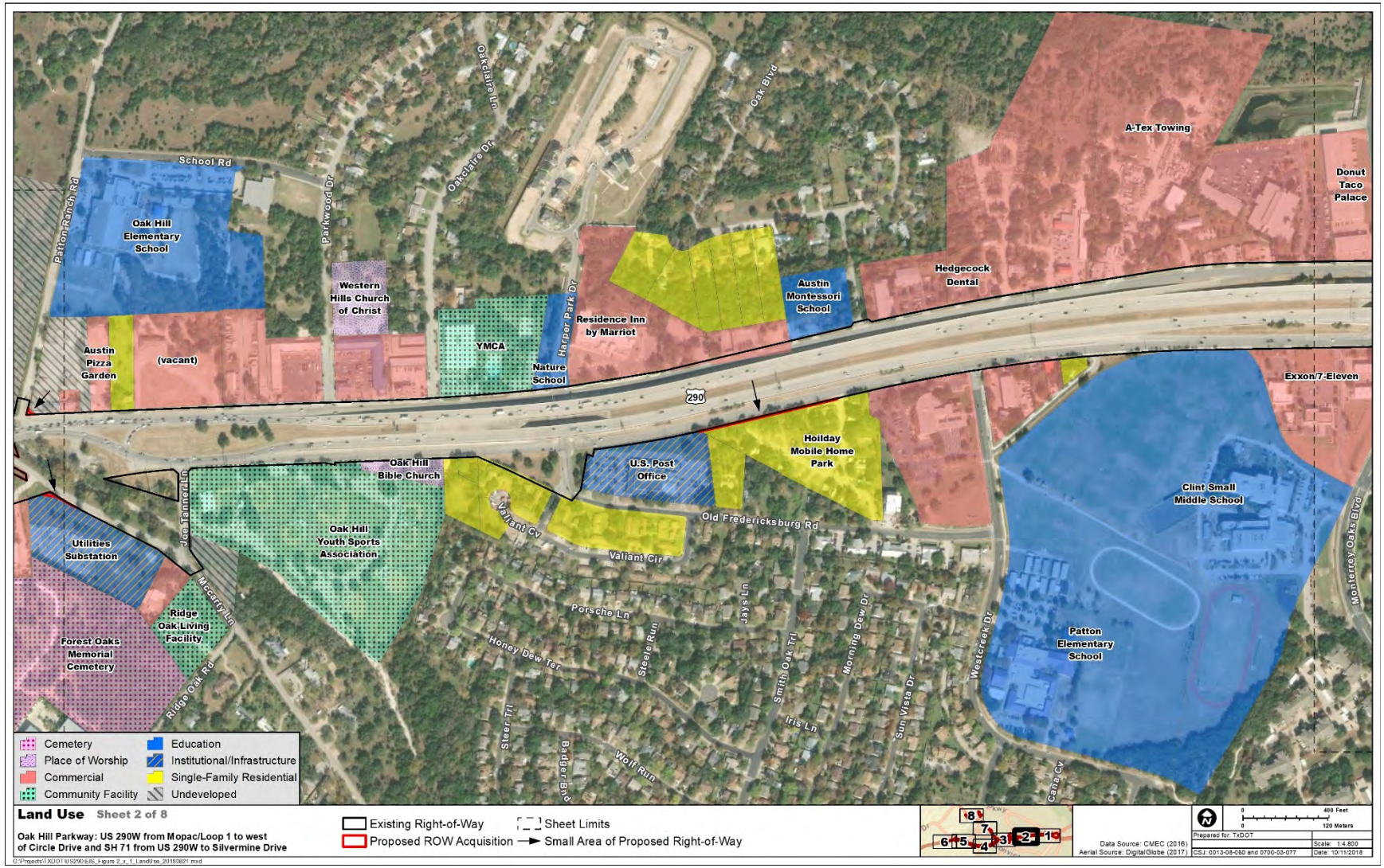

Figure 4-1b. Existing land uses in the OHP Project area.

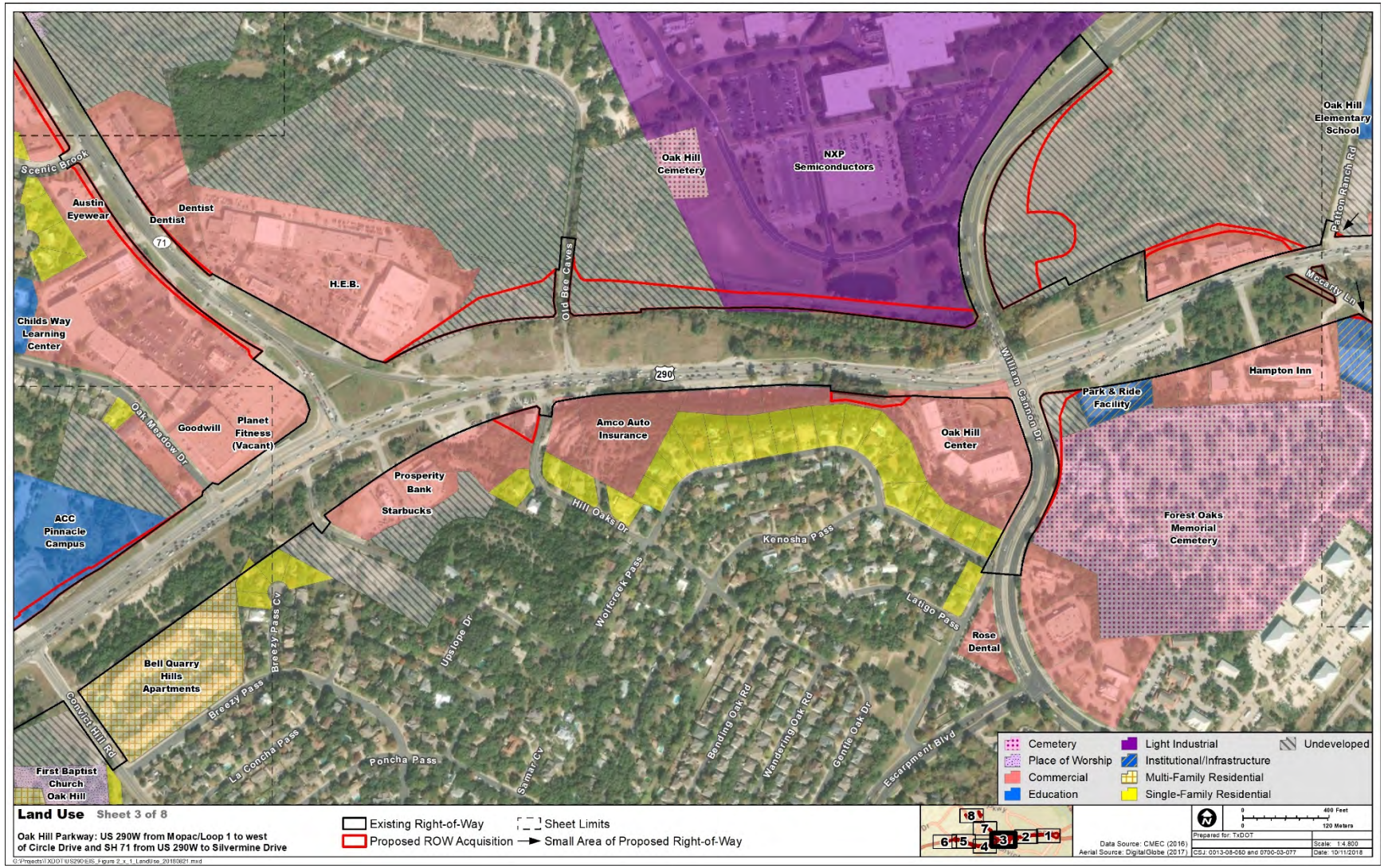

Figure 4-1c. Existing land uses in the OHP Project area.

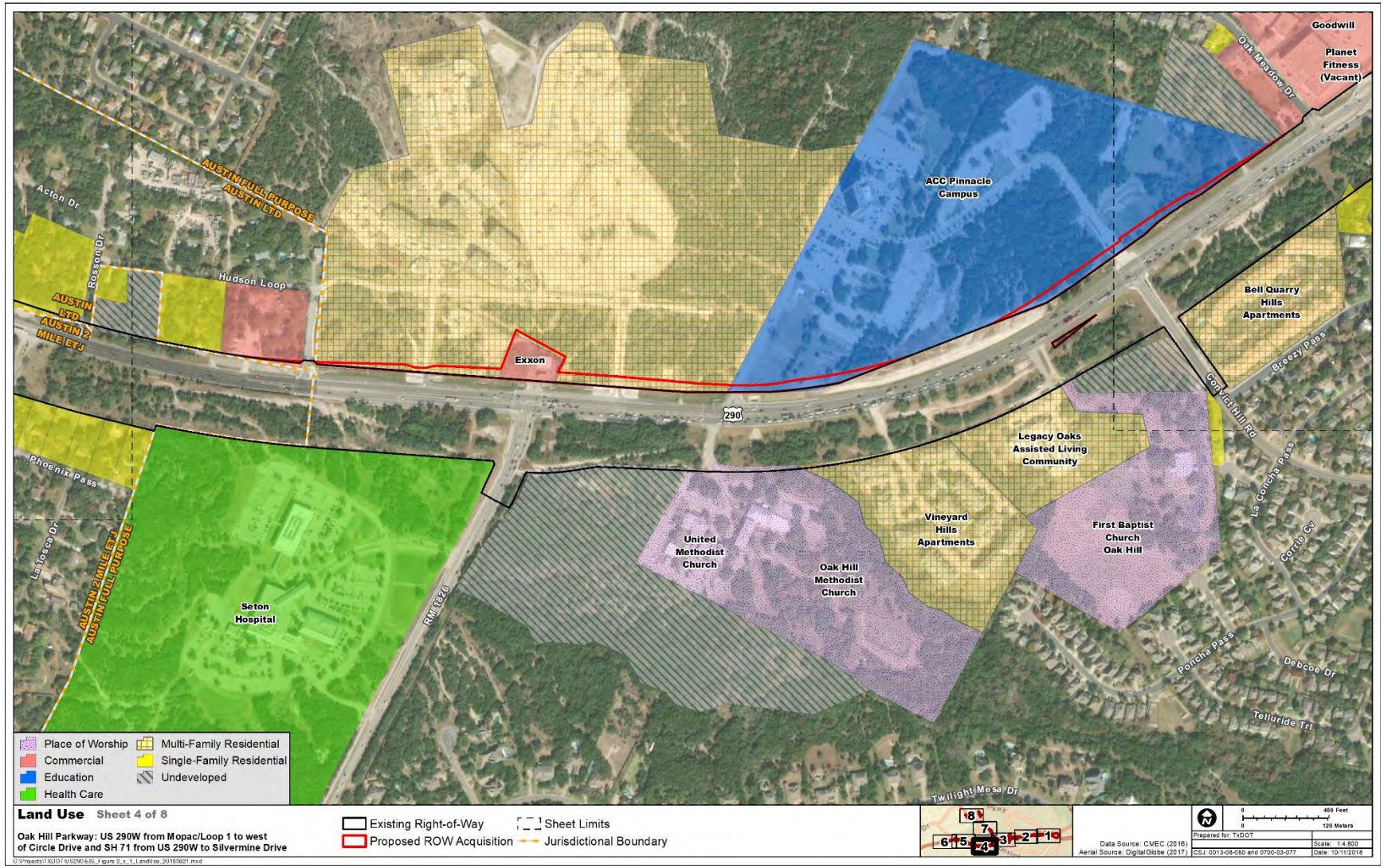

Figure 4-1d. Existing land uses in the OHP Project area.

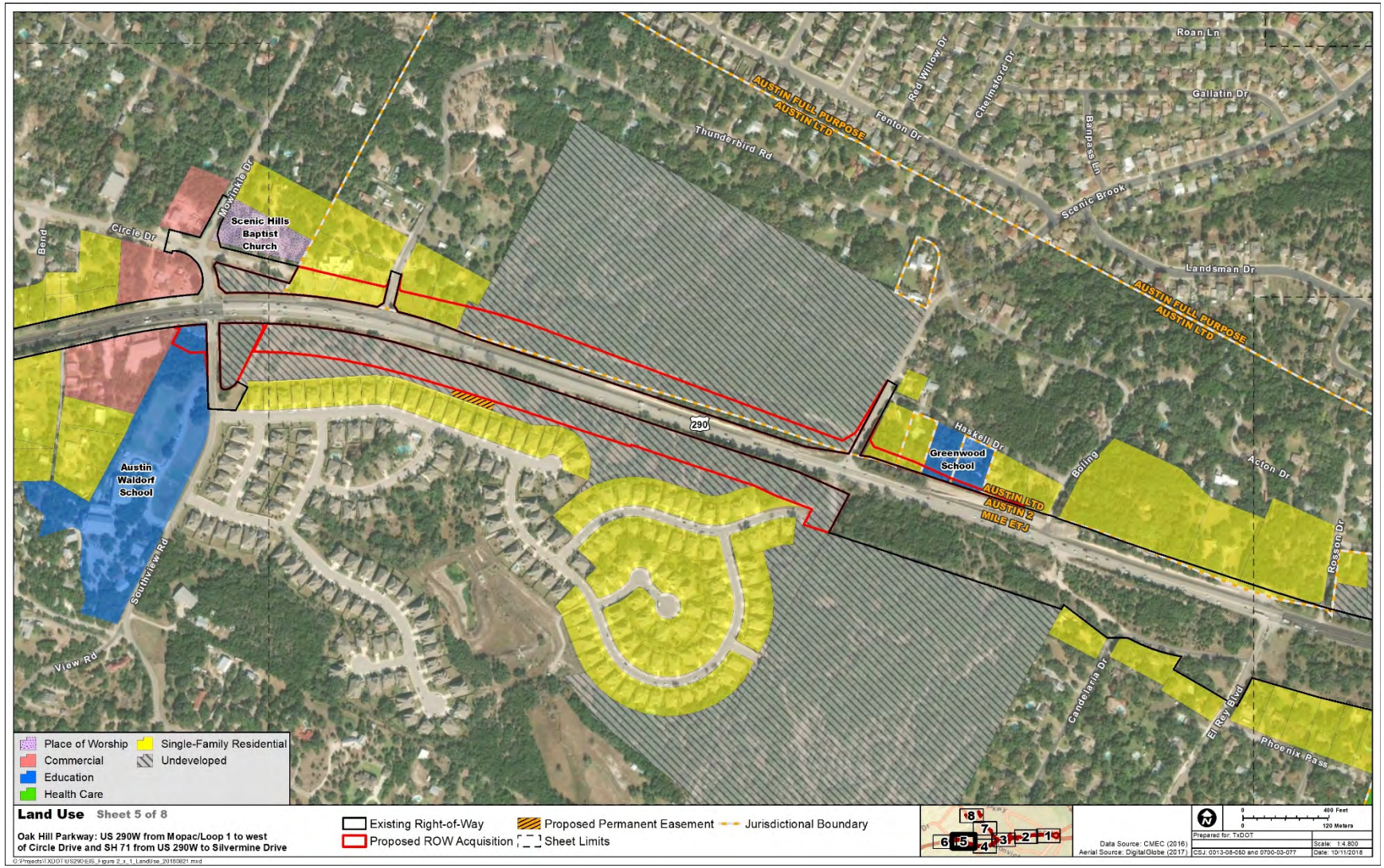

Figure 4-1e. Existing land uses in the OHP Project area.

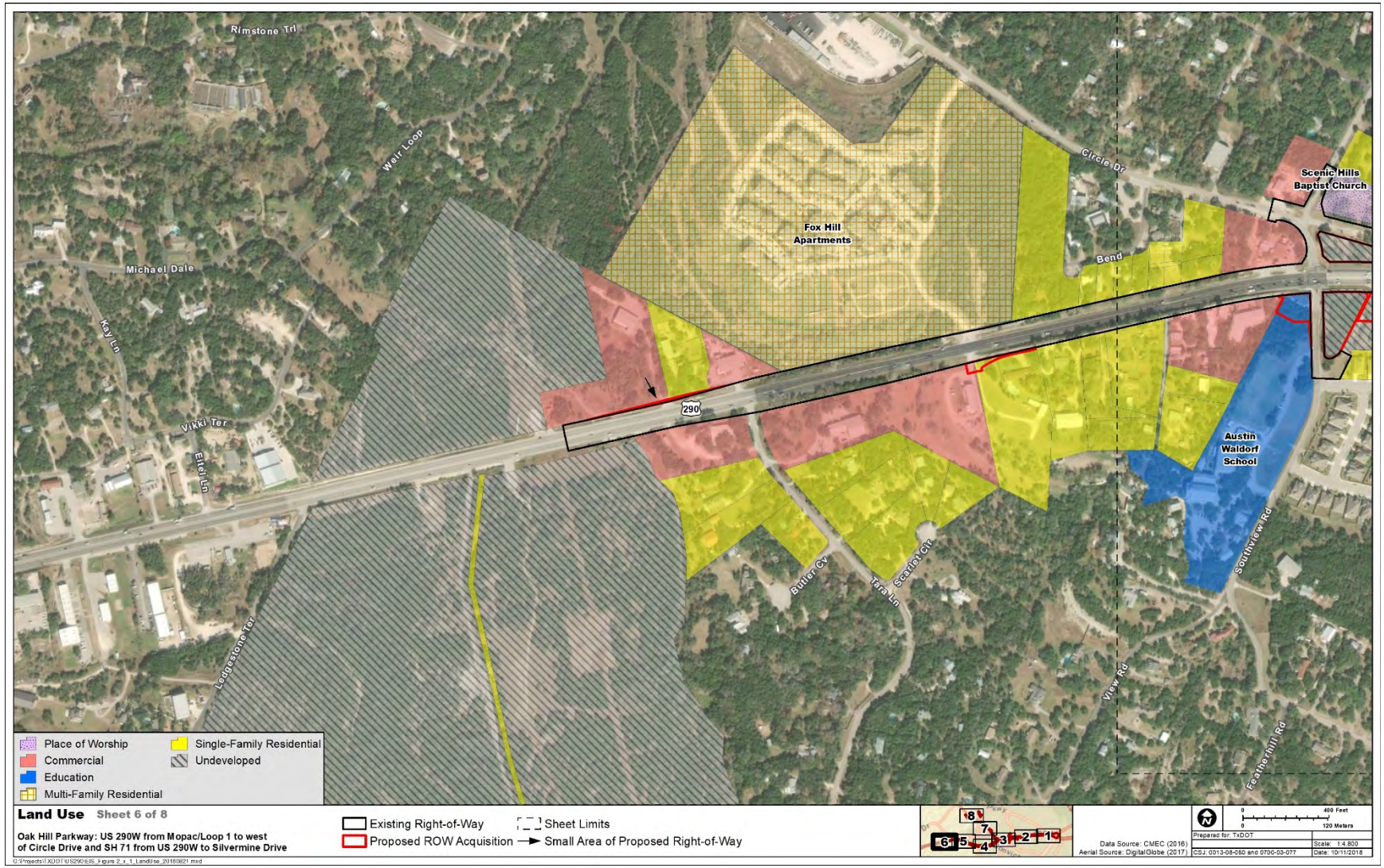

Figure 4-1f. Existing land uses in the OHP Project area.

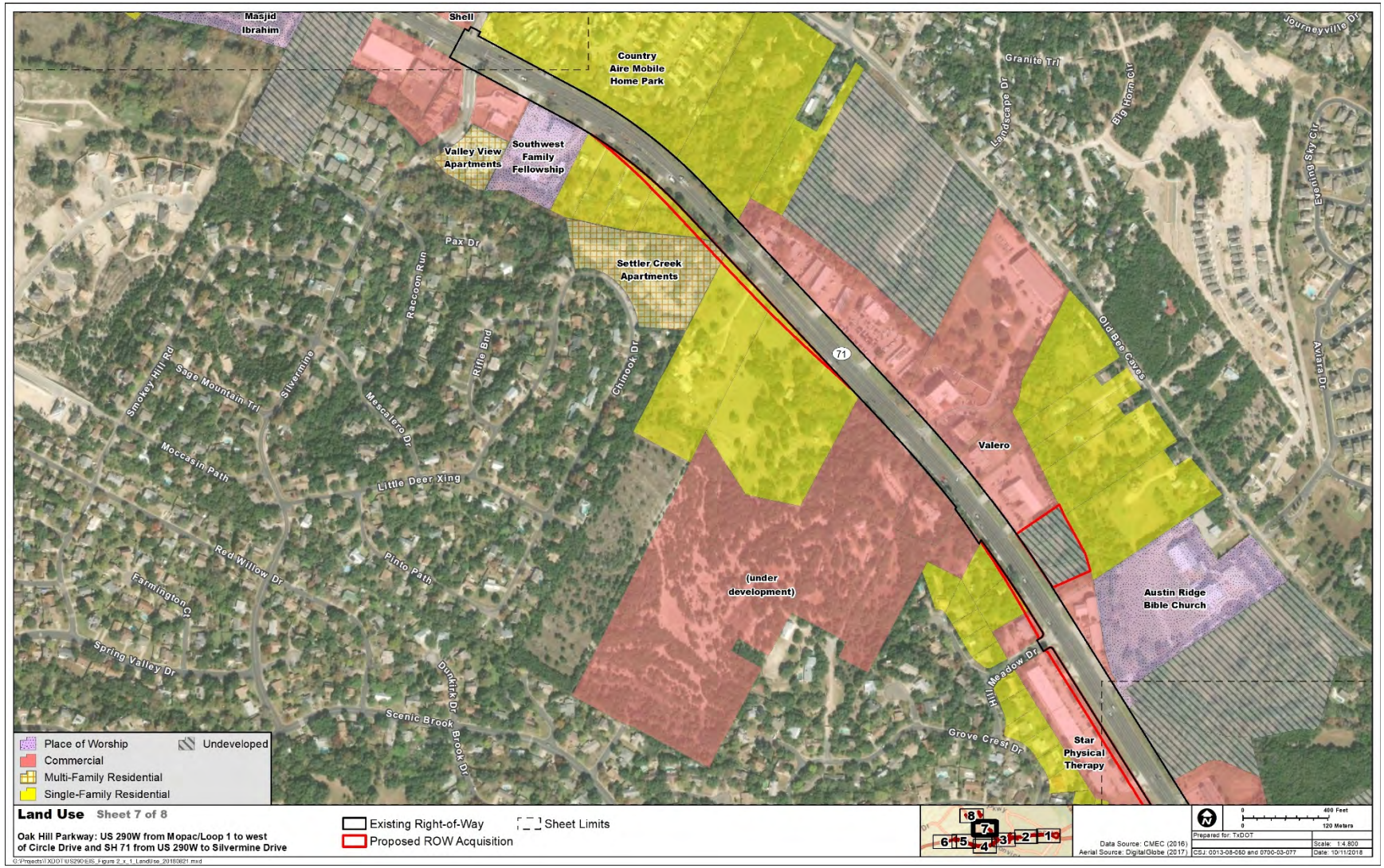

Figure 4-1g. Existing land uses in the OHP Project area.

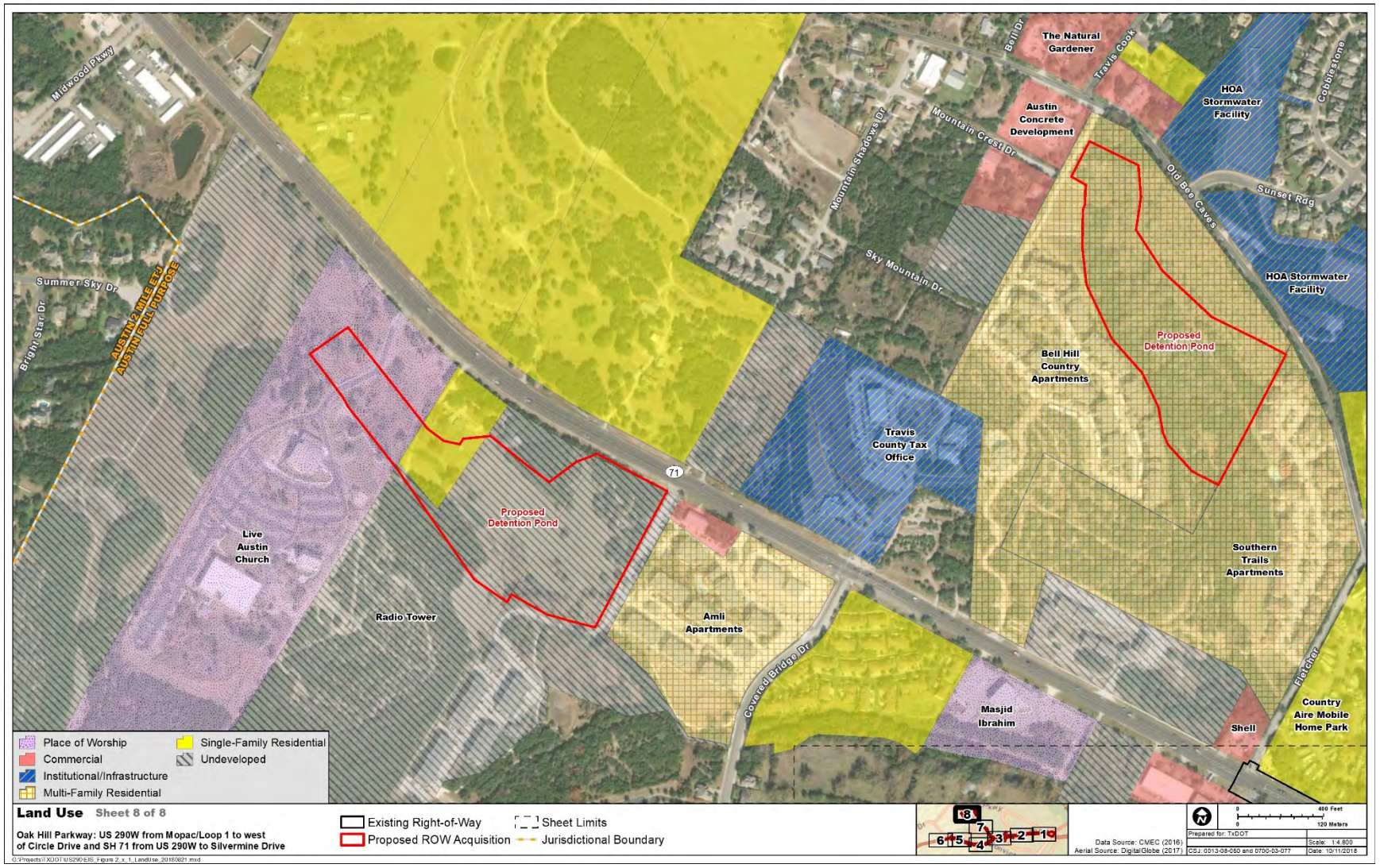

Figure 4-1h. Existing land uses in the OHP Project area.

4.2.1 Consistency with Local Plans and Land Use Policies

Local land use plans and zoning maps were reviewed to determine consistency with plans and policies governing the project area. Since the publication of the Draft EIS, the following local plans are still applicable and have not changed.

- CAMPO *2040 Regional Transportation Plan* (CAMPO 2015)
- City of Austin *Imagine Austin Comprehensive Plan* (COA 2012)
- City of Austin *Urban Trails Master Plan* (COA 2014)
- *Oak Hill Combined Neighborhood Plan* (COA 2008)
- *Travis County Land, Water, and Transportation Plan* (Travis County 2014)

However, the COA initiative to revise its land development code through a process called CodeNEXT has since been terminated. The COA is planning to develop a new approach to revising its land development code in 2019.

The proposed OHP Project is in the southwest portion of the COA in an area known as Oak Hill. The Oak Hill community was annexed by the COA by 1989. Brief discussions of the most pertinent local land use plans and policy documents governing land use in the project corridor can be found in the Draft EIS. The OHP Project will comply with state and federal regulations and does not conflict with any of local plans or land use policies listed above or discussed in Section 4.2.1 of the Draft EIS.

As stated in **Section 2.3**, one of the goals and objectives identified at the outset of the OHPW project was to facilitate the development of a small activity center in Oak Hill in accordance with the CAMPO Centers map in the 2040 CAMPO Plan or to facilitate the redevelopment of an activity center as identified in *Imagine Austin*. The OHP Project does not include the development or redevelopment of an activity center in Oak Hill, as this concept would be a collaborative undertaking by the community, the COA, and CAMPO. However, construction of the *Preferred Alternative* would not preclude the development of a future activity center in the area and would therefore be consistent with the CAMPO and *Imagine Austin* Plans as originally intended.

4.2.2 Existing Conditions

The existing conditions documented in Section 4.2.2 of the Draft EIS remain valid.

4.2.3 Environmental Consequences

Land uses directly impacted by the *Preferred Alternative* are those permanently converted to transportation use. The *Preferred Alternative* requires that approximately 71.75 acres of land be converted to right-of-way and approximately 0.62 acres for use as temporary construction easements. The proposed right-of-way would result in one residential and four commercial displacements (two of the commercial displacements are to occur due to removal of access).

Access to many of the driveways along the corridor would remain or be rebuilt to function similarly to existing conditions; however, 31 driveways would be eliminated and access to 61 driveways would change from having two-way access to/from the roadway to having one-way frontage road access. It is anticipated that land uses remaining on the affected parcels would not be impacted.

A summary of impacts to land uses for the *Preferred Alternative* is provided below in **Table 4-1**.

Table 4-1. Land Use Impacts (Acres) of the *Preferred Alternative*

Land Use	Impacts of *Preferred Alternative*: Acres Converted to Transportation Right-of-Way
Cemetery	< 1
Community Facility	-
Education	2.0
Health Care	-
Institutional/Infrastructure	< 1
Place of Worship	3.5
Commercial	3.5
Light Industrial	2.0
Multi-Family Residential	16.0
Single-Family Residential	5.0
Undeveloped	39.0
Total	**71.75**

Source: Project Team, 2018.

In considering the total land mass of the project area, out of the 11 aggregated land use categories, approximately 54 percent of all impacts would occur on undeveloped lands (approximately 39 acres). Multi-family residential lands represent the second greatest amount of land use impacts at 22 percent of the total acreage, most of which is from one parcel (**Figure 4-1h**). This multi-family residential land impact would be used to create a stormwater detention pond adjacent to an existing apartment complex (Bell Hill Country Apartments) under the *Preferred Alternative*. The remaining land use impacts associated with the *Preferred Alternative* are largely partial land acquisitions of front yard setbacks from parcels fronting US 290 and SH 71. These impacts are from a range of land use categories that have developed over time along the transportation corridor. Total land impacts for the *Preferred Alternative* are negligible in the context of existing land uses and development patterns along the existing transportation corridor.

Some of the impacts associated with the *Preferred Alternative* are for construction of a shared-use path along the length of the project. The *Preferred Alternative* would provide improvements to the roadway network and bicycle and pedestrian facilities which would be

consistent with the CAMPO *2040 RTP* and the 2014 *Austin Bicycle Plan* by providing a shared-use path along its length.

4.2.3.1 Encroachment-Alteration Impacts

Selection of the *Preferred Alternative* did not result in the identification of additional encroachment-alteration effects. The encroachment-alteration effects documented in the Draft EIS remain valid.

4.2.4 Conclusion

The *Preferred Alternative* would require the acquisition of approximately 71.75 acres of lands to be converted to transportation right-of-way. Approximately 0.62 acres of temporary construction easements are also required by the *Preferred Alternative*. Based on the analysis of land use impacts and benefits, the OHP Project would provide overall benefits to the community. Land uses, including commercial activity centers, residential neighborhoods, and community facilities, such as emergency service providers, schools, places of worship, and parklands within the OHP Project corridor would benefit from travel efficiencies resulting from the project. Access to and from some area roadways and neighborhoods onto US 290 and SH 71 would change with implementation of the *Preferred Alternative*, and the function of some driveways would be eliminated or altered (two-way access to the facility changing to one-way access). These changes would change traffic patterns in the area.

Residents and travelers through the transportation corridor would maintain access to businesses, community facilities, and other resources, even though traffic patterns would be modified. Overall, congestion would be reduced and mobility and travel times improved such that land use resources would be more easily accessible. The proposed project supports land use goals as articulated by the COA in the *Oak Hill Combined Neighborhood Plan*.

4.3 Transportation System

4.3.1 Description of Existing and Planned Systems

The existing project corridor serves as a gateway to southwest Travis County and is a primary route between central Austin and the communities of Dripping Springs, Bee Cave, Lakeway, and unincorporated areas of Travis and Hays Counties. The existing and planned transportation system in the project area, made up of roadway, transit, and bicycle and pedestrian facilities, has not changed since publication of the Draft EIS.

The *Preferred Alternative* proposes to improve mobility, promote long-term congestion management, improve safety, and increase multimodal travel options, which is consistent with the transportation policies adopted in the project area.

In addition to TxDOT, several entities conduct transportation planning applicable to the project area, including the Mobility Authority, the COA, Travis and Hays Counties, Capital Metro, and CAMPO. The following local plans were reviewed for their potential influences on

transportation within the project area: the *CAMPO 2040 RTP*; the COA's *Imagine Austin*, *Vision Zero Action Plan*, *Oak Hill Combined Neighborhood Plan*, *Sidewalk Master Plan*, *Urban Trails Master Plan*, and *Bicycle Master Plan*; Capital Metro's *Connections 2025 Transit Plan*; the *Travis County Land, Water, and Transportation Plan*; and the *Hays County Transportation Plan*. These plans indicate that entities in the project area are anticipating additional growth and are planning for it in terms of multimodal transportation improvements. More information about these plans can be found in Section 4.3 of the Draft EIS.

Additionally, since publication of the Draft EIS, the COA has begun the process of writing the *Austin Strategic Mobility Plan,* which will guide all the various local transportation policies, plans, programs, projects, and investments for more than twenty years into the future. However, the draft of the plan is not currently available for preview by the public; it is expected to be available for public comment between late 2018 and early 2019.

4.3.2 Environmental Consequences

The *Preferred Alternative* would provide improvements to the roadway network and bicycle and pedestrian facilities consistent with the policies and goals found in the planning documents discussed in this chapter. Travel conditions along US 290 and SH 71 through the corridor are projected to improve with the *Preferred Alternative*. Proposed mainlanes combined with other roadway improvements would alleviate some of the traffic volume along existing frontage roads and make accessing businesses and offices throughout the project corridor easier. The *Preferred Alternative* would give commuters better options for modes of travel other than a single-occupancy vehicle. The *Preferred Alternative* would be implemented with input from Capital Metro to create appropriate transit options within the corridor.

The OHP Project has proposed construction of approximately 7 miles of 10-foot-wide shared-use paths along the OHP Project corridor, from MoPac to Circle Drive along US 290 and from US 290 to Silvermine Drive along SH 71. Improvements are expected to connect with the COA's proposed YBC Trail at Oak Hill to Barton Creek. Striped bicycle lanes on cross streets would be implemented to allow for safe travel across US 290 at Circle Drive, Scenic Brook Drive, Convict Hill Road, William Cannon Drive, and RM 1826. There would be a similar bicycle lane at SH 71 and Scenic Brook Drive. Additionally, approximately 7 miles of 6-foot-wide continuous sidewalks along the corridor; these sidewalks would be compliant with the requirements of the Americans with Disabilities Act (ADA).

Under the *Preferred Alternative*, the Oak Hill Park & Ride would no longer operate or provide service at its existing location at US 290/SH 71 and William Cannon Drive. However, TxDOT is actively working with Capital Metro to identify options for park and ride opportunities in the Oak Hill area that would enhance Capital Metro and CAMPO's initiative to provide express service along the corridor. Capital Metro's *Connections 2025 Transit Plan* includes plans for a new park and ride facility in Oak Hill. Capital Metro has been involved with engaging the public about the proposed project and is actively working to ensure mass transit within the corridor fits the public's needs and helps to foster community cohesion and access within and out of the Oak Hill area.

Access to and from some area roadways and neighborhoods onto US 290 and SH 71 would change with implementation of the *Preferred Alternative*, and the function of some driveways would be eliminated or changed (two-way access to the facility changing to one-way access). It is not anticipated that local travel times would increase by more than two to three minutes at certain locations. Overall travel times through the corridor would be anticipated to decrease due to the addition of roadway capacity and reduction of traffic congestion.

The neighborhoods and community facilities within the project area would also experience temporary effects related to construction activities, such as temporary changes in traffic patterns. A traffic control plan would be developed prior to construction to manage and route traffic safely and efficiently, and maintain access to local streets, businesses, and other facilities. The traffic control plan would detail how motorists would be alerted to the time and day of lane closures. Furthermore, construction activities would be scheduled to minimize traffic disruption within the corridor.

Overall, the proposed project would result in improvements to the existing roadway and transit system and provide improved connections to the bicycle and pedestrian network.

4.3.2.1 Encroachment-Alteration Effects

The selection of the *Preferred Alternative* did not result in the identification of additional encroachment-alteration effects. The encroachment-alteration effects documented in the Draft EIS remain valid.

4.4 Geologic and Soil Resources

As a result of participating agency comments received during the Draft EIS public comment period, the geologic and soil resources were reassessed for the *Preferred Alternative* alignment. The physiographic setting and soils within the proposed alignment have not changed. Below is a summary of the updated analysis of geologic features identified in the revised *Geologic Assessment* (GA) (**Appendix E**).

4.4.1 Geology

Geologic formations within the project area include Lower Cretaceous marine deposits and more recent Quaternary sediments. These formations, composed chiefly of limestone, were deposited on a vast submerged plain known as the Comanche Shelf (Bureau of Economic Geology, 1972). In addition, a portion of the project area lies within the Edwards Balcones Fault Zone Aquifer (Edwards Aquifer), an environmentally sensitive area. Numerous enhanced karst features occur within the area of the Edwards Aquifer, resulting in a very productive groundwater aquifer (**Figure 4-2**). Karst features are formed from the dissolution of soluble rocks, including limestone, and are characterized by sinkholes, caves, and underground drainage systems. The majority of the recharge into the Edwards Aquifer occurs where surface water flows over faults, fractures, and karst features that have been solutionally enhanced.

The Edwards Aquifer contains several zones, which are based on how water drains in these areas; these include the Recharge Zone, Transition Zone, and Contributing Zone. The Recharge Zone includes an area where highly faulted and fractured Edwards Limestone outcrops occur at the surface, providing a means for large quantities of water to flow into the aquifer with little filtration. The Transition Zone contains areas where limestones that overlie the aquifer are faulted and fractured and include caves and sinkholes. Within this area, it is possible for surface water to flow into the Edwards Aquifer below. The Contributing Zone consists of areas of non-Edwards Formation outcrops that occur at a higher elevation, causing water to drain to stream courses that overlie the Recharge Zone. Additional information regarding the Edwards Aquifer and its zones is provided in Section 4.9 of the Draft EIS.

The Texas Speleological Survey database was queried for possible known or existing recharge features within the boundaries of the project area. The Texas Speleological Survey did not include any records for existing recharge features within the project area (Texas Speleological Survey, 2008). Some of the development within the project area predates the era of comprehensive record-keeping of karst features; therefore, it is possible that construction in the vicinity of developed lots might encounter undocumented karst features covered during prior development.

The Mount Bonnell Fault forms the boundary between the Edwards Aquifer Contributing and Recharge Zones and occurs within the central portion of the project area (see **Figure 4-2**). Fracturing coincident with the fault may provide a pathway for groundwater to enter the limestone and contribute to the formation of caves. The portion of the project area east of the Mount Bonnell Fault is located in the Recharge Zone of the Barton Springs Segment of the Edwards Aquifer (Barton Springs/Edwards Aquifer Conservation District [BSEACD], 2010). Groundwater in this area generally flows from the southwest to the northeast toward a few focused discharge points, and recharge is typically focused at faults and karst features, such as caves and sinkholes. Within the project area, the groundwater hydrology is largely influenced by the karst units of the Edwards Group, which form an outcrop east of the Mount Bonnell Fault. This suggests that the likelihood of karst features occurring within the project area may be greatest east of the Mount Bonnell Fault within the Edwards Aquifer Recharge Zone. In addition, according to communications from the Texas Speleological Survey staff, the distribution of caves on a countywide basis suggests a concentration of caves exists along the east side of the Mount Bonnell Fault.

The geologic units mapped within the Recharge Zone portion of the project area include: Quaternary alluvium (Qal), Quaternary fluviatile terrace deposits (Qhg), the Kainer Formation (Kk) of the Edwards Group, and the Upper member of the Glen Rose limestone (Kgru). Geologic units found within the Recharge Zone portion of the project area predominantly include Kk and a smaller area of Qhg along the southeastern border. The remaining portion of the project area lies within the Edwards Aquifer Contributing Zone and contains mainly Kgru areas and moderate portions of Qal located within the north-central portion of the project area.

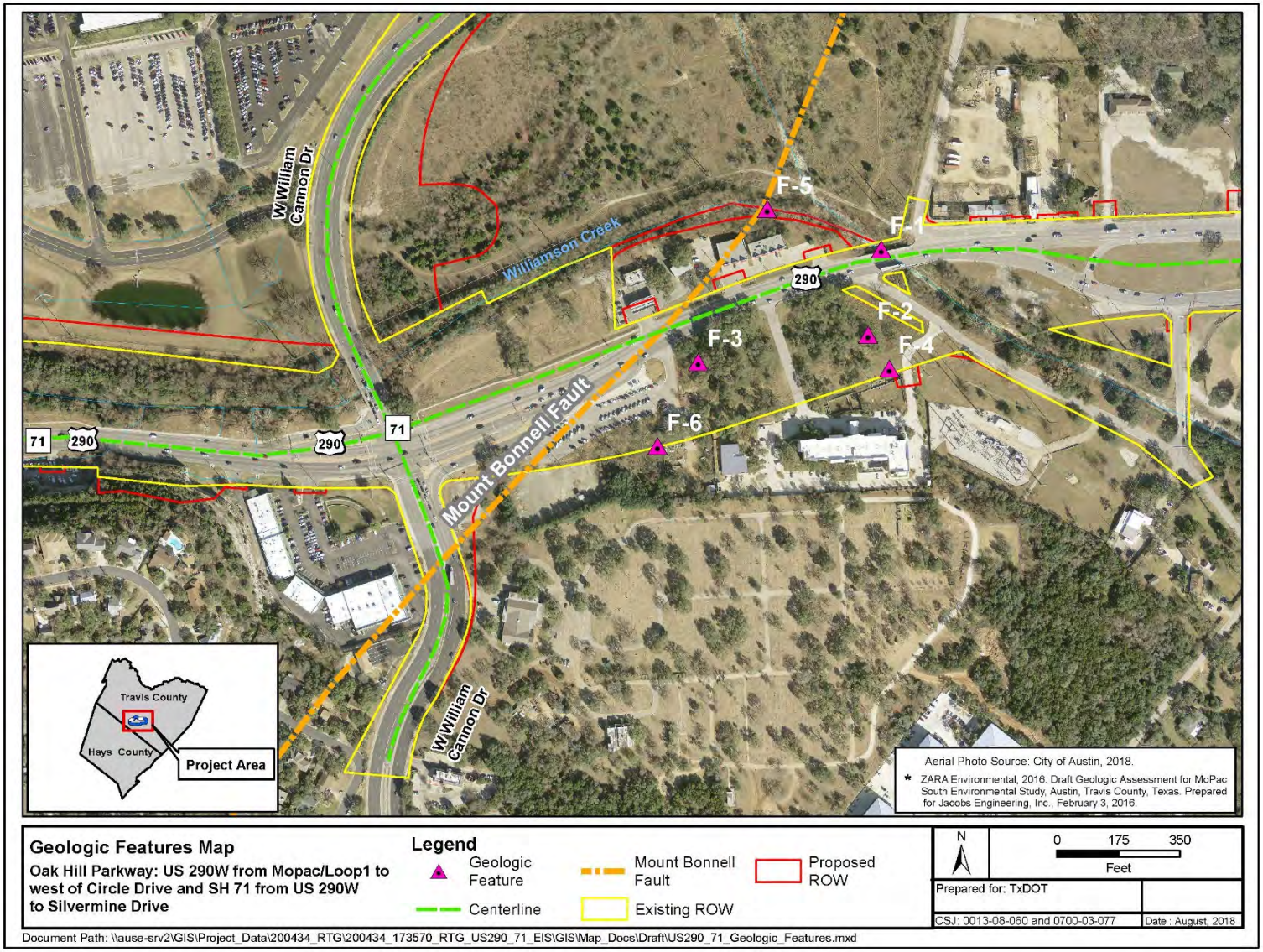

Figure 4-2. Geologic features map.

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Through background research and field investigations, all known karst features in and near the project area were documented during the GA of the project area (see **Appendix E**). Six karst features that occur within the existing right-of-way would be affected by project activities; all six features were documented according to TCEQ guidelines (TCEQ, 2004a). Four of these six karst features were scored as sensitive. Identified features are classified according to type, recharge potential, and other characteristics. The features are scored based on fixed TCEQ classification scores included in TCEQ's Geologic Assessment Table form. If a feature is scored at less than forty points, then it is considered insensitive; if a feature is scored greater than or equal to 40 points, then it is considered sensitive, meaning it has a greater potential to conduct surface water into the aquifer.

Gaines Sink (ZARA Environmental, 2016) lies to the east of the project right-of-way at the northwest corner of the intersection of northbound MoPac frontage road and Southwest Parkway, as shown on **Figure 4-3**. Gaines Sink was not assessed during the field geologic survey, as it is outside the bounds of the survey area. A GA provided by TxDOT staff states that before the construction of MoPac, the sinkhole drained approximately 4 acres of land (ZARA Environmental, 2016). ZARA Environmental describes the area where the sinkhole is located as being "protected from surface runoff from adjacent at-grade roadways by curbs and gutters that are conveyed by a surface and subsurface stormwater system, treated by existing water quality facilities, and released to the north into the Barton Creek drainage," (Zara Environmental, 2016). No dye tracing has been done at this site. ZARA Environmental (2016) describes the site as being close to the groundwater divide between Cold Springs and Sunset Valley (Barton Springs) and notes that recharge into Gaines Sink could flow to either Cold Springs, Barton Springs, or both (Hauwert et al., 2004).

Flea Market Sink is a closed depression outside the northern limits of the TxDOT right-of-way, east of William Cannon Drive between Industrial Oaks Boulevard and Oak Boulevard, along the frontage road of westbound US 290. The area was identified as "Flea Market Sink" by COA staff member Ed Peacock in email communication to TxDOT dated May 23, 2018. Members of the project team completed a second site visit on June 22, 2018, to assess the Flea Market Sink. The sink area is approximately 35 feet in diameter, sloping to approximately 2 to 2.5 feet in depth. A corrugated metal pipe standing above the ground surface is located in the center of the sink area. The pipe extends to a depth of approximately 6 feet below grade, where it intersects an approximately 12-inch-diameter pipe that runs to the south toward the US 290 stormwater drain system. Various pieces of anthropogenic litter were present both inside the pipe and in the sink area. Several limestone boulders approximately 1 foot in diameter are present. The sink area is fenced but was not locked. It appears that the stand pipe and storm sewer connection were constructed to alleviate ponding of stormwater in the feature and keep the ponded water from impacting the car lot east of and adjacent to the site. In researching the site and communicating with staff, it was not determined what entity (i.e., COA and/or TxDOT) constructed the stand pipe and adjoining infrastructure to connect the pipe to the storm sewer system.

Based on organic and anthropogenic materials present, it appears that the feature can hold water for long periods of time during flood events. Therefore, it is estimated that the feature does not contribute a significant amount of recharge to the Edwards Aquifer. With the current stormwater drain installed, it does not appear that the feature will receive project drainage. The current stormwater system drains the parcels surrounding the area into the project stormwater system. Flea Market Sink is shown on **Figure 4-4.**

4.4.1.1 Feature Descriptions

Feature F1 is a group of widely spaced fractures in bedrock within the Williamson Creek stream bed. The fracture apertures are less than one-tenth of one inch wide and do not appear to convey a significant amount of recharge. This feature could be associated with the Mount Bonnell Fault, and precautions should be taken to protect flow to this feature during construction activity. The feature was evaluated as sensitive with a moderate potential for infiltration.

Feature F2 is a solution cavity situated along the base of a bedding outcrop. This feature is infilled by soil and organic debris, and animal burrowing is evident. The potential for rapid infiltration of this feature is low, and it was evaluated as non-sensitive.

Feature F3 is a small outcrop of limestone exhibiting small interconnected solution-enlarged cavities. It was evaluated as non-sensitive with a low relative potential for infiltration.

Feature F4 is a karst zone that encompasses an approximately 100-by-30-foot area on a gently sloping hillside covered with live oak trees and Ashe juniper. Multiple fractures are present within this feature, and apertures appear to show some evidence of solution enlargement, although most are infilled with vegetation and soil. Overall, this feature is expected to have a low potential for recharge to the aquifer due to the large amount of vegetative debris filling the fractures and the Speck soils that occur across this portion of the project area which are characterized by high runoff potential. However, due to the zone classification of this feature and its similarity with the regional structural trend, it was evaluated as sensitive.

Feature F5 is identified as the surface expression of the Mount Bonnell Fault within Williamson Creek which shows little evidence of solution enlargement. Most fractures within the streambed appear to be sealed with fine-grained sediment and vegetative debris. This feature is not exposed in any other location within the project area. It was evaluated as sensitive with a moderate potential for infiltration.

Feature F6 is a solution cavity of about 2 square feet located along the southern limits of the TxDOT right-of-way south of US290. The feature itself appears Y-shaped in plan view and extends to a depth of about 4 feet. Native soils infill the cavity on the sides, and the feature does not appear to open or expand laterally with depth. The feature was evaluated as sensitive with a moderate potential for infiltration.

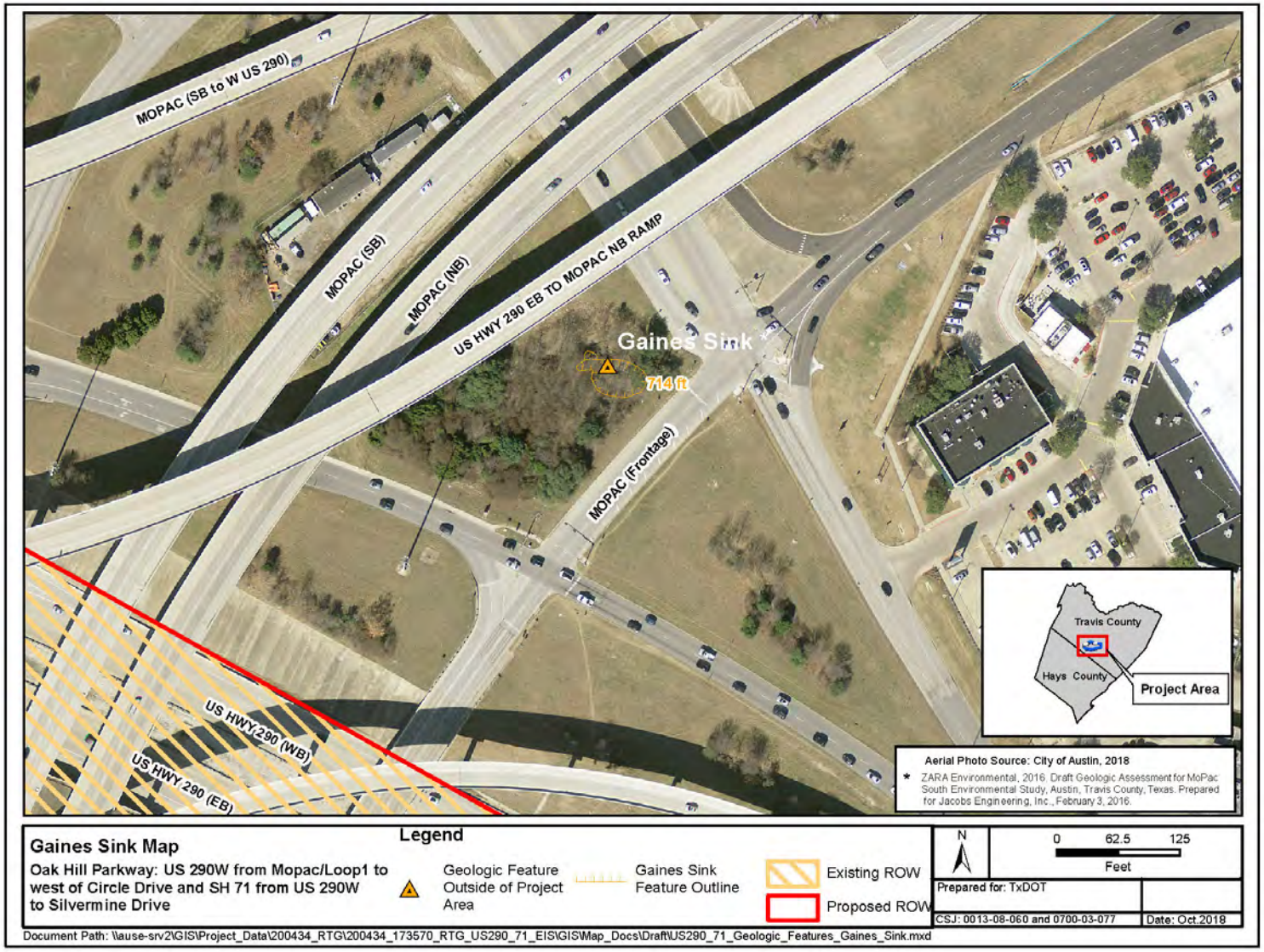

Figure 4-3. Gaines Sink map.

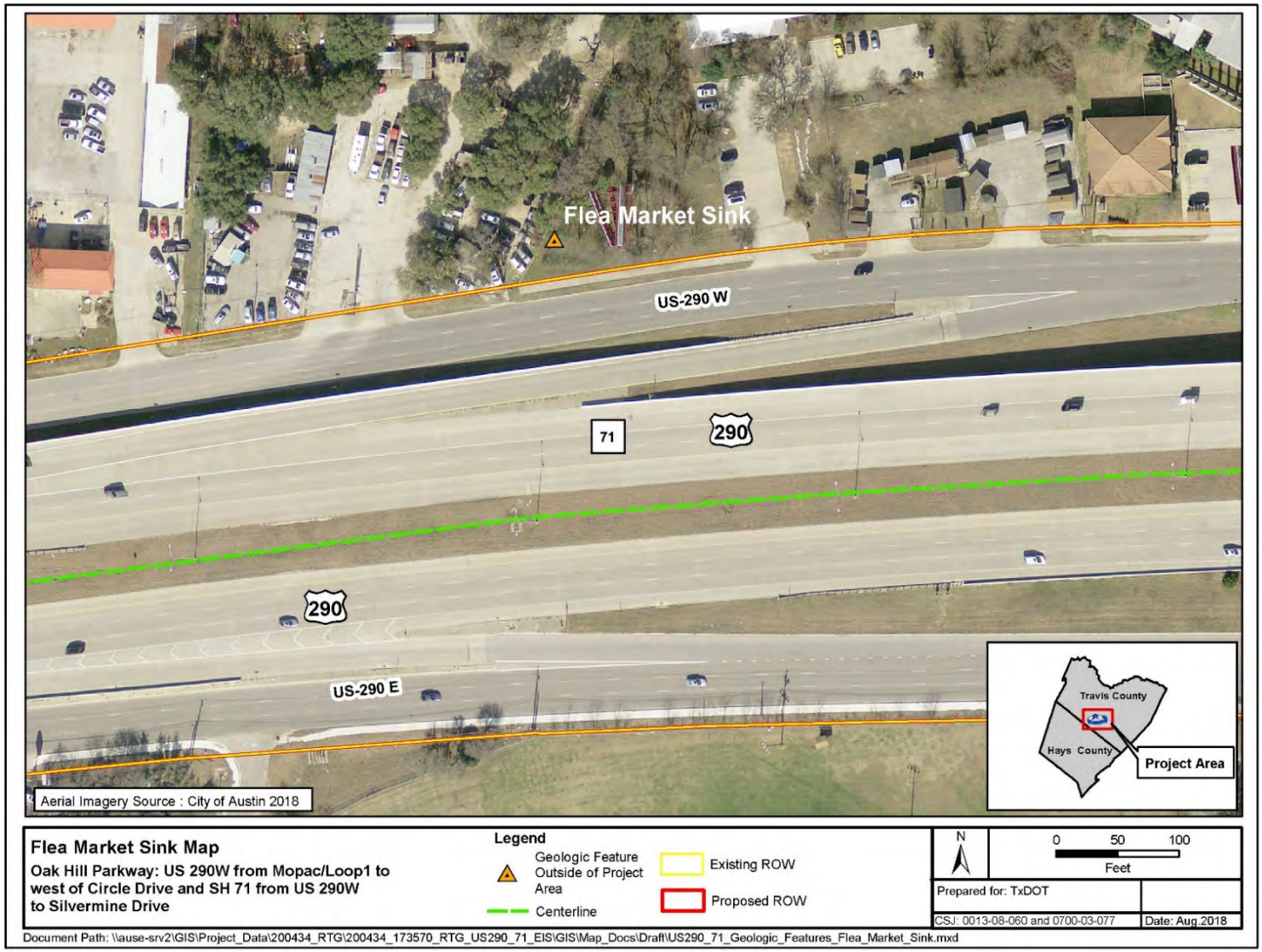

Figure 4-4. Flea Market Sink map.

4.4.1.2 Environmental Consequences

Geologic resources within the project area are anticipated to receive minor impacts from the *Preferred Alternative* construction activities. Geologic units located near the ground surface may be exposed, resulting in erosion of those areas. Erosion effects would be minimized by utilizing preventive best management practices (BMPs) including dikes, berms, mulching, erosion control blankets, and other protective measures. Six karst features occur within the existing right-of-way area and would be affected by the *Preferred Alternative*. Impacts from the *Preferred Alternative* would be largely consistent with existing conditions, but due to the higher TSS removal, some water quality impacts could be mitigated. Gaines Sink and Flea Market Sink will not be impacted by the *Preferred Alternative* as they are both outside the construction boundaries of this project. Construction impacts, erosion, and sedimentation issues would be minimized by the use of BMPs both during and after project construction.

Construction activities proposed for the *Preferred Alternative* within the project area would result in a range of effects to existing soils. The potential for soil compaction, erosion, or sedimentation would increase along with most construction activities. BMPs, along with other erosion and sediment control measures, would be utilized to minimize erosion and soil loss during these activities. These proposed actions would result in a reduction of project impacts to area soils.

Although areas designated as prime farmland soils do occur within the project area, the project is within an area of land already in urban development; therefore, it is exempt from the FPPA. No coordination with the NRCS would be required for this project.

Water quality measures, including the use of BMPs during construction and operation of the project, would help reduce and control stormwater runoff within the project area. Structural BMPs would include silt fences, grassy swales, rock filter dams, and water quality ponds.

4.4.1.3 Encroachment-Alteration Effects

Encroachment-alteration impacts to geology and soils resulting from the *Preferred Alternative,* as documented in the Draft EIS, remain valid.

4.5 Socioeconomic Resources

The *Community Impacts Assessment Technical Report* appended to the Draft EIS described the OHP Project as having tolled mainlanes. The Draft EIS indicated the technical report would be updated prior to publication of the Final EIS with the revised project description reflecting TxDOT's selection of non-tolled mainlanes. However, because the change to a non-tolled facility did not result in major design changes or impacts to socioeconomic resources, the impacts are discussed within this Final EIS and are not included in an updated technical report. Existing conditions including community facilities, demographic characteristics, employment and economic conditions, access, and community cohesion have not changed and are detailed in the Draft EIS.

Displacements and relocations would be handled according to the Uniform Relocation and Real Property Acquisition Policies Act of 1970, as amended. The potential for displacements and relocations resulting from the *Preferred Alternative* was determined based on schematics provided by the project engineers.

4.5.1 Environmental Consequences

4.5.1.1 Community Facilities

Table 4-2 summarizes the potential impacts to community facilities including neighborhoods, communities, and mobile home parks; police, fire and emergency medical services (EMS); schools; places of worship; cemeteries; and parklands. In addition to these expected permanent impacts, approximately 4.8 acres would be required as temporary construction easements (0.62 acres), drainage easements (0.17 acres), and driveway licenses (3.99 acres). After construction, the *Preferred Alternative* would be expected to reduce congestion and travel times and improve access, mobility, and reliability within the OHP Project corridor. The *Preferred Alternative* would thereby potentially improve access to and reduce travel times to neighborhoods and community facilities in the project area.

Table 4-2. Changes to Community Facilities—*Preferred Alternative*

Category	Impacts
Neighborhoods, Communities, and Mobile Home Parks	Approximately 8.7 acres would be acquired from the Ridgeview Austin Homeowners Association as two parcels along the south side of US 290 east of Southview Road (Circle Drive). Currently, these parcels are zoned Common Areas and Undeveloped, and acquisition would not result in any relocations or displacements. A traffic control plan would be developed prior to construction, and construction activities would be scheduled to minimize disruption. The *Preferred Alternative* would not further divide, separate, or isolate any neighborhood, community, or mobile home park and would not affect community cohesion.
Police, Fire, and Emergency Services	No police, fire, or EMS stations or medical service facilities would be directly affected. Temporary changes in traffic patterns during construction may affect emergency responders in the short term. Notification prior to construction and/or temporary roadway closures or detours would be provided to emergency service providers. Following construction, improved access, mobility, and reliability within the corridor would be expected.
Schools	Approximately 1.44 acres of property would be acquired from ACC, and approximately 1.37 acres would be acquired from the Austin Waldorf School. No school buildings or facilities would be affected by these acquisitions, as the acquisitions would affect only undeveloped or driveway portions of the properties. Minor and temporary changes to bus routes or school commutes through the project area may occur during construction. Road closures and/or detours would be properly marked.
Places of Worship	The *Preferred Alternative* would require the acquisition of approximately 3.98 acres owned by places of worship (0.14 acres from Hill Country Baptist Church, 0.7 acres from Scenic Hills Baptist Church, and 3.14 acres from LifeAustin). These acquisitions would be from portions of the properties that are not currently used for worship or gathering purposes. No buildings at these places of worship would be affected by the acquisitions, and no displacements or changes to the active use of the property would occur.

Category	Impacts
Cemeteries	Under the *Preferred Alternative*, approximately 0.12 acres would be acquired from SCI Funeral Services. The acquired parcels would be slivers along William Cannon Drive and would affect the entrance driveway to the Cook-Walden/Forest Oaks Funeral Home and Memorial Park. The acquisition of right-of-way in this area would not affect the function of the cemetery or funeral home. During construction, access to this cemetery/funeral home may be temporarily affected. However, TxDOT would work with the funeral home to ensure their operations would be ongoing during construction.
Parkland	No parklands would be directly impacted by the *Preferred Alternative*. Improved mobility within the corridor would allow for easier access to parklands within the project corridor.
Other Community Facilities	The Oak Hill Park & Ride facility, operated by Capital Metro, would be closed with the implementation of the *Preferred Alternative*. Capital Metro may move this facility, but a new location has not yet been identified and it is possible the facility would be closed or unavailable while Capital Metro is assessing options for locations. The remaining other community facilities would continue to operate, and the services they provide would not be adversely affected.

Source: Project Team, 2017.

4.5.1.2 Displacements and Relocations

Displacements and relocations were reassessed using the revised proposed right-of-way for the *Preferred Alternative*. The number and location of displacements and relocations remains the same. However, the amount of right-of-way acreage has changed slightly: 80 parcels, totaling approximately 71.75 acres, would be acquired for the *Preferred Alternative.* This would result in one residential and two commercial property displacements due to right-of-way acquisition, and two commercial displacements due to removal of access. Additional right-of-way may also be needed due to utility conflicts and maintenance requirements which have not been fully vetted at this stage of the project design. The locations of the displacements are shown on **Figure 4-5**. These businesses, and the owners of the residential property, have been contacted consistent with the USDOT policy as mandated by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, which established that all property owners from whom property is needed are entitled to receive just compensation for their land. Just compensation is based on fair market value of the property. TxDOT would provide information and resources to the affected property owners. The displacements are described in detail in Section 4.5 of the Draft EIS.

Displacements and relocations would be handled according to the Uniform Relocation and Real Property Acquisition Policies Act of 1970, as amended. The potential for displacements and relocations resulting from the *Preferred Alternative* was determined based on schematics provided by the project engineers.

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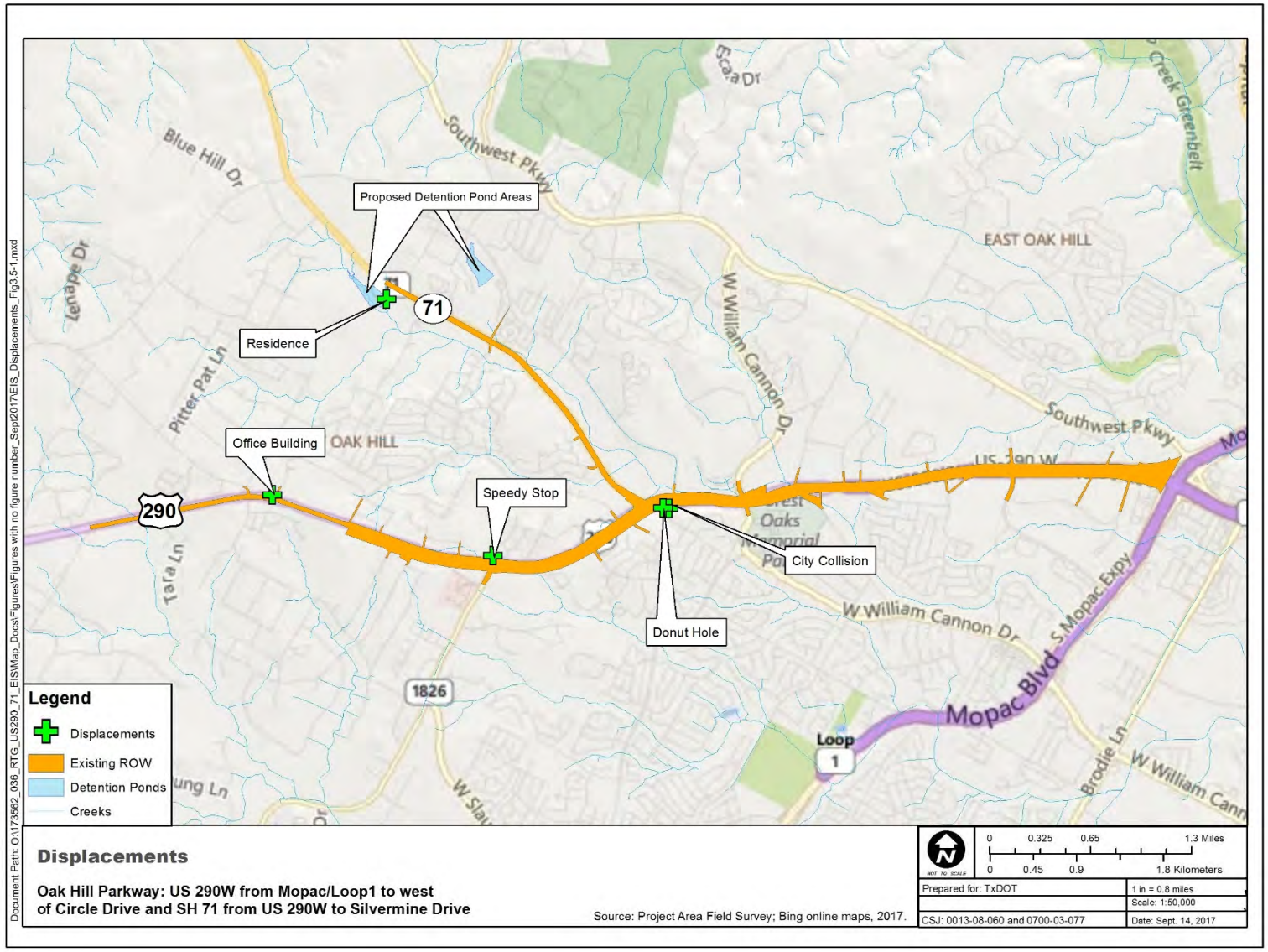

Figure 4-5. Displacements.

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4.5.1.3 Access Analysis

Access has not changed since selection of the *Preferred Alternative.* In all, 189 driveways (including both developed and dirt/gravel access) were counted within the project area's existing right-of-way, based on aerial photography. As shown in **Table 4-3**, access to the majority of driveways would remain or be rebuilt to function similar to the existing condition; however, 31 driveways would be eliminated, and access to 61 driveways would change from having two-way access to/from the roadway to having one-way frontage road access.

Table 4-3. Driveway Access Changes—*Preferred Alternative*

	Access to Roadways Remains Similar to Existing Condition	Driveways Eliminated	Access to Roadways Changes from Two Way to One Way
Count	97	31	61
Percent	51.3%	16.4%	32.3%

Source: Project Team, 2017.

In addition to changes in driveway access, access to/from US 290/SH 71 from some area neighborhoods and roadways may change. **Table 4-4** summarizes the changes in access that would result under the *Preferred Alternative*. As shown in the table, commuters would have reduced access at 21 access points from which they would have to travel a longer distance to reach the same point.

Table 4-4. Access Changes—*Preferred Alternative*

Access Description	Number of Locations Studied	Locations with the Same Access	Locations with Improved Access	Locations with Reduced Access	Additional Length Required to Access (ft.)
To US 290 from Roadways	36	23	3	9	28,050
From US 290 to Roadways	63	51	3	10	38,950
To SH 71 from Roadways	6	5	0	1	1,800
From SH 71 to Roadways	12	11	0	1	4,600
Total *Preferred Alternative*	**117**	90	6	21	73,400

Source: Project Team, 2018.

In **Table 4-4**, "reduced access points" are those where implementation of the alternative creates a longer travel distance when compared to the existing condition to reach the same point (e.g., instead of making a left-turn onto the facility, a driver would now need to turn right and go through a Texas turnaround). It should be noted that, currently, left-hand turns onto the existing facility may be difficult and dangerous due to congestion and/or speed of traffic.

Therefore, even though the traffic pattern would change and commuters would no longer have the option for left-hand turns onto the facility at a number of locations, the *Preferred Alternative* would include the benefits of enhanced safety and, in some cases, reduced travel time even though a longer distance may have to be travelled to reach a point due to the forced use of a right-hand turn and Texas turnaround. These access changes would not be expected to impact community cohesion, as areas would still be easily accessible, and safety would increase. The reduced access changes would require traveling an additional distance ranging between 0.4 miles and 1.25 miles. At most with this alternative, reduced access would result in a commuter having to travel approximately 1.25 miles longer than the current condition. This worst case would be for a traveler on southbound Hudson Loop accessing eastbound US 290; estimated time needed to travel this distance is approximately two to three minutes.

4.5.1.4 Encroachment-Alteration Effects

Encroachment-alteration impacts to socioeconomic resources resulting from the *Preferred Alternative,* as documented in the Draft EIS, remain valid.

4.6 Environmental Justice

Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The Environmental Justice analysis in Section 4.6 the Draft EIS remains valid since selection of the *Preferred Alternative.*

4.6.1 Environmental Consequences

The *Preferred Alternative* would not be expected to result in disproportionately high and/or adverse impacts to EJ populations.

4.6.1.1 Encroachment-Alteration Effects

Encroachment-alteration impacts to EJ communities have not changed with the selection of the *Preferred Alternative*.

4.6.2 Limited English Proficiency

Overall, approximately 6.6 percent of the population in the census block groups within the project area were considered to have limited English proficiency, with Spanish being the most common language after English (USCB, 2014). The Limited English Proficiency analysis in the Draft EIS remains valid.

4.6.2.1 Limited English Proficiency Effects

The OHP Project team has provided, and will continue to provide, meaningful communications to stakeholders who could be affected by the construction and operations of the OHP Project. Materials were made available in the dominant language spoken (English), and translation services were available for speakers of other languages upon request. The public hearing notices were published in English and Spanish in *Ahora Sí*. That publication included a statement saying, "If you require a Spanish translator please contact the TxDOT Point of Contact no later than seven days prior to the public hearing."

TxDOT has and will continue to conduct public involvement activities for the proposed OHP Project in accordance with Executive Order 13166 to ensure full and fair participation.

4.7 Air Quality

The Air Quality analysis completed for the project, documented in the *Air Quality Impacts Assessment Technical Report* (**Appendix F**), followed the TxDOT *Air Quality Compliance Flowchart for FHWA/FTA and State-only Projects* (TxDOT, 2017). The technical report was updated in July 2018 to reflect accurate traffic data following the decision by TxDOT to pursue non-tolled mainlanes.

4.7.1 Conformity to Transportation Plans

The proposed project is located within Travis County, which is designated as in attainment or unclassified for all National Ambient Air Quality Standards (NAAQS). Therefore, the project is not subject to transportation conformity.

4.7.2 Carbon Monoxide Traffic Air Quality Analysis

Annual average daily traffic (AADT) volumes for the design year 2040 are estimated to be up to 183,700 vehicles per day (see **Table 4-5**). Since the design-year AADT would exceed 140,000 trips, the need for a Carbon Monoxide Traffic Air Quality Analysis (CO TAQA) was triggered. Traffic volumes used were developed by Rodriguez Transportation Group (RTG) using the 2040 CAMPO model approved by the TxDOT Transportation Planning and Programming Division (TP&P), which assumed all CAMPO projects, in addition to the proposed OHP Project, were built.

Table 4-5. 2040 Daily Traffic Volumes

Roadway Link	No Build Alternative	*Preferred Alternative*
US 290		
West of Circle	41,850	70,640
Circle to Scenic Brook	43,700	70,180
Scenic Brook to RM1826	46,145	74,900
RM 1826 to Convict Hill	45,110	99,870
Convict Hill to SH71	39,460	98,870

Roadway Link	No Build Alternative	*Preferred Alternative*
SH71 to William Cannon	58,270	144,280
William Canyon to Old Fredericksburg	78,100	155,510
Old Fredericksburg to Monterey Oaks	80,370	157,830
Monterey Oaks to MoPac	86,850	159,300
MoPac to Brodie	91,140	142,980
East of Brodie	147,670	161,670
SH 71		
US290 to Scenic Brook	41,750	60,730
North of Scenic Brook	27,390	45,720
MoPac		
North of US290	168,490	183,700

Source: RTG, 2018.

To verify that the proposed project would not result in an exceedance of the 1-hour or 8-hour CO NAAQS, CO TAQA modeling was conducted for the *No Build Alternative* and the *Preferred Alternative* for both the opening-year-to-traffic (2024) and design-year (2040) conditions. The CO concentrations were modeled at two different locations to capture the peak traffic volumes in the project area (MoPac/US 290 Interchange) and the largest project-related increase in traffic volumes (SH 71/US 290 Interchange). CO concentrations for the proposed action were modeled using CALINE3 and the TxDOT Motor Vehicle Emissions Simulator 2014 (MOVES2014) emission rate lookup tables and factored in adverse meteorological conditions and sensitive receptors at the right-of-way line in accordance with the *Standard Operating Procedure for Complying with CO TAQA Requirements* (TxDOT, 2015). Local concentrations of CO are not expected to exceed national standards at any time. **Table 4-6** lists the peak 1-hour and 8-hour CO concentrations expected within the project area. As shown, the CO concentrations for the *No Build Alternative* and the *Preferred Alternative* are far below the NAAQS of 35 parts per million (ppm) and 9 ppm, respectively. The modeling outputs, traffic volumes used in the modeling, and a figure showing the receptor locations are included in Appendix B of the *Air Quality Impacts Assessment Technical Report* (**Appendix F**).

Table 4-6. CO Concentrations (ppm)

Alternative	1-hour	8-hour	Exceed NAAQS?	% of 1-hour NAAQS	% of 8-hour NAAQS
Opening Year (2024)					
No Build	2.0	0.9	No	5.7	10.0
Preferred Alternative	2.2	1.0	No	6.3	11.1
Design Year (2040)					
No Build	1.4	0.5	No	4.0	5.6
Preferred Alternative	1.5	0.6	No	4.3	6.7

Source: Project Team, 2018.
Note: CO concentrations include the background concentrations of 1.2 ppm and 0.4 ppm for the 1-hour and 8-hour conditions, respectively.

4.7.3 Mobile Source Air Toxics

As the proposed project would add capacity to the facility and the design-year AADT volumes would exceed 140,000 vehicles per day, it was determined that a quantitative mobile source air toxics (MSAT) analysis would be required for the proposed OHP Project.

4.7.3.1 Project-Specific MSAT Information

For each alternative, the amount of MSAT emitted would be proportional to the vehicle miles traveled (VMT), assuming other variables such as fleet mix are the same for each alternative. The VMT estimated for the *Preferred Alternative* is slightly higher than that for the *No Build Alternative*, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the *Preferred Alternative* along the highway corridor (**Figure 4-6**). The reduction in VMT along parallel routes would result in a corresponding decrease in MSAT emissions. The emissions increase is offset by lower MSAT emission rates due to increased speeds; based on the MSAT MOVES2014 emission rates included in the TxDOT Air Quality Toolkit, emissions of all the priority MSATs decrease as speed increases (U.S. Environmental Protection Agency [EPA], 2016). Also, regardless of the alternative chosen, emissions would likely be lower than present levels in the design year as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (FHWA, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the project area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project would have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under the *Preferred Alternative* there may be localized areas where ambient concentrations of MSAT could be higher than the *No Build Alternative*. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built along OHP.

However, the magnitude and the duration of these potential increases compared to the *No Build Alternative* cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the *Preferred Alternative* could be higher relative to the *No Build Alternative*, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT would be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions that, in almost all cases, would cause region-wide MSAT levels to be significantly lower than today.

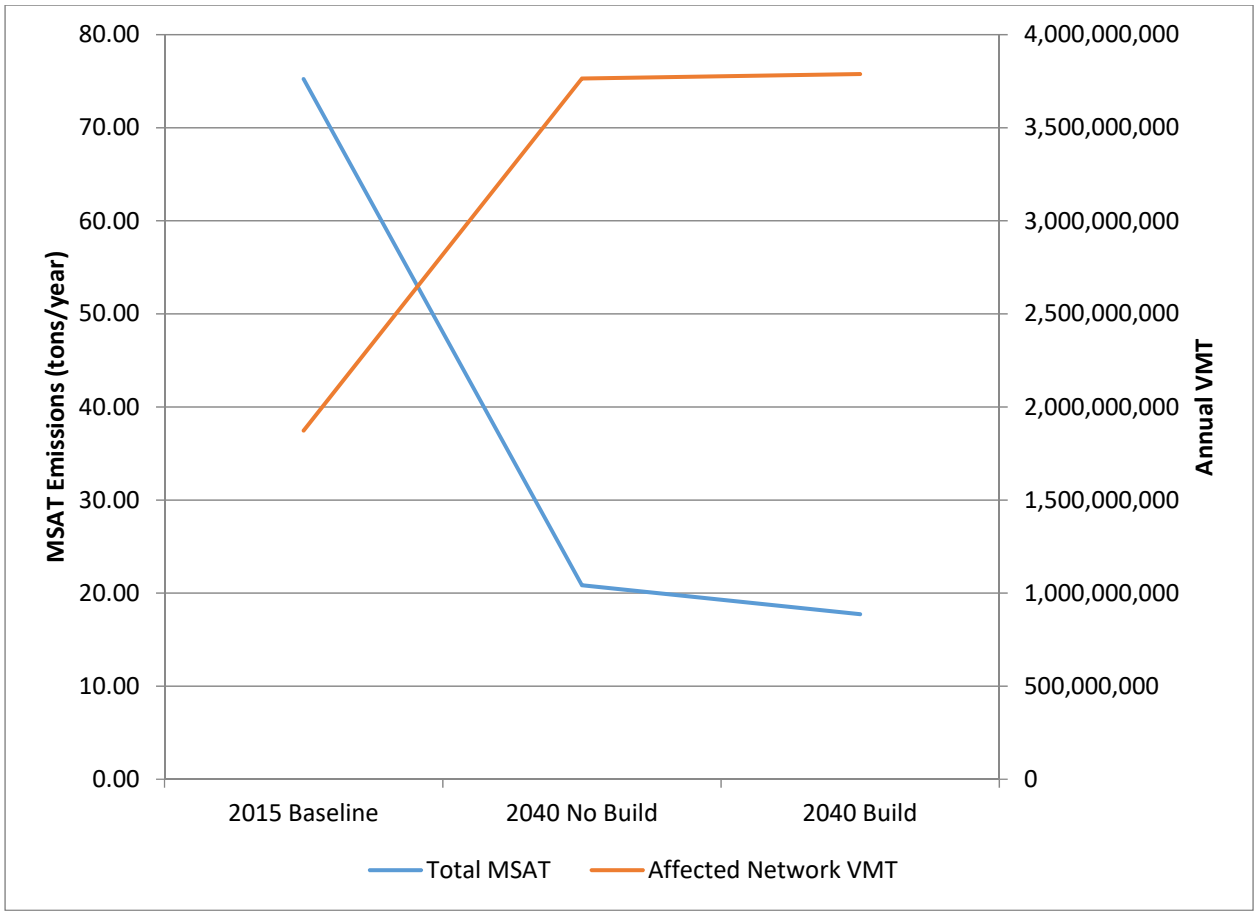

Figure 4-6. Comparison of MSAT Emissions vs. VMT for the *Preferred Alternative*.

4.7.3.2 Quantitative MSAT Analysis Methodology

The analysis of MSATs within the project area considers on-road sources for nine priority MSATs: 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (DPM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (POM). This analysis is based on the approved CAMPO models for each of the analyzed years of 2015 and 2040. These models take into account all future projects expected to be completed by each year, as well as projected traffic for the *Preferred Alternative*. For the *No Build Alternative*, the proposed project was removed from the model to generate new projected traffic volumes. An affected transportation network was derived for the *Preferred Alternative* for the design year 2040 by comparing the *No Build* to the *Preferred Alternative* road link ADTs to determine which roadway links in the model achieve a ±5 percent volume change due to the *Preferred Alternative*. The same roadway links identified through this process were used as the affected network links for the base year of 2015 and design year of 2040. VMT was calculated by using the affected network links and the AADTs of those links for each modeled year. Speeds were modeled as average speeds for each link and type of roadway. The analysis used the TxDOT MOVES2014 emission rate lookup tables for each of the priority MSATs.

4.7.3.3 Quantitative MSAT Analysis Results

The resulting emission inventory compiled for the nine priority MSATs for the proposed project is summarized in **Table 4-7** and shown in **Figure 4-7** for the *Preferred Alternative*. The analysis indicates that a decrease in MSAT emissions can be expected for both the *Recommended* and the *No Build* alternatives in 2040 when compared with the existing year of 2015. Under the *Preferred Alternative*, emissions of total MSAT are predicted to decrease by 76 percent from 2015 to 2040. This general trend is prevalent when comparing the annual emissions of the specific priority MSATs in both the *Recommended* and *No Build* alternatives in 2040 when compared with the existing year of 2015. In addition, although the *Preferred Alternative* would increase the VMT by more than 64,000, when compared to the 2040 *No Build* conditions, the total MSAT emissions decrease by 15 percent. As shown in **Figure 4-6**, if emissions are plotted over time, a decreasing level of MSAT emissions can be seen from the base year (2015), although overall VMT continues to rise.

Table 4-7. MSAT Emissions—*Preferred Alternative* (tons/year)

Toxin	2015 Baseline	2040 No Build	2040 Build	Change from 2015 Baseline to 2040 Build	Change from 2040 No Build to 2040 Build
Benzene	6.09	1.65	1.46	-4.63	-0.19
Napthalene	0.95	0.41	0.38	-0.57	-0.04
Butadiene	0.81	0.02	0.02	-0.79	0.00
Formaldehyde	8.30	5.22	4.76	-3.55	-0.46
Acrolein	0.57	0.24	0.22	-0.35	-0.02
DPM	51.06	10.15	8.08	-42.99	-2.08
POM	0.38	0.08	0.07	-0.31	-0.01
Acetaldehyde	4.09	1.70	1.55	-2.54	-0.16
Ethylbenzene	2.99	1.37	1.20	-1.79	-0.16
Total MSAT	75.23	**20.84**	**17.73**	-57.50	-3.11
Affected Network Daily VMT	5,131,929	10,314,669	10,378,677	5,246,748	64,008

Source: Project Team, 2017.

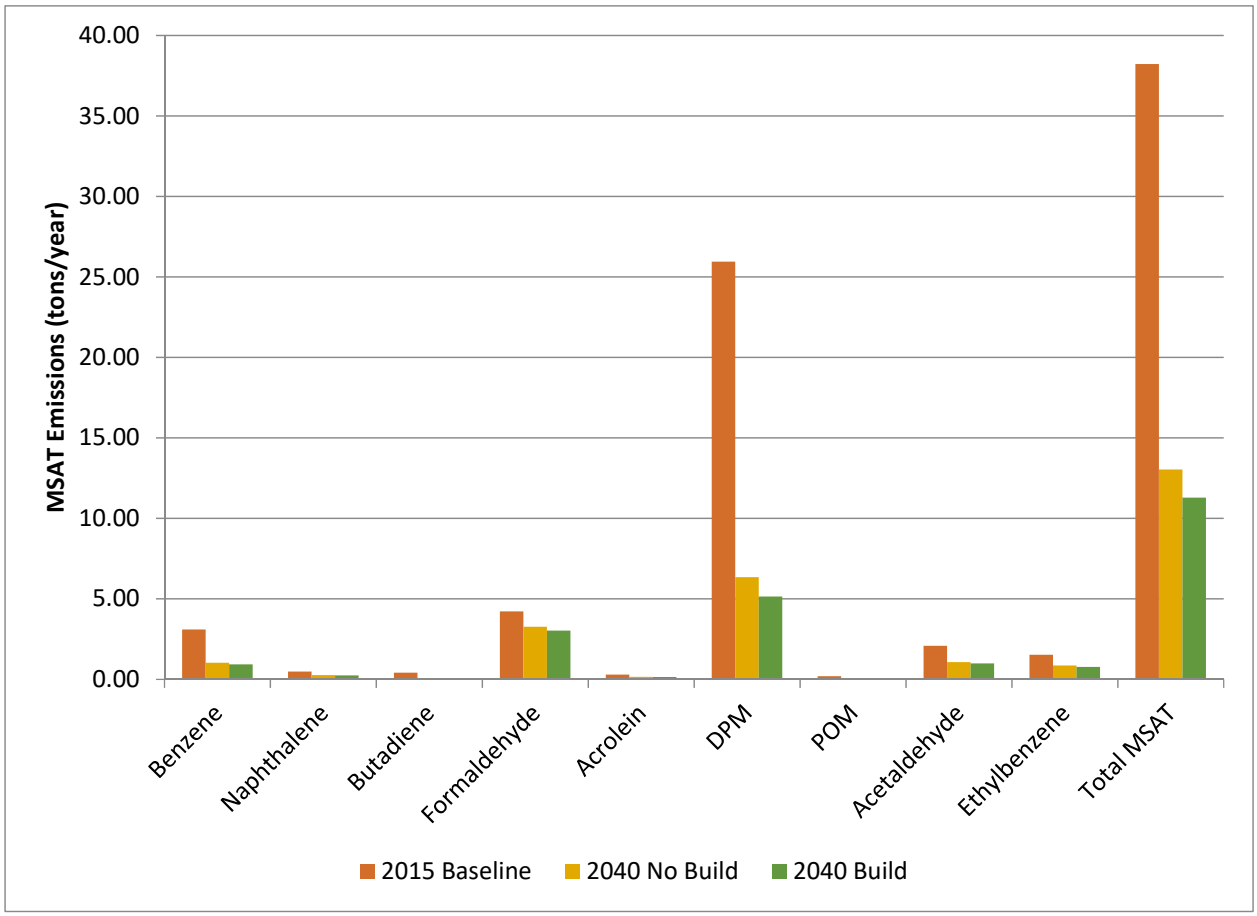

Figure 4-7. Projected changes in MSAT emissions over time under the *Preferred Alternative*.

4.7.4 Environmental Consequences

4.7.4.1 CO TAQA

Local concentrations of CO are not expected to exceed national standards at any time under the *Preferred Alternative*.

4.7.4.2 MSAT

Emissions of total MSAT are predicted to decrease by 76 percent from 2015 to 2040 under the *Preferred Alternative*. This general trend is prevalent when comparing the annual emissions of the specific priority MSATs under the *Recommended* and *No Build* alternatives in 2040 when compared with the existing year of 2015. In addition, although the *Preferred Alternative* would increase the VMT by more than 64,000, when compared to the 2040 *No Build* conditions, the total MSAT emissions decrease by 15 percent. If emissions are plotted over time, a decreasing level of MSAT emissions can be seen from the base year (2015), although overall VMT continues to rise.

4.7.4.3 Encroachment-Alteration Effects

Encroachment-alteration impacts on air quality from MSATs are unquantifiable due to existing limitations in determining pollutant emissions, dispersion, and impacts to human health. Emissions would likely be lower than present levels in future years as a result of the EPA's national air quality regulations (i.e., new light-duty and heavy-duty on-road fuel and vehicle rules and the use of low-sulfur diesel fuel). Even with an increase in VMT and possible temporary emission increases related to construction activities, the EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in reductions of on-road emissions of MSATs and the ozone precursors volatile organic compounds and oxides of nitrogen over time. For these reasons, encroachment-alteration impacts on air quality are not anticipated as a result of the proposed project.

4.8 Traffic Noise Analysis

A *Noise Analysis Technical Report* was completed for the proposed project in October 2017 and updated in July 2018 to reflect revised projected traffic data, based on the decision by TxDOT to pursue non-tolled mainlanes for the OHP Project. Traffic volumes used were developed by RTG using the TxDOT TP&P Division-approved 2040 CAMPO model which assumed all CAMPO projects, in addition to the OHP Project, were built. This report is included as **Appendix C** and the results are summarized below.

4.8.1 Background Information

The predominant land uses in the vicinity of the project area are residential, commercial, and transportation. The project area follows the proposed right-of-way running from east to west along and within the existing right-of-way of US 290 and SH 71.

Sound from highway traffic is generated primarily from a vehicle's tires, engine, and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type, and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise
- Determination of existing noise levels
- Prediction of future noise levels

- Identification of possible noise impacts
- Consideration and evaluation of measures to reduce noise impacts

The FHWA has established the Noise Abatement Criteria (NAC) listed in **Table 4-8** for various land use activity areas; NAC are used as one of two means to determine when a traffic noise impact would occur.

Table 4-8. Noise Abatement Criteria

Activity Category	dB(A) Leq	Description of Activity Category
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential.
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	––	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	––	Undeveloped lands that are not permitted.

Source: FHWA, 2017.

Absolute criterion: The predicted noise level at a receiver approaches, equals, or exceeds the NAC. Approach is defined as 1 dB(A) below the NAC. For example, a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

Relative criterion: The predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal, or exceed the NAC. Substantially exceeds is defined as more than 10 dB(A). For example, a noise impact would occur at a Category B residence if the existing noise level is 54 dB(A) and the predicted noise level is 65 dB(A) (an 11 dB(A) increase).

When a traffic noise impact occurs, noise-abatement measures must be considered. A noise-abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

The FHWA traffic noise modeling software was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type, and speed of vehicles; highway alignment and grade; cuts, fills, and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Existing and predicted traffic noise levels were modeled at receiver locations that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and that could potentially benefit from feasible and reasonable noise abatement. Result tables for the receivers in the project area are included in the *Noise Analysis Technical Report*, included as **Appendix C**.

4.8.2 Environmental Consequences

The *Preferred Alternative* would result in traffic noise impacts to receivers, as described below. Noise abatement measures including traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers were considered.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be feasible, the abatement measure must be able to reduce the noise level at greater than 50 percent of impacted, first row receivers by at least 5 dB(A). To be reasonable, it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least 5 dB(A), and the abatement measure must be able to reduce the noise level of at least one impacted, first row receiver by at least 7 dB(A).

Traffic management: Control devices could be used to reduce the speed of the traffic; however, the minor benefit of 1 dB(A) per 5 miles per hour reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments: Any alteration of the existing alignment would displace existing businesses and residences, require additional right-of-way, and not be cost effective/reasonable.

Buffer zone: The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Traffic noise barriers: This is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations. It was then determined whether noise barriers would be reasonable and feasible.

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2040) noise impact contours shown in **Table 4-9**. Due to the extreme geometry, changes in alignment, and changes in speed limit located throughout the project area, these distances are approximate.

Table 4-9. Worst-Case Impact Contour Distances for the *Preferred Alternative*

Land Use	Impact Contour	Distance from Right-of-Way
NAC category B and C	66 dB(A)	≈ 495 feet
NAC category E	71 dB(A)	≈ 335 feet

Source: Project Team, 2018.

A copy of this traffic noise analysis will be available to local officials. As of the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

4.8.3 Noise Impacts

The *Preferred Alternative* would impact 122 of the 456 noise receivers analyzed. **Table 4-10** summarizes the change in dB(A) that would be expected at each receiver location with the *Preferred Alternative*.

Figure 4-8a–e shows the locations of each receiver as well as proposed noise barriers. For detailed results of the Traffic Noise Analysis, see the *Noise Analysis Technical Report* included as **Appendix C**.

Traffic noise barriers would not be feasible and reasonable for any of the following impacted receivers (72 total) and, therefore, are not proposed for incorporation into the project.

R1: This receiver represents a single impacted residence with a driveway facing the roadway. A continuous traffic noise barrier would restrict access to this residence. Gaps in a traffic noise wall would satisfy access requirements, but the resulting non-continuous wall segments would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R5, R7, R9–R10, R14: These receivers represent a total of five impacted residences. A traffic noise wall that would achieve the minimum feasible reduction of 5 dB(A) while achieving a 7 dB(A) noise reduction design goal at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver.

R19: This receiver represents a single impacted residence. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R26 and R36: These receivers are separate, individual residences. Traffic noise walls that would achieve the minimum feasible reduction of 5 dB(A) while achieving a 7 dB(A) noise reduction design goal at each of these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver.

R81 and R82: These receivers represent two impacted residences. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R91: This receiver represents a single impacted residence. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) while achieving the noise reduction design goal of 7 dB(A).

R95-1, R95-2 and R99: These receivers represent 128 first- and second-story receivers at Settler's Creek Apartments and a single impacted residence, of which 10 are first-row impacted receivers. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was evaluated in this area in an attempt to shield these impacted residences. A traffic noise wall that would achieve the minimum, feasible reduction of 5 dB(A) for greater than 50 percent of impacted, first-row receivers while achieving the noise reduction design goal of 7 dB(A) could not be designed.

R109 and R114: These receivers represent a single impacted residence and the YMCA, both with driveways facing the roadway. A continuous traffic noise barrier would restrict access to these residences. Gaps in a noise wall would satisfy access requirements, but the resulting non-continuous wall segments would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R126: This receiver represents a single impacted school, with direct driveway access to the service road creating a gap in the traffic noise barrier. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R135–R136: These receivers represent two impacted residences. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

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Table 4-10. Summary of Predicted 2040 Noise Level Change for the *Preferred Alternative*

Noise Impact	NAC Activity Category/ Acceptable dB(A) Leq	Change (+/-)	Representative Receivers
No	B/67	-8 to -4	R27, R28, R29, R30, R31, R32, R33, R96, R102-1, R103-2, R104, R259, R261, R262, R263, R264, R266, R269, R274, R275
		-3	R92, R97, R102-2, R103-1, R265, R272, R276
		-2	R38, R39, R43-1, R93, R98, R105, R258, R268, R273, R278, R279, R280, R281, R286, R287, R288, R289, R290, R291, R292, R293
		-1	R35, R37, R41, R42, R43-2, R43-3, R71, R83, R84, R85, R88, R89, R90, R94, R106, R107, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124, R125, R127, R128, R129, R131, R233, R270, R271, R277, R282, R285, R294
		0	R16, R59, R60, R68, R69, R70, R72, R79, R80, R86, R87, R130, R141, R143, R224, R225, R230, R232, R236, R237, R283, R301
		+1	R2-1, R2-2, R2-3, R12, R13, R17, R21, R34, R44, R50, R53, R54, R55, R56, R57, R61, R62, R63, R64, R65, R66, R67, R73, R74, R75, R76, R77, R78, R112, R113, R132, R133, R134, R137, R138, R139, R140, R142, R144, R145, R170, R180, R182, R183, R185, R187, R193, R195, R196, R198, R200, R201, R202, R203, R204, R214, R215, R216, R222, R223, R226, R227, R229, R231, R295, R296, R297, R298
		+2	R6, R8, R11, R22, R23, R24, R25, R45, R46, R47, R48, R49, R51, R52, R111, R168, R169, R171, R172, R173, R174, R175, R176, R177, R178, R179, R181, R184, R186, R188, R189, R190, R191, R192, R194, R197, R199, R205, R206, R217, R218, R219, R220, R221, R228, R253, R284, R336, R338, R344, R441-1
		+3	R20, R146, R147, R149, R163, R164, R165, R207, R208, R209, R210, R211, R212, R235, R240, R241, R251, R252, R300, R302, R316, R317, R319, R324, R334, R335, R339, R340, R341, R342, R343, R345, R354, R356, R357, R358, R359, R371, R376, R378, R379, R380, R401, R402, R413, R415, R417
		+4	R243, R244, R247, R248, R249, R250, R315, R318, R321, R325, R351, R355, R377, R383, R384, R388, R392, R394, R396, R398, R399, R400, R414, R416, R436
		+5	R234, R239, R242, R245, R246, R320, R322, R323, R390, R391, R393, R395, R397
		+6	R303

Noise Impact	NAC Activity Category/ Acceptable dB(A) Leq	Change (+/-)	Representative Receivers
Yes	**B/67**	-10 to 0	R1, R36, R81, R82, R91, R95-1, R95-2, R109, R361
		+1	R99, R135, R362
		+2	R5, R7, R9, R19, R26, R136, R154, R167, R331, R332, R333, R337, R360, R363, R364, R366, R441-2
		+3	R10, R152, R153, R155, R156, R161, R162, R166, R267-1, R299, R329, R330, R365, R367, R368, R369, R370, R373, R374, R381, R411, R424, R429, R430, R434
		+4	R148, R150, R151, R157, R158, R159, R160, R213, R306, R326, R327, R328, R372, R375, R382, R404, R405, R406, R407, R408, R410, R412, R418, R419, R420, R425, R426, R427, R431, R432, R433, R435
		+5	R267-2, R267-3, R304, R305, R308, R310, R314, R385, R386, R387, R389, R403, R409, R421, R422, R423, R428
		+6	R307, R309, R311, R313
		+7	R238, R312
		+8	R-256-1, R256-3
		+9	R256-2
No	**C/67**	-4	R101
		-2	R40
		+1	R3
		+2	R4, R257
		+3	R439, R440
		+4	R255
		+5	R347
Yes	**C/67**	-3	R114
		-1	R126
		+2	R353, R442
		+3	R352, R438

Noise Impact	NAC Activity Category/ Acceptable dB(A) Leq	Change (+/-)	Representative Receivers
		+4	R437
		+6	R348
		+7	R349
No	**D/52**	-3 to 0	R58, R100, R260
		+2	R18, R110
		+4	R346
		+5	R254
Yes	**E/72**	+3	R14
No	**E/72**	-3 to 0	R108, R444
		+1	R15
		+2	R443
		+8	R350

Source: Project Team, 2018.

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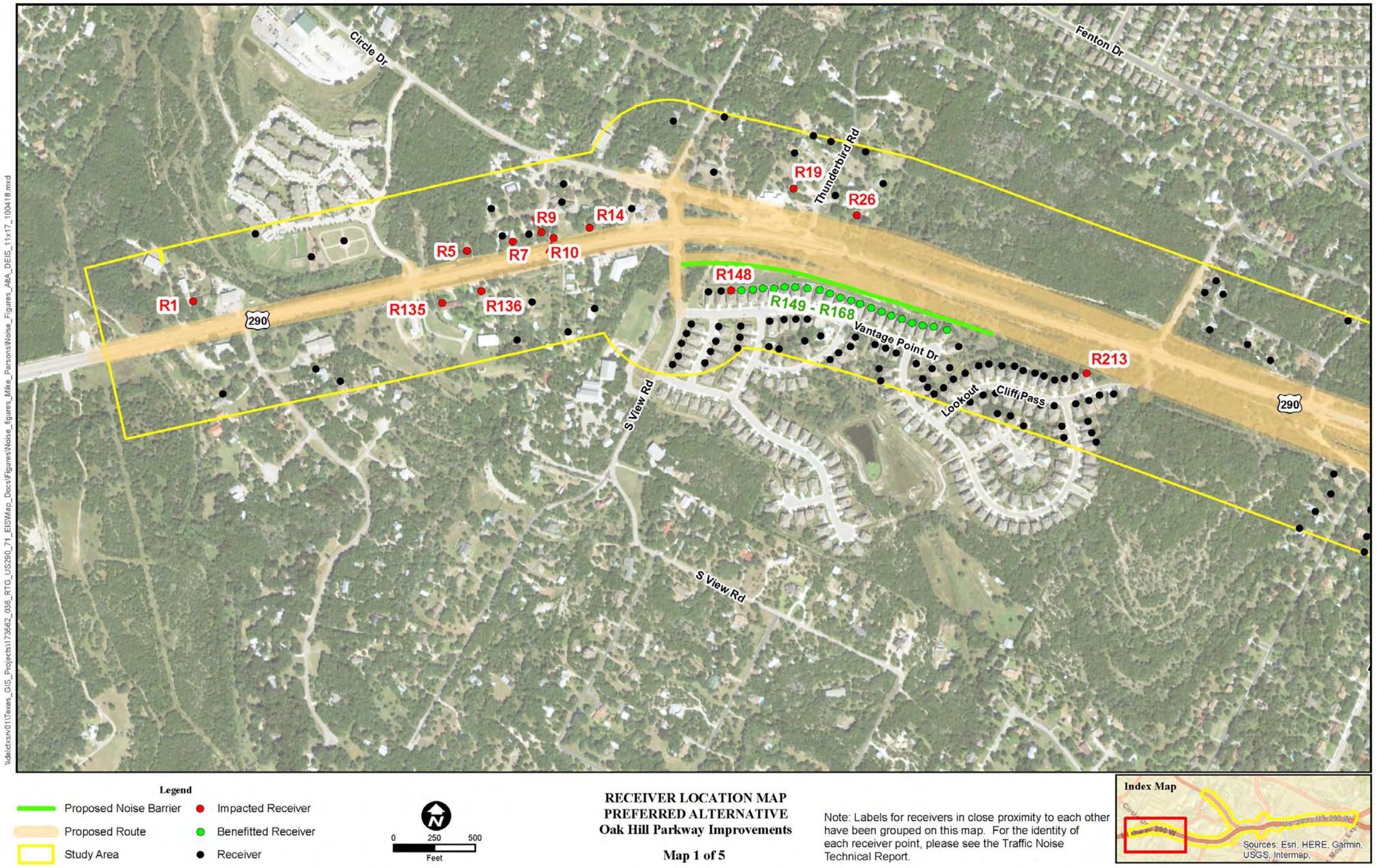

Figure 4-8a. Receiver location map for the *Preferred Alternative*.

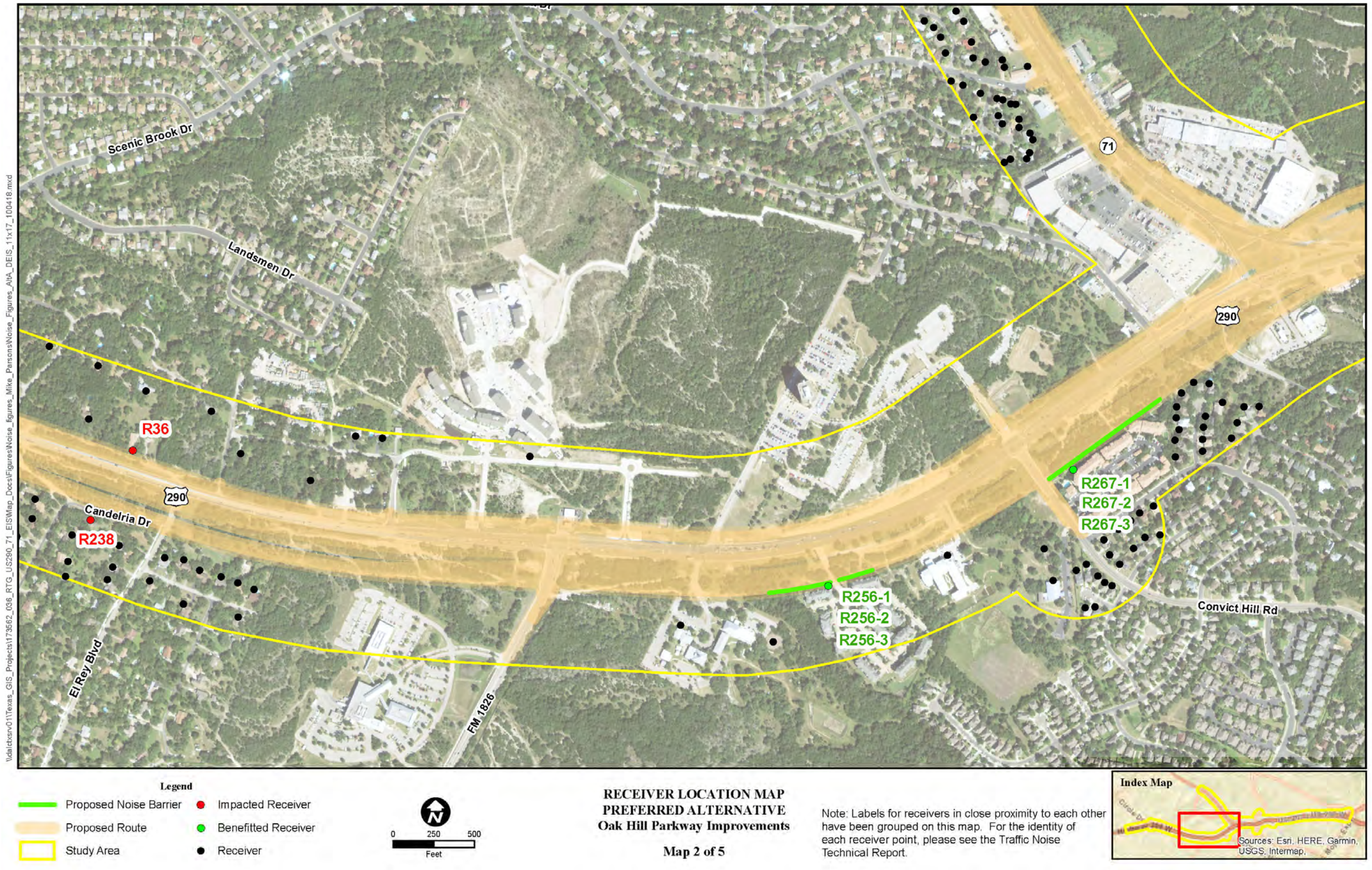

Figure 4-8b. Receiver location map for the *Preferred Alternative*.

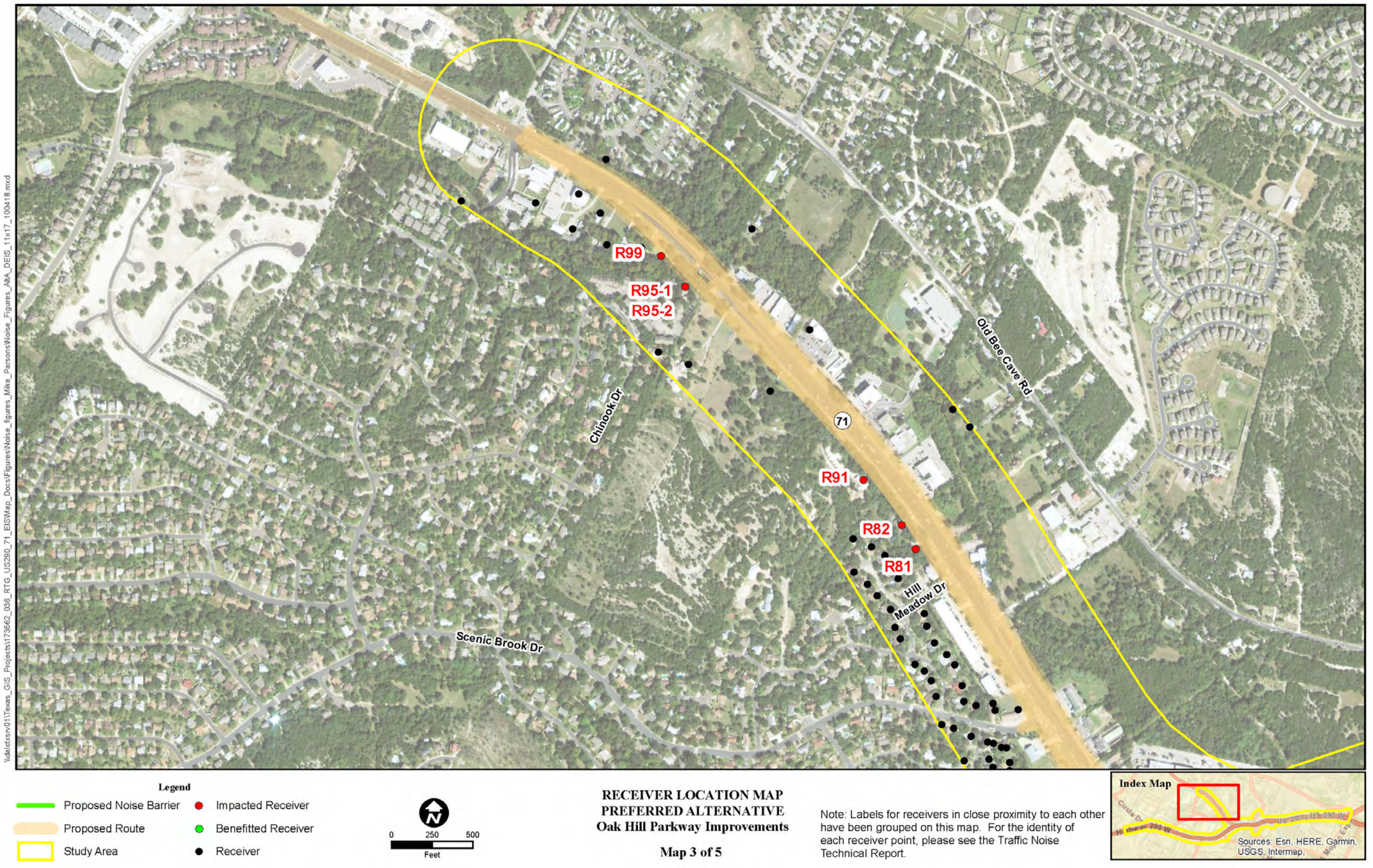

Figure 4-8c. Receiver location map for the *Preferred Alternative*.

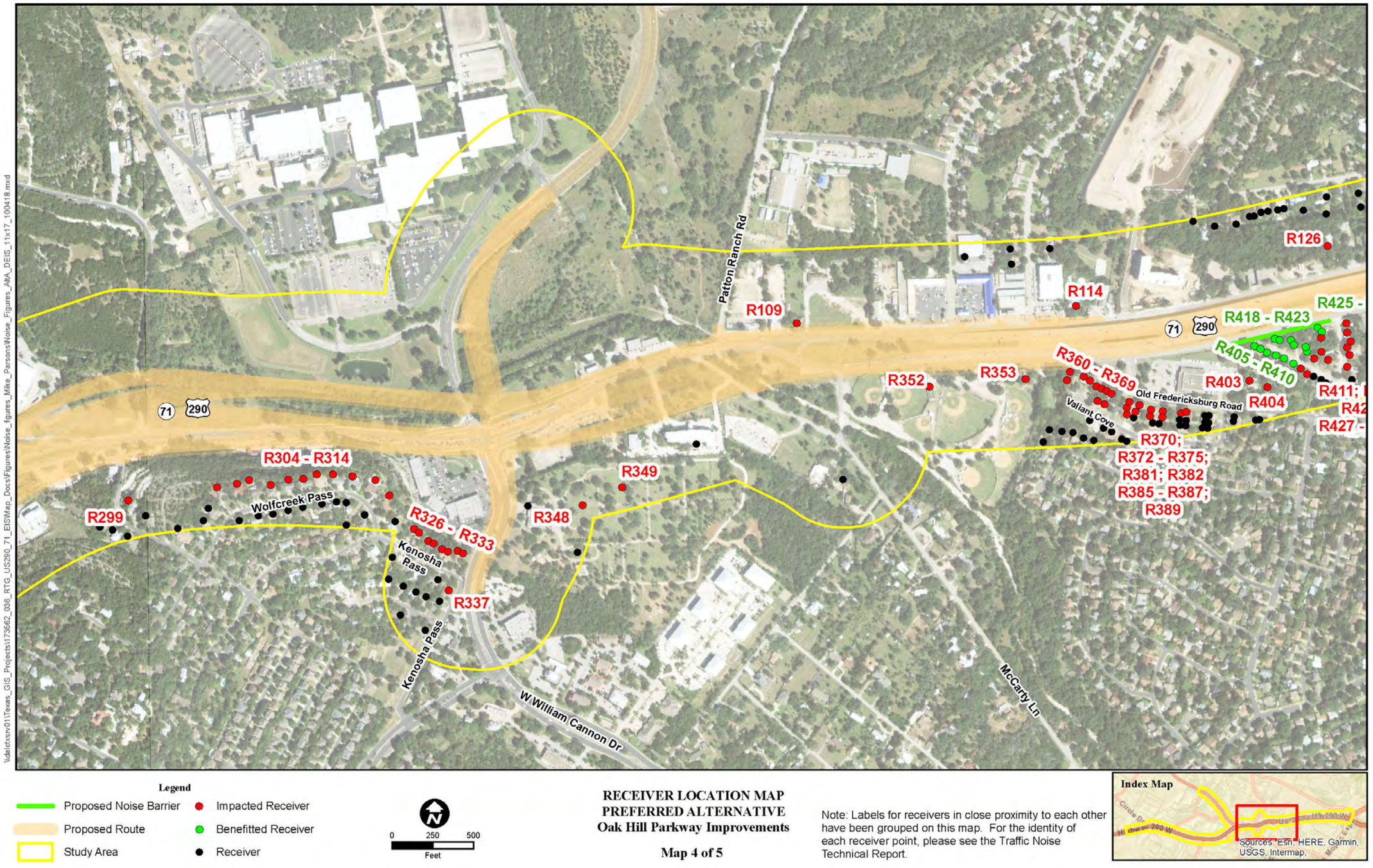

Figure 4-8d. Receiver location map for the *Preferred Alternative.*

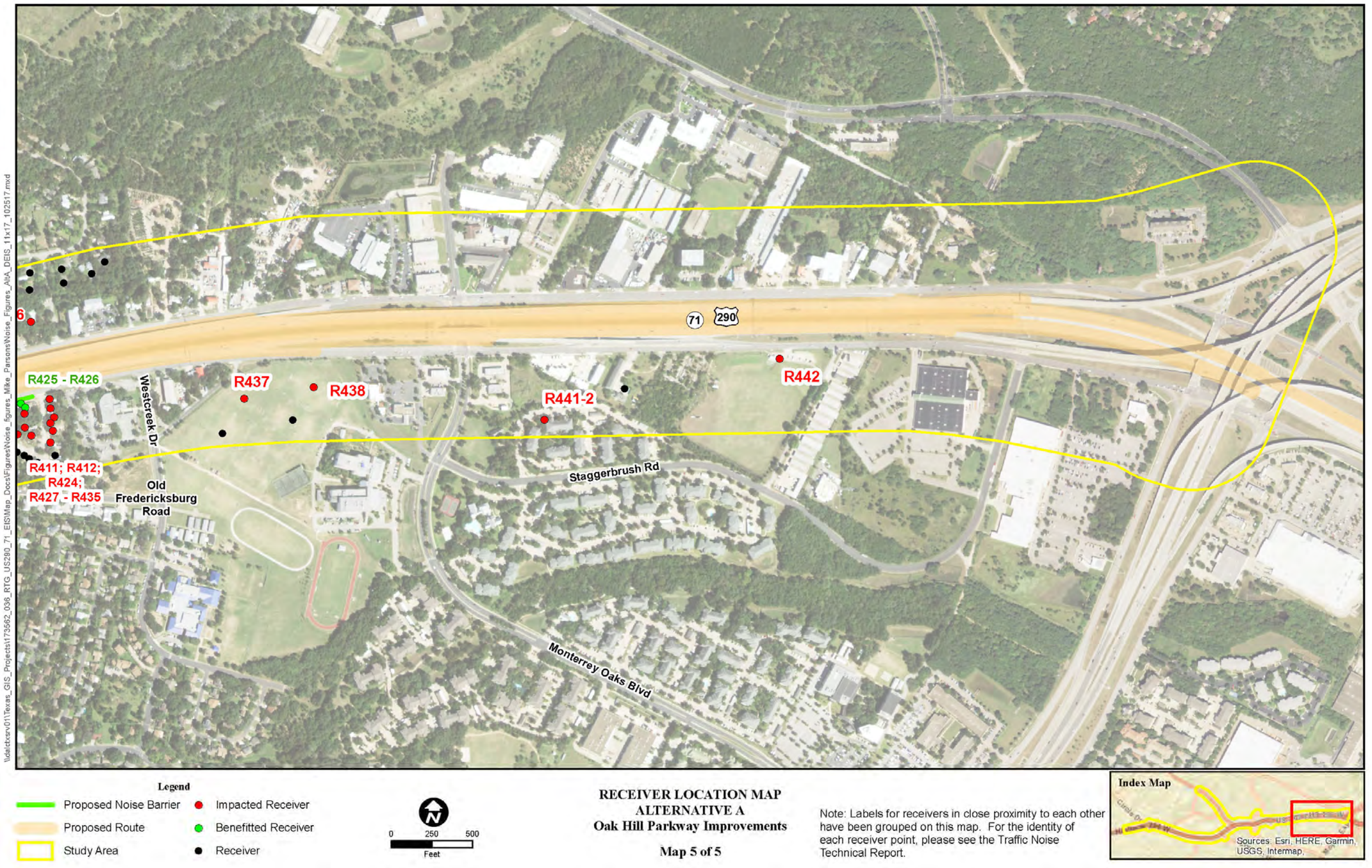

Figure 4-8e. Receiver location map for the *Preferred Alternative.*

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R213: This receiver is a separate, individual residence. A noise wall that would achieve the minimum feasible reduction of 5 dB(A) while achieving a 7 dB(A) noise reduction design goal would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver.

R238: This receiver represents a single impacted residence. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R299, R304–R314: These receivers represent a total of 12 impacted residences. These receivers are located on a cliff overlooking US 290, making it difficult to design an effective traffic noise barrier. Due to this reason, as well as breaks in the barrier for frontage road access and multiple elevated mainline structures, a traffic noise barrier design that could achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal could not be developed.

R326–R333, R337: These receivers represent a total of nine impacted residences. A traffic noise barrier placed along the William Cannon Drive right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

R348 and R349: These receivers represent two common areas at a cemetery. A traffic noise barrier up to 20 feet in height placed along the right-of-way line was not sufficient to achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R352: This receiver represents impacted recreational land use in the area. Due to breaks in the barrier for access, a traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R353: This receiver represents a single impacted receiver (an outdoor activity area associated with a church). A traffic noise wall that would achieve the minimum feasible reduction of 5 dB(A) while achieving a 7 dB(A) noise reduction design goal at this receiver would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver.

R360–R370, R372–R375, R381–R382, R385–R387, R389: These receivers represent a total of 21 impacted residences. Multiple barrier configurations were evaluated in this area in an attempt to design a feasible and reasonable traffic noise barrier. A traffic noise barrier placed along the right-of-way line, between 10 and 20 feet in height and 477 and 1,681 feet in length, was not sufficient to achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R437–R438: These receivers represent impacted recreational land uses in the area. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R441-2: This receiver represents the Monterey Ranch Apartments second-story units. A traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum feasible reduction of 5 dB(A) while achieving the 7 dB(A) noise reduction design goal.

R442: This receiver represents impacted recreational land use in the area. Due to breaks in the barrier for access, a traffic noise barrier placed along the right-of-way line, up to 20 feet in height, was not sufficient to achieve the minimum, feasible reduction of 5 dB(A) or the noise reduction design goal of 7 dB(A).

Traffic noise barriers would be feasible and reasonable for the following impacted receivers (50 total) and, therefore, are proposed for incorporation into the project:

R148 R150–R162, R166–R167: These receivers represent a total of 16 impacted residences, of which 16 are first-row impacted receivers. Based on preliminary calculations, a traffic noise barrier 1,951 feet in length and 14 feet in height would reduce noise levels by at least 5 dB(A) for 16 first-row impacted receivers and 4 additional benefited receivers at a total cost of $491,652 or $24,583 for each benefited receiver. Moreover, 5 first-row impacted receivers are predicted to meet the TxDOT noise reduction design goal of 7 dB(A) or more.

R256-1, R256-2 and R256-3: Receiver 256 represents 168 first-, second-, and third-story receivers at Vineyard Hills Apartments. In all, 23 receivers are impacted in this area, of which 20 are first-row receivers. Based on preliminary calculations, a traffic noise barrier 599 feet in length and 20 feet in height would reduce noise levels by at least 5 dB(A) for 13 first-row impacted receivers and 5 additional benefited receivers at a total cost of $215,640 or $11,980 for each benefited receiver. Moreover, 11 first-row impacted receivers are predicted to meet the TxDOT noise reduction design goal of 7 dB(A) or more.

R267-1, R267-2 and R267-3: Receiver 267 represents 162 first-, second-, and third-story receivers at Bell Quarry Hill Apartments. In all, 46 receivers are impacted in this area, of which 43 are first-row receivers. Based on preliminary calculations, a traffic noise barrier 842 feet in length and 20 feet in height would reduce noise levels by at least 5 dB(A) for 36 first-row impacted receivers and 9 additional benefited receivers at a total cost of $303,120 or $6,736 for each benefited receiver. Moreover, 28 first-row impacted receivers are predicted to meet the TxDOT noise reduction design goal of 7 dB(A) or more.

R403–R412, R418–R435: These receivers represent a total of 28 impacted residences, of which four are first-row receivers. Based on preliminary calculations, a traffic noise barrier 667 feet in length and 19 feet in height would reduce noise levels by at least 5 dB(A) for three first-row impacted receivers and 11 additional benefited receivers at a total cost of $228,114 or $16,294 for each benefited receiver. Three first-row impacted receivers are predicted to meet the TxDOT noise reduction design goal of 7 dB(A) or more.

Table 4-11 summarizes the proposed traffic noise barriers for the *Preferred Alternative.*

Table 4-11. Traffic Noise Barrier Proposal (Preliminary) for the *Preferred Alternative*

Barrier	Representative Receivers	Total # Benefited	Length (ft.)	Height (ft.)	Total Cost	Cost per Benefited Receiver
A1	R148, R150–R162, R166–R167	20	1,951	14	$491,652	$24,583
A2	R256-1, R256-2, R256-3	18	599	20	$215,640	$11,980
A3	R267-1, R267-2, R267-3	45	842	20	$303,120	$6,736
A4	R403–R412, R418–R435	14	667	19	$228,114	$16,294

Source: Project Team, 2018.

The *Preferred Alternative* proposes 4 noise barriers for 50 receivers representing 113 impacted individual receivers and benefiting an estimated 97 receivers. Any subsequent project design changes may require a reevaluation of this preliminary traffic noise barrier proposal. The final decision to construct the proposed traffic noise barriers would not be made until completion of the project design, utility evaluation, and polling of property owners who are adjacent to the proposed noise barrier locations where noise abatement was determined to be reasonable and feasible. Prior to construction, noise workshops would be conducted with affected stakeholders to discuss noise mitigation measures.

4.8.3.1 Encroachment-Alteration Effects

Increases in traffic noise levels resulting from the proposed project are considered a direct effect and were analyzed in the traffic noise analysis (discussed above). Additional noise impacts, in the form of encroachment-alteration effects, are not anticipated as a result of the proposed project.

4.9 Water Resources

Section 4.9 and Appendix G of the Draft EIS included a comprehensive discussion regarding the existing conditions of surface and groundwater resources within the OHP Project area. The sections below provide a summary of that information, a summary of feedback provided by agencies during the public comment period, and additional information in the form of updated figures and analyses resulting from design changes proposed for the *Preferred Alternative*.

4.9.1 Edwards Aquifer/Groundwater Resources

The *Preferred Alternative* crosses the Barton Springs Segment of the Edwards Aquifer. The Edwards Aquifer includes four freshwater zones: the Contributing Zone, the Recharge Zone, the Transition/Artesian Zone, and the Contributing Zone within the Transition Zone. **Table 4-12** defines and describes these zones and provides the acreage of each zone that occurs within the *Preferred Alternative* alignment. Approximately 64 percent lies within the Contributing Zone, and 36 percent is located in the Recharge Zone (**Figure 4-9**).

Table 4-12. Edwards Aquifer Zones in the *Preferred Alternative* Alignment

Edwards Aquifer Zone	Description	Acreage Within *Preferred Alternative*
Contributing Zone	Water from the Contributing Zone flows over relatively impermeable limestones until it reaches the Recharge Zone. The Contributing Zone is located on the Edwards Plateau and catches water from rainfall events in streams that flow into the Recharge Zone. The Contributing Zone within the Edwards Plateau generally occurs in the Texas Hill Country. This zone is about 5,400 square miles, with elevations ranging between 1,000 and 2,300 feet above sea level. Rainfall averages about 30 inches per year in this zone, and water runs off into streams or infiltrates into the water table.	251.75
Recharge Zone	The Recharge Zone is an area where highly fractured and faulted Edwards limestones outcrop at the land surface allowing large quantities of water to flow into the aquifer. The aquifer in the Recharge Zone is unconfined and has a water table that rises and falls in response to rainfall. Water works its way down by gravity into the transition/artesian zone. The Recharge Zone is about 1,250 square miles and is located along the Balcones Fault. About 75–80 percent of the recharge occurs when streams and rivers cross the porous formation and go underground. The remaining recharge amount is the result of precipitation.	138.76
Transition Zone	The Transition/Artesian Zone includes a thin strip of land south and southeast of the Recharge Zone from San Antonio to Austin. Limestones that overlie the Edwards Aquifer in this area are faulted and fractured and have caves and sinkholes that allow surface water entry into the aquifer.	0.00
Contributing Zone within Transition Zone	The Contributing Zone is composed of topographically high elevation areas within the Transition Zone where runoff drains to streams that flow over the Recharge Zone.	0.00

Source: Eckhardt, 2016; Project Team, 2018.

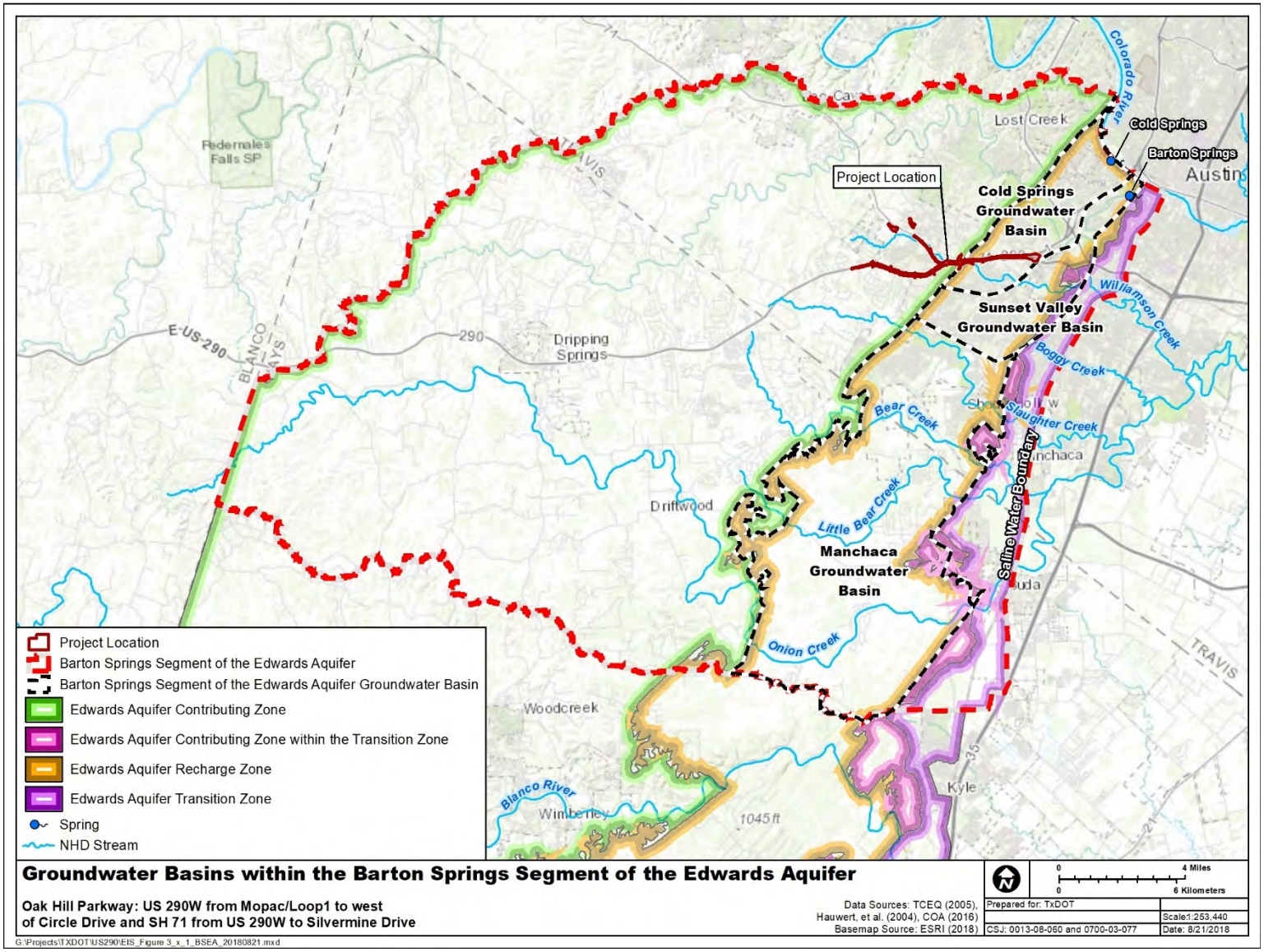

Figure 4-9. Groundwater basins within the Barton Springs segment of the Edwards Aquifer.

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The Barton Springs segment of the Edwards Aquifer is approximately 155 square miles (BSEACD, 2003). Three groundwater basins have been delineated within this segment: Cold Springs, Sunset Valley, and the Manchaca groundwater basins (**Figure 4-9**). A portion of the *Preferred Alternative* is located within the Cold Springs groundwater basin as mapped by Hauwert (2009, 2015). Several studies have been performed in the Barton Springs segment of the Edwards Aquifer to identify flow paths and rates of flow through the aquifer from these different basins. In general, dye trace studies have concluded that most groundwater within this segment discharges at Barton Springs, located approximately 4.3 miles northeast of the eastern terminus of the project area (BSEACD, 2010; Smith et al., 2005). However, some studies indicate that approximately 12 square miles of the aquifer discharges to Cold Springs (Hauwert, 2009, 2015), while others suggest that the Cold Springs discharge from this area occurs only during high flow events (Slade, 2014). Hauwert (2009) reported that two sites on Williamson Creek located downstream closer to the confluence with Onion Creek transmitted dye to Barton Springs instead of to the Cold Springs Complex. These studies suggest that within the Recharge Zone, Cold Springs may be hydraulically linked to surface water recharge from the upper portions of Williamson Creek (Hauwert, 2009, 2015), but lower reaches of this creek are also connected to flow paths discharging at Barton Springs. It is likely that the discharge from both Cold Springs and Barton Springs is highly correlated with groundwater levels; to date, all dye trace studies for the Barton Springs segment represent point injections into recharge features and none have studied stream reaches or varying flow conditions at Barton Springs (Slade, 2014). Although conflicting studies regarding sub-surface hydrology of this area introduce uncertainty into this discussion, researchers generally agree that additional research is required to identify a definitive boundary between the Cold Springs and Barton Springs groundwater basins (Hauwert, 2012; Slade, 2014). Similarly, the COA's Watershed Protection Department recognizes the entire project area as occurring within the Barton Springs Zone and does not distinguish between potential groundwater basins (COA, 2018).

A minimum of 75 percent of recharge to the Edwards Aquifer comes from six streams located within the Recharge Zone (Slade, 2014). Of these, Williamson Creek, its tributaries, and Devil's Pen Creek (a tributary to Slaughter Creek) occur within the *Preferred Alternative* alignment. Recharge from the eastern portions of the project area has been associated with the Cold Springs flow route through the aquifer, which has been shown to supply water to Cold Springs and other unidentified springs on the Colorado River (Hauwert, 2009, 2015). Flow paths from downstream of Oak Hill are located within the Sunset Valley groundwater basin and have mapped flow paths that lead to the Upper Barton and Parthenia (Main) Springs (Hauwert, 2009, 2015). Dye trace studies have shown that potential pollutants in the upper portions of Williamson Creek can reach Cold Springs (through groundwater paths) in about eight days and can reach Barton Springs from the lower reaches in as little as one to three days under high flow conditions (Hauwert, 2015).

4.9.1.1 Groundwater Quality

A comprehensive discussion regarding water quality in the project area is included in Section 4.9.1.3 of the Draft EIS. Since the release of the Draft EIS, additional measures were evaluated in the *Oak Hill Parkway TSS Removal Load Memorandum* in an effort to ensure that the project could achieve a net decrease in annual TSS loading as described in the 2017 consultation with the USFWS (**Appendix D**). A summary of the existing conditions and potential impacts to groundwater quality is included below.

Potential impacts on water quality related to roadway construction and operation can quickly translate to the aquifer and springflow environments. If contaminants, such as heavy metals, oil, nutrients, or pesticides, are mobilized by stormwater, they could flow into Williamson Creek or downstream to Slaughter Creek via tributaries and enter the aquifer through faults, fractures, or other unidentified recharge features. An updated GA was completed for the *Preferred Alternative* (**Appendix E**), and additional discussion regarding the features identified with the project area are included in **Section 4.4**. Several sensitive recharge features were noted during the GA in the vicinity of Williamson Creek (**Section 4.4**). Without appropriate BMP use, sediment-laden water may enter recharge features via overland flow or the stream bed and could bring contaminants into aquifer and spring outflow environments.

The greatest possibility for groundwater impacts during the construction phase of the proposed project could occur if voids connected to the aquifer or containing groundwater are intersected during the down cutting of bedrock below the current grade or other excavation activities, such as for bridge piers. Preliminary design indicates that the *Preferred Alternative* would require the placement of approximately 167 columns within the Recharge Zone. Columns would reach depths between 19 and 33 feet and have limited potential to reach the aquifer.

Additionally, previously unknown caves and recharge features may be impacted by construction activities. Trenching and boring may create, uncover, or enlarge openings, changing the hydrology and atmospheric conditions of the feature. New or enlarged openings may allow for runoff to enter aquifer conduits with little to no opportunity for pollution attenuation from natural methods such as soil percolation. The accidental discovery of recharge features or other underground voids may require them to be partially or completely plugged, which could lead to their removal from the recharge matrix. If voids or water flow are encountered, 30 Texas Administrative Code 213.5(f)(2) requires that construction cease in the vicinity of the void. A geologist would then evaluate the void and work with the design engineer, if necessary, to develop a void mitigation plan. The void mitigation plan must be certified by a geologist, submitted to the TCEQ and approved prior to the implementation of mitigation and before continuing construction in the vicinity of the void. An on-site environmental inspector will be required during construction of the project.

The *Preferred Alternative* would incorporate a variety of approved practices for managing stormwater runoff during all phases of the project in order to attenuate the potential impacts to groundwater as discussed in the *Preliminary Water Quality Analysis and Design Report*,

included as Appendix H in the Draft EIS, and in the *Oak Hill Parkway TSS Removal Load Memorandum* (**Appendix D**). During construction, TCEQ-approved measures to reduce erosion and maintain sediment on site would be implemented and documented in the Stormwater Pollution Prevention Plan (SW3P). Management of post-construction runoff for the proposed project would also be accomplished with permanent TCEQ-approved measures that would capture and treat the first flush. Generally, the most contaminated stormwater runoff occurs during the first flush of runoff generated during a storm event, which mobilizes particles and contaminants that have accumulated on impervious surfaces since the previous rainfall event. Two upstream detention ponds and up to 17 water quality ponds are proposed as part of the *Preferred Alternative* design. These proposed drainage and water quality treatment improvements would result in a decrease in the annual TSS loading for the *Preferred Alternative* alignment. It is anticipated that the proposed OHP Project would result in negligible impacts to water quality. The risk would be mitigated by the incorporation of permanent TCEQ-approved BMPs that are properly maintained throughout the life of the project. The proposed BMPs would protect surface water and groundwater in the project area by minimizing erosion, reducing TSS, and reducing the rate and velocity of discharged stormwater. These features would decrease flood potential and reduce the amount of roadway contaminants potentially reaching the sensitive recharge features or the Barton Creek watershed during storm events. As currently designed, the anticipated TSS removal exceeds the total removal required by the TCEQ. As a result of on-going coordination with the COA, TxDOT has also committed to working with the COA during the final design phase of water quality facilities for the project to investigate possible enhancements to the water quality.

The *Preferred Alternative* is within the Edwards Aquifer Recharge Zone and Edwards Aquifer Contributing Zones as discussed above; therefore, it would require the preparation of a WPAP in compliance with the Edwards Aquifer Rules (TCEQ, 2013). According to the TxDOT-TCEQ 2013 Memorandum of Understanding (MOU), construction of the *Preferred Alternative* required coordination with the TCEQ due to its location over the Edwards Aquifer and due to the project's NEPA classification as an EIS. The project and associated activities undertaken by TxDOT are to be implemented, operated, and maintained in a manner that complies with the Edwards Aquifer rules and any applicable TCEQ guidance documents in effect to implement the rules. Coordination with the TCEQ was completed on May 24, 2018 (see **Appendix D**).

4.9.1.2 Groundwater Quantity

A comprehensive discussion regarding water quantity in the project area is included in Section 4.9.1.4 of the Draft EIS. Since the release of the Draft EIS, no additional studies or analyses have been conducted regarding water quantity along the *Preferred Alternative* alignment. A summary of the existing conditions and potential impacts to groundwater quantity is included below.

Due to the aquifer's high permeability, water levels and springflows respond quickly to rainfall, drought, and extraction (pumping). These dynamic systems can decline rapidly in response to drought conditions but will also rebound quickly with increased precipitation (Texas Water

Development Board [TWDB], 2016b). Groundwater quantity may be negatively impacted by the introduction of impervious cover such as roadways, parking lots, and buildings. These surfaces can limit the amount of aquifer recharge, particularly with large scale urbanization. Increased runoff due to impervious cover can divert stormwater sheet flow to discrete channels and eventually to surface streams, thus focusing surface water flow to creeks and rivers and speeding the departure of surface flow from recharge zones. Alteration of natural vegetation regimes can also reduce recharge by speeding up runoff. An increase in impervious cover could also increase the frequency of flow in creeks and stream beds where most of the recharge occurs. Sediment-laden stream water may also plug recharge features with sediment, closing off potentially important paths of aquifer recharge. In a scenario where stormwater flow is increased, infiltration is decreased, and recharge features are plugged, water levels in the Edwards Aquifer could be reduced. Low flows in Barton Springs have been associated with increased specific conductance (Mahler et al., 2006) and decreased dissolved oxygen levels (Turner, 2009), both of which negatively affect spring-dependent biota.

As discussed in the Draft EIS, changes in the quantity of water reaching sensitive features may result from intentional and incidental aspects of roadway operation. Sensitive features function within the context of their contributing surface watersheds. Although there are no known caves or large recharge features within the *Preferred Alternative* alignment, encroachment of impervious roadway cover on the drainage basins associated with unknown caves or recharge features could result in a decrease in water volume, resulting in potential drying of the cave environment and impacts to sensitive karst invertebrates or aquifer-dependent species utilizing those areas (Section. 4.4.1). When roadways cross recharge watersheds and their design incorporates changes in topography, the watersheds may be truncated and potential recharge flow may effectively be removed and lost to other processes such as evapotranspiration. Stormwater management infrastructure can impact recharge water as well. In addition to changes in erosive potential mentioned earlier, water may be conveyed into or away from the surface or subsurface catchment basins of sensitive features. Each of these can result in changes in recharge water quantity if not addressed.

Construction of the *Preferred Alternative* would result in minimal impacts to water quantity resulting from the placement of approximately 74.0 acres of new impervious cover in an already urbanized area. The permanent BMPs discussed in the section above and in Section 4.9.2.3 would be designed to control the velocity of flow and quality of stormwater runoff leaving the project area in order to minimize any potential impacts to the recharge of groundwater over the Edwards Aquifer. The BMPS would be designed to maintain recharge characteristics at the level of the preexisting condition or improve recharge characteristics. Moreover, the proposed 17 water quality ponds (such as batch detention ponds, sand filter system ponds, bioretention ponds), two upstream detention ponds, and proposed removal of concrete from the channel of Williamson Creek are designed to delay the release of stormwater, reduce peak flow volumes, and increase the duration of flow events, which would increase the opportunity for recharge into known and unknown features in the project area. Additionally, the proposed improvements would not require the withdrawal or use of any

groundwater during the construction or operation phase of the project. Therefore, the proposed project would result in minimal and discountable negative impacts to water quantity.

4.9.1.2.1 Drinking Water Systems

The TWDB Groundwater Database lists 11 private water wells within 500 feet of the *Preferred Alternative*. Table 4-21 in the Draft EIS shows the well numbers, well types, and recorded water depth for the listed wells; this information has not changed since the release of that document. The proposed project would not require the withdrawal of water from any adjacent wells or other drinking water systems. Additionally, there are no public water supply wells or public water supply intakes within or adjacent to the *Preferred Alternative* alignment (TCEQ, 2017). Due to the robust BMPs proposed for protection of stormwater runoff within the project area, no impacts to the quality of well water is anticipated for the *Preferred Alternative*.

4.9.1.3 Encroachment-Alteration Effects

Encroachment-alteration effects to groundwater quality could occur primarily due to increased impervious cover or removal of vegetation that results in increased runoff, erosion, and altered recharge (flow and quality) to the aquifer. Impervious cover would be directly increased by the additional travel lanes for the *Preferred Alternative* and the roadway infrastructure associated with this option. Impervious cover may also increase due to induced changes that result from the proposed project. Placement of the roadway could encroach on the surface or subsurface drainage areas of previously unknown adjacent karst recharge features, altering the hydrologic regimes in those features. Negligible groundwater quantity encroachment-alteration effects are anticipated as a result of the proposed project.

4.9.2 Surface Water Resources

The Draft EIS summarized the existing conditions for surface water resources within the OHP Project area. As discussed in Section 4.9.2 of the Draft EIS, the OHP Project area is located within the Colorado River Basin and crosses the drainage area of three watersheds: Slaughter, Williamson, and Barton Creek (**Figure 4-10a–b**). Since the publication of the Draft EIS, the statuses of these watersheds and the river basin have not changed, and no additional field studies have been conducted for the *Preferred Alternative*. As noted in the Draft EIS, a surface water quality monitoring site occurs within the OHP Project area at the Williamson Creek/US 290 crossing. During the public comment period, the Department of the Interior noted the location of this station and identified the likely need to relocate this station prior to construction. As a result, the project team has coordinated with the local USGS office and has committed to working with the USGS and the COA to identify a new location for the Williamson Creek monitoring station once construction of the *Preferred Alternative* is completed.

4.9.2.1 Jurisdictional Waters of the U.S., Including Wetlands

Section 4.9.2.5 of the Draft EIS identified potential impacts to 11 streams, 1 wetland, 2 ponds, and 1 stock pond within the limits of the OHP Project area. The Draft EIS analysis was based on a combination of field investigation where right-of-entry had been granted and desktop research.

In summary, US 290 is crossed by one tributary to Slaughter Creek (Devil's Pen Creek), five unnamed tributaries to Williamson Creek, Wheeler Branch, and Williamson Creek. SH 71 is crossed by Scenic Brook Tributary, one other unnamed tributary to Williamson Creek, and the main branch of Williamson Creek. The areas proposed for both of the detention ponds include tributaries to Williamson Creek. Williamson Creek is an intermittent stream within the OHP Project area; it flows to the southeast into Onion Creek and on to the Colorado River. The main branch of Slaughter Creek is a perennial water; it flows southeast into Onion Creek and on to the Colorado River. Its confluence with Onion Creek is located approximately 7 miles upstream of the Williamson Creek confluence. Tributaries to Williamson Creek and Slaughter Creek would be considered potentially jurisdictional waters of the U.S. due to their direct hydrologic connection to a traditional navigable water. Because all the streams in the project area are tributaries to Williamson Creek or Slaughter Creek, they would also be considered potentially jurisdictional.

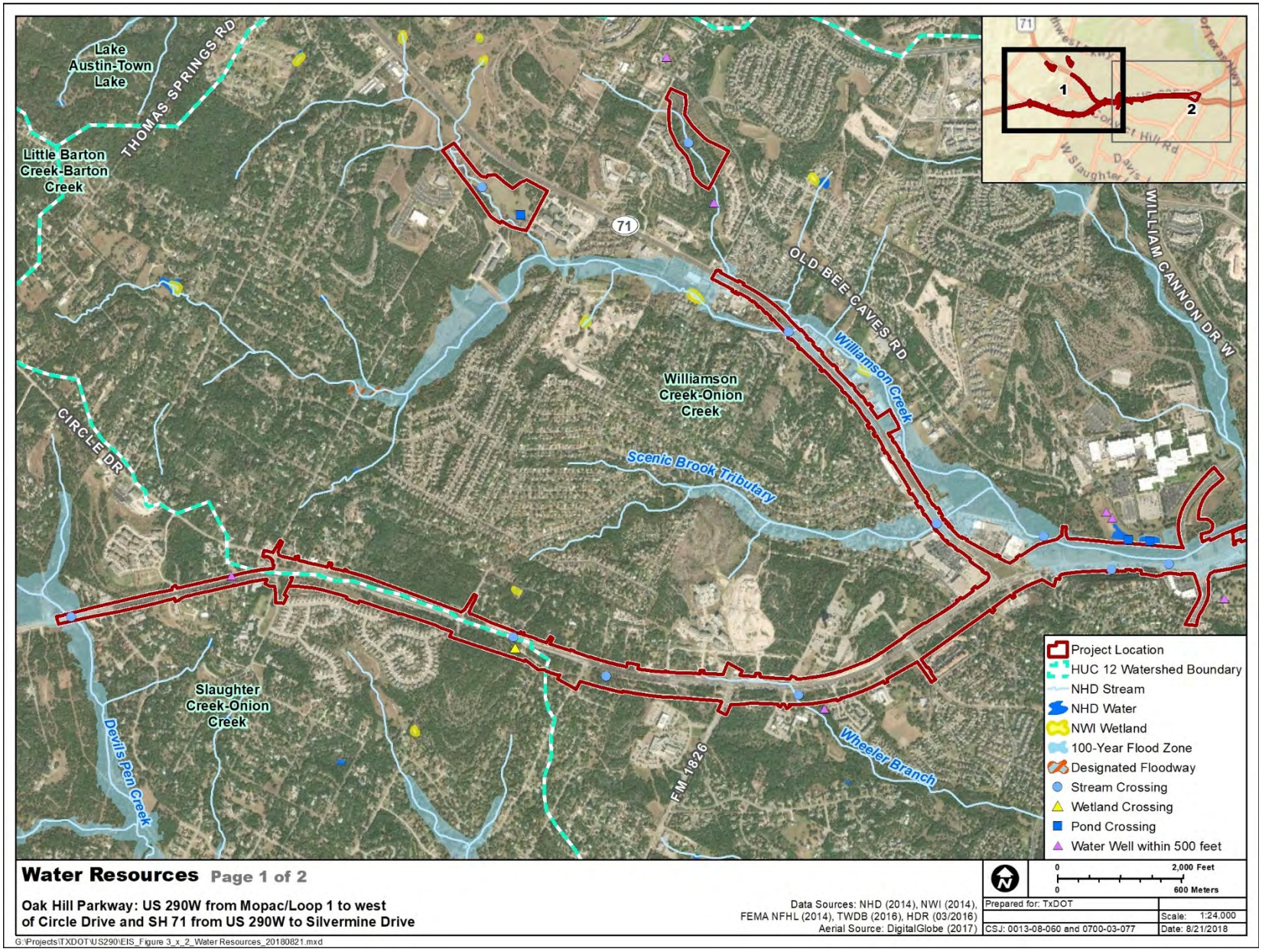

Figure 4-10a. Water resources overlain on the *Preferred Alternative* alignment.

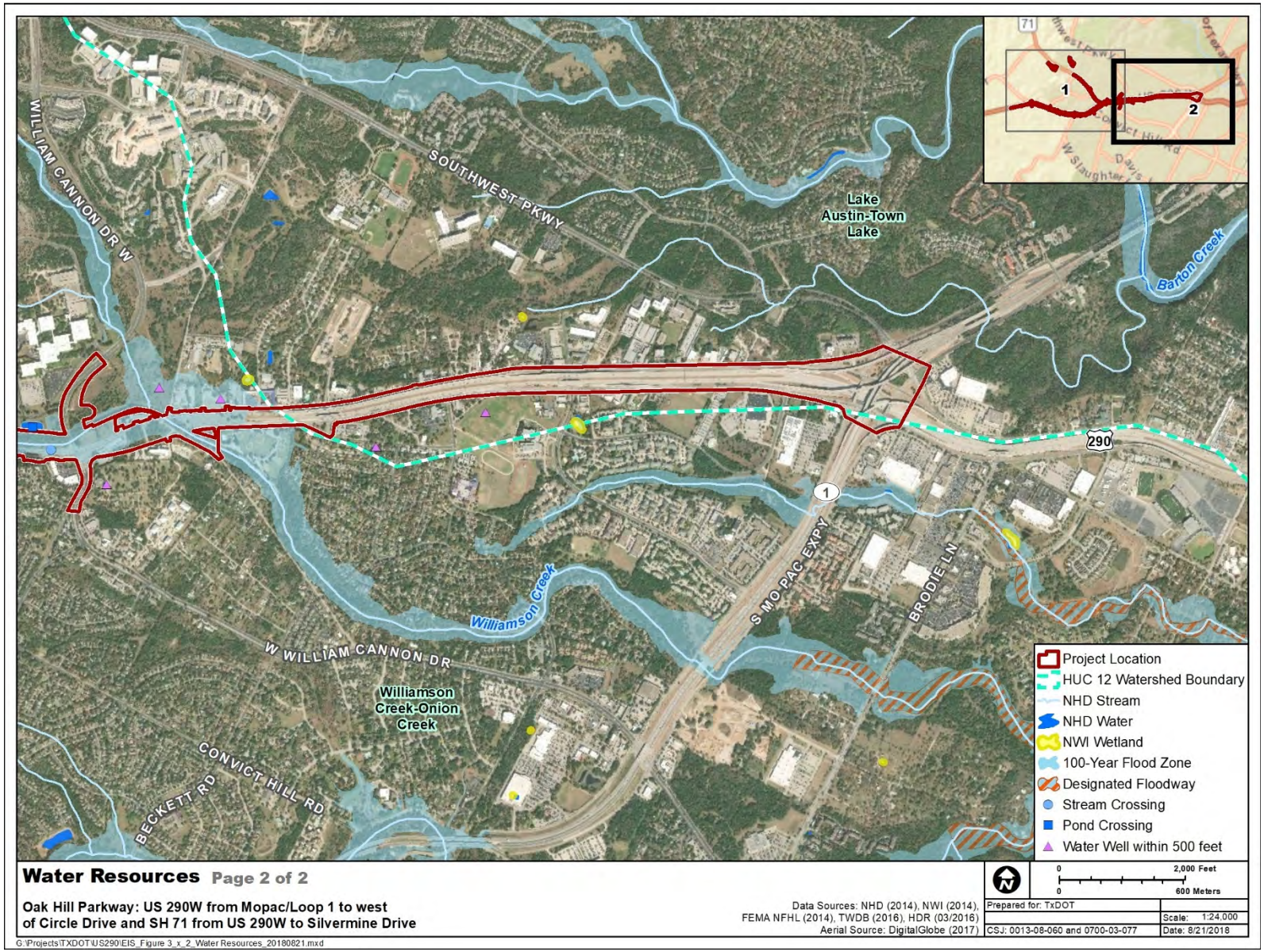

Figure 4-10b. Water resources overlain on the *Preferred Alternative* alignment.

In addition to the streams, one emergent wetland was identified within the OHP Project area. This wetland is associated with a stream crossing in the OHP Project area. Two detention ponds were located on an adjacent property where right-of-way was proposed. One stock pond is located within one of the proposed upstream detention locations.

No additional field investigations were conducted following the release of the Draft EIS, but a review of the revised *Preferred Alternative* design identified several changes to the impact evaluation for the project. In total, the *Preferred Alternative* would result in an approximately 0.17-acre increase in potential impacts at two crossings (Stream 3 and Stream 6) and would no longer impact the adjacent detention pond facilities (Pond 1 or Pond 2). The acreage of each potentially jurisdictional water body within the *Preferred Alternative* alignment is shown in **Table 4-13** below. These acreages do not reflect actual impacts within the project area. Exact acreages of impact would be determined during final design. Field verification was restricted to areas where right-of-entry was granted; detention pond locations were not included in this assessment due to lack of right-of-entry. Final impact calculations will be conducted for each aquatic resource once right-of-way has been obtained.

Table 4-13. Acreages of Water Bodies within the *Preferred Alternative* Alignment

Aquatic Resource Type	Description	OHWM (ft.)	Acreage within Alignment
Wetland 1	Headwaters of Tributary to Scenic Brook Tributary	undet.	0.03
Stream 1	Unnamed Tributary to Williamson Creek	3	0.01
Stream 2	Unnamed Tributary to Williamson Creek	2	0.04
Stream 3	Ephemeral Stream Wheeler Branch	10	0.46
Stream 4	Ephemeral Scenic Brook Tributary to Williamson Creek	20	0.08
Stream 5	Perennial Stream Headwaters of Williamson Creek at SH 71 bridge	5	0.03
Stream 6	Williamson Creek	25	2.43
Stream 7	Unnamed Tributary to Williamson Creek	5	0.18
Stream 8	Unnamed Tributary to Williamson Creek	4	0.02
Stream 9	Devil's Pen Creek*	undet.	undet.
Stream 10	Unnamed Tributary to Williamson Creek*	undet.	undet.
Stream 11	Unnamed Tributary to Williamson Creek*	undet.	undet.
Stock Pond 1	Stock Pond*	n/a	0.33
Total			3.61

Source: USFWS, 2017; USGS, 2017; Project Team, 2018.
*Right-of-entry was not granted for these areas; estimates were calculated from desktop analysis.

Typically for linear transportation projects, if less than 0.5 acres of fill is proposed into a single and complete crossing, then impacts to any waters of the U.S., including wetlands, would be

authorized under a Nationwide Permit 14 (NWP 14); impacts greater than 0.5 acres would require an Individual Permit. For an NWP 14, impacts which equal or exceed 0.1 acres or discharge into a wetland would require a pre-construction notification. Based on current design concepts for the *Preferred Alternative*, each crossing of Williamson Creek, its tributaries, and Devil's Pen Creek are anticipated to span the ordinary high water mark (OHWM), resulting in minimal permanent impacts to these water bodies. Efforts made during the planning stages to avoid impacts to waters of the U.S. would continue during final design. Once design has been advanced and right-of-entry is obtained, a final wetland/waters of the U.S. delineation would be conducted to identify the appropriate level of USACE permitting and determine whether mitigation would be required.

Temporary construction impacts would be minimal due to the proposed use of BMPs or activities (e.g., work platforms, coffer dams, temporary access roads) that are designed to minimize impacts to existing waters and wetlands.

4.9.2.2 Floodplains

According to the Federal Emergency Management Agency (FEMA) Flood insurance rate maps, the project intersects the designated 100-year floodplains associated with Williamson Creek and Devil's Pen Creek (**Figure 4-10a–b**). Floodplain impacts were reassessed for the *Preferred Alternative* due to the design revisions. Per this assessment and consideration of public comment, the following floodplain calculations and coordination information has been updated.

In all, 69.32 acres of FEMA-mapped floodplains are within the *Preferred Alternative* alignment. Areas mapped as Zone A or AE are subject to inundation by the 1-percent-annual-chance flood event. The proposed alignment includes 68.02 acres of Zone A or AE connected to Williamson Creek and 1.3 acres of floodplain at Devil's Pen Creek. These calculations represent a 1.4-acre decrease of mapped floodplains within the *Preferred Alternative* alignment compared to the impacts discussed in Section 4.9.2.6 of the Draft EIS. The *Preferred Alternative* would not provide new access across the floodplains of Williamson Creek or Devil's Pen Creek, and it would not support incompatible development within any floodplain. Although the existing US 290/SH 71 roadways represent a current encroachment upon the 100-year floodplains of these two creeks, the proposed *Preferred Alternative* would avoid significant floodplain encroachments, would avoid actions that adversely affect the base floodplains, and would be compatible with the National Flood Insurance Program and FEMA programs; therefore, it would meet the requirements of a practicable alternative under Executive Order 11988.

In addition to the impacts discussed above, the existing concrete bridges at Old Bee Cave Road, William Cannon Drive, and US 290 would be removed and rebuilt under the *Preferred Alternative* as discussed in the Draft EIS. It is anticipated that approximately 563, 1,597, and 996 cubic yards (CY) of concrete would be removed from the 25-year floodplain at these locations. The new crossings would include construction of bridges utilizing 10-by-10-foot concrete columns totaling 222 CY. The net result of the bridge removal/reconstruction would

be an approximately 2,933 CY reduction of concrete within the 25-year floodplain of Williamson Creek. When coupled with the proposed upstream detention ponds, the bridge crossing improvements are anticipated to have a positive effect on downstream flooding. For flood events below a 10-year flood, there would be no overland flow outside the banks of Williamson Creek, and for flood events at the level of a 10-year flood or higher, overflow from the Williamson Creek to Barton Creek watershed would occur. However, 10-year or higher flood levels at the overflow point would be reduced by approximately 0.5 feet from the existing conditions (H&H Resources, 2017).

Impacts to floodplains in the project area would be minimized by using BMPs during both construction and operation of the proposed project. It is anticipated that bridge support structures (e.g., piers and abutments) and culverts could be designed to avoid causing an increase in the base flood elevation that would violate applicable floodplain regulations. Coordination with the local floodplain administrator would be required. Additional information regarding construction within the floodplain of Williamson Creek, including the hydraulics design associated with stream crossings in the project area, is detailed in the *Hydrology and Hydraulics Study US 290/SH71 Oakhill Parkway Project Travis County*, included as Appendix I in the Draft EIS.

4.9.2.3 Surface Water Quality and Quantity

Surface water quality and quantity impacts were reassessed for the *Preferred Alternative* alignment. Per this reanalysis and public comment, additional measures were evaluated in the *Oak Hill Parkway TSS Removal Load Memorandum* (**Appendix D**) in an effort to ensure that the project could achieve a net decrease in annual TSS loading. In the preliminary design of the *Preferred Alternative*, 2 upstream detention ponds, up to 17 water quality ponds, vegetated filter strips (VFS), and permeable friction course (PFC) pavement are proposed. During final design, the ultimate number and configuration of BMPs may be revised as necessary to maintain the commitment to a net decrease.

A summary of potential impacts resulting from the construction and operation of the *Preferred Alternative* is provided below. Although the design varies slightly from what was presented in the Draft EIS, no additional acreage of impervious cover would be added within the water quality study area as a result of these design changes, but there was an overall reduction in the size of the proposed upstream detention ponds. As a result of public comment, several additional commitments focusing on water quality within the OHP Project area have been added and are discussed below. A discussion of the water quality impacts as they pertain to federally listed species is included in **Section 4.10.3.2**.

Because of the direct and indirect impacts associated with solids entrained in a waterbody, the TSS in a sample of water is measured as an important indicator of water quality. Construction-phase contamination would be prevented by adherence to environmental commitments such as temporary BMPs outlined in the SW3P and WPAP. While TSS is a principal concern during both construction and operation of roadways, the BMPs that are

proposed as part of this project would address other roadway-associated pollutants as well, such as heavy metals, nutrients, and hydrocarbons.

The proposed project design includes two upstream detention ponds (with a total area of 17.31 acres) and up to 17 water quality ponds to mitigate for the increased impervious cover throughout the OHP Project area. These permanent ponds would be designed to improve the quality of stormwater runoff as well as the flow characteristics (e.g., rate and velocity) of discharged stormwater, which would decrease flood potential and reduce channel scouring downstream. It is anticipated that due to the upstream detention ponds and the US 290 bridge improvements at Old Bee Cave Road, William Cannon Drive, and US 290 there would be a reduction in 10-year flood levels of 0.5 feet in Williamson Creek that would slightly reduce overland flow into the Barton Creek watershed (H&H Resources, 2017). This improvement would reduce the amount of roadway contaminants potentially reaching the Barton Creek watershed, and indirectly the Barton Springs complex, during storm events.

TSS is often used as an indicator of water quality because it includes both large and small sediment particles. Most BMPs designed to improve water quality focus on TSS removal in stormwater runoff. The proposed OHP Project would strictly adhere to the TCEQ standards for BMPs over the Edwards Aquifer and would commit to at least 80 percent removal of the incremental increase in TSS resulting from the proposed project's addition of impervious cover over the Recharge Zone. A supplemental *Oak Hill Parkway TSS Removal Load Memorandum* (**Appendix D**) was prepared to address permanent water quality BMPs for the OHP Project and provides approximate locations for each measure. The *Oak Hill Parkway TSS Removal Load Memorandum* provides multiple treatment scenarios for meeting and exceeding the TCEQ standards; however, the information summarized below presents the results from Scenario 1 as described in **Appendix D**. **Table 4-14** represents a summary of the proposed TSS removal amounts for the *Preferred Alternative*. As currently designed, all scenarios presented in **Appendix D** result in the anticipated TSS removal exceeding the total removal required by the TCEQ.

Table 4-14. Proposed TSS Removal by the *Preferred Alternative*

	Removal in Pounds per Year
TSS Removal Required for OHP Project Area	78,425
Existing Conditions TSS Removal	18,428
Proposed Conditions TSS Removal	94,074
Proposed Minus Required TSS Removal (Overtreatment)	15,649

Source: KFA, 2018.

Post-construction TSS levels in treated stormwater are anticipated to exceed the total TCEQ required removal by approximately 15,649 pounds for the *Preferred Alternative* under Scenario 1 (KFA, 2018). As described in **Table 4-15** below, the proposed design would utilize a combination of batch detention, VFS, PFC pavement, bioretention, and sand filter systems to meet and exceed the TSS removal required by the TCEQ.

Table 4-15. Summary of Proposed Water Quality Control Facilities—*Preferred Alternative*

Type	Watershed	Treatment Type
Vegetated Filter Strip Area	Varies	Vegetated Filter Strip
Vegetated Filter Strip Shared-Use Path	Varies	Vegetated Filter Strip
Permeable Friction Course to Vegetated Filter Strip in Series	Varies	Permeable Friction Course to Vegetated Filter Strip
Permeable Friction Course	Varies	Permeable Friction Course
Pond A	Devil's Pen Creek	Bioretention
Pond B	Devil's Pen Creek	Batch Detention
Pond C	Williamson Creek	Sand Filter System
Pond D	Williamson Creek	Sand Filter System
Pond E	Williamson Creek	Sand Filter System
Pond F	Williamson Creek	Sand Filter System
Pond G	Williamson Creek	Sand Filter System
Pond H	Williamson Creek	Sand Filter System
Pond I	Williamson Creek	Sand Filter System
Pond J	Williamson Creek	Batch Detention
Pond K	Williamson Creek	Bioretention
Pond L	Williamson Creek	Sand Filter System
Pond M	Williamson Creek	Sand Filter System
Pond N	Williamson Creek	Sand Filter System
Pond O	Williamson Creek	Sand Filter System
Pond P	Williamson Creek	Bioretention
Pond Q	Williamson Creek	Bioretention

Source: KFA, 2018.

In addition to stormwater runoff, hazardous materials spills are also a concern for surface water quality as they may enter features associated with the Contributing and Recharge Zones of the aquifer. Water quality ponds under the *Preferred Alternative* would be equipped with shut off valves to mitigate impacts associated with accidental spills within the OHP Project corridor. Over 5 acres of earth would be disturbed as a result of the *Preferred Alternative*, which would require preparation of a SW3P for the project. Stormwater runoff would be addressed through compliance with the Texas Pollutant Discharge Elimination System (TPDES) and Edwards Aquifer Protection Program. As a result of ongoing coordination with the COA, TxDOT has committed to working with the COA during the final design phase of water quality facilities for the project to investigate possible enhancements to the water quality in the project area.

4.9.2.4 Encroachment-Alteration Effects

4.9.2.4.1 Waters of the U.S., Including Wetlands

Anticipated fill impacts to waters of the U.S., including wetlands, would generally be limited to the project footprint. Temporary and permanent impacts to waters of the U.S. would not disrupt any natural processes in the OHP Project area. The construction of any of the proposed alternatives would have limited encroachment-alteration effects because of the existing dense urbanization of the proposed OHP Project area and the incorporation of water quality BMPs. The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (CWA) (33 United States Code 1251 et. Seq, Section 404); therefore, any additional development in the area surrounding the OHP Project would be subject to these regulations and subsequent minimization and mitigation measures.

4.9.2.4.2 Floodplains

The proposed project would result in encroachment-alteration effects within a regulatory floodplain. The proposed project would increase impermeable surfaces and have the potential to indirectly affect sediment and pollutant loading in the flood hazard areas as mapped by FEMA. However, floodplain management regulations and design standards would require that the project be designed so as not to alter base flood elevations and not cause adverse flood impacts to upstream or downstream properties.

4.9.2.4.3 Surface Water Quality and Quantity

Encroachment-alteration effects to water quality could occur and would primarily be due to increased impervious cover or removal of vegetation that results in increased non-point source runoff and altered recharge (flow and quality) to the aquifer, increased localized erosion, and degraded water quality downstream. Placement of the roadway could encroach on the surface or subsurface drainage areas of previously unknown adjacent karst recharge features, altering the hydrologic regimes in those features. Use of BMPs within the OHP Project area would minimize water quality effects downstream, and regulations such as the CWA's 303(d) list of impaired waters managed by the TCEQ would continue long-term monitoring of surface water quality in Travis County.

4.10 Ecological Resources

4.10.1 Regulatory Authority

The following regulations were reassessed for the *Preferred Alternative*: Migratory Bird Treaty Act, Fish and Wildlife Coordination Act, Executive Order 13112 on Invasive Species, and the Executive Memorandum on Beneficial Landscaping. Per this review and consideration of public comments following the release of the Draft EIS, it was determined that no updated factual corrections or revisions were necessary. As such, the summary, analysis, and environmental commitments presented in Section 4.10.1 of the Draft EIS would not change under the *Preferred Alternative*.

4.10.1.1 Texas Parks and Wildlife Department Memorandum of Understanding

As discussed in the Draft EIS, Transportation Code 201.60 requires TxDOT to adopt an MOU with each state agency that has a responsibility for the protection of the natural environment or for the preservation of historic or archeological resources. The Texas Administrative Code (Title 43, chapter 2, subchapter G) contains the MOU between TxDOT and the Texas Parks and Wildlife Department (TPWD), which became effective on September 1, 2013. TPWD, as a participating agency, reviewed and commented on the Draft EIS which served as coordination under the MOU. TxDOT formally responded to TPWD comments on July 18, 2018. No additional coordination with TPWD would be required for this project unless future design modifications resulted in a reevaluation that was determined to be a substantial change from previous coordination or if the scope of the reevaluation relates to an issue on which TPWD commented.

4.10.2 Vegetation

The primary impact to vegetation would be the removal of existing vegetation to accommodate right-of-way, site preparation, and construction of the *Preferred Alternative*. As described in Section 4.10.2 of the Draft EIS, the following vegetation types were identified within the OHP Project area: (1) Edwards Plateau: Ashe Juniper Motte and Woodland, (2) Edwards Plateau: Deciduous Oak/Evergreen Motte Woodland, (3) Edwards Plateau: Savanna Grassland, (4) Edwards Plateau: Floodplain Juniper Shrubland, (5) Edwards Plateau: Riparian Hardwood Forest, (6) Native Invasive: Mesquite Shrubland, and (7) Urban Low Intensity (**Figure 4-11**). No additional site visits or habitat assessments were conducted following the release of the Draft EIS. However, several of the vegetation impacts discussed in the Draft EIS have been updated to reflect the revised *Preferred Alternative* design. The results of the revised desktop vegetation analysis are presented in **Table 4-16.**

Table 4-16. Impacts to Observed Vegetation Types within the *Preferred Alternative* Alignment

Observed Vegetation Type	Impacts (acres)
Urban	120.45
Edwards Plateau Ashe Juniper, Motte, and Woodland	25.56
Edwards Plateau Deciduous Oak/Evergreen Mottle Woodland	53.21
Edwards Plateau: Savanna Grassland	18.48
Edwards Plateau: Floodplain Ashe Juniper Shrubland	0.06
Edwards Plateau: Riparian Hardwood Forest	19.43
Native Invasive: Mesquite Shrubland	3.81
Total	241.00

Source: Project Team, 2018.

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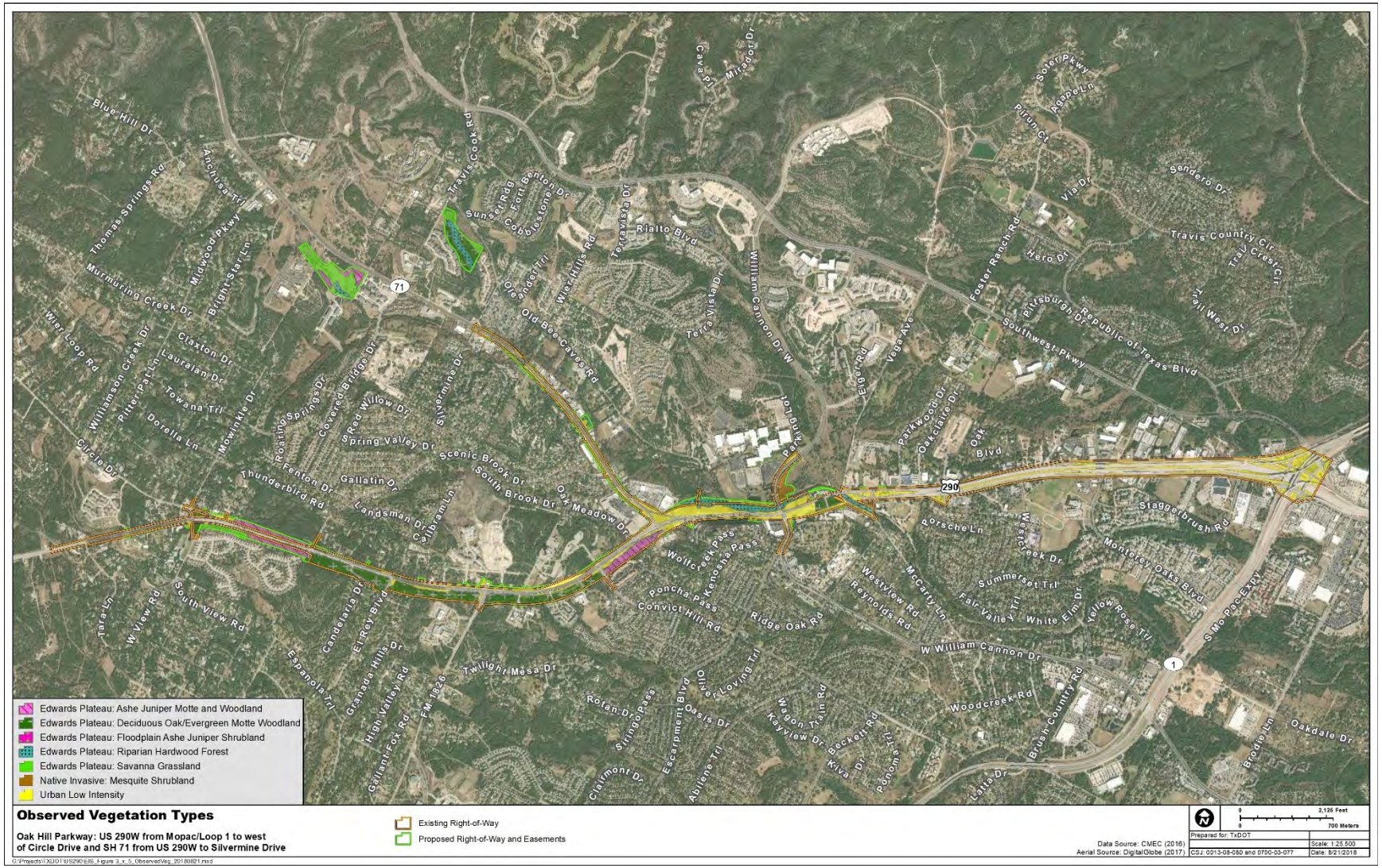

Figure 4-11. Observed vegetation types in the *Preferred Alternative* alignment.

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4.10.2.1 Trees

During the early public involvement stages of this project, trees were identified as an important resource by community members. As described in the Draft EIS, additional survey effort was expended to identify and attempt to minimize impacts to large hardwood trees within the project area. In all, 518 native hardwood trees, including over 15 distinct species, were mapped as a result of the survey effort. The dominant species included plateau live oak (45 percent), other oaks (18 percent), and pecan trees (16 percent). The size class surveyed ranged from 10 inches diameter at breast height (DBH) to 62 inches DBH. DBH is a standard measurement of tree trunk diameter and is typically measured at 4.5 feet (alternatively 1.4 meters) above ground level. Approximately 88 percent of trees measured less than 35 inches DBH. No tree health metrics or tree conditional assessments were conducted during these initial surveys. Ashe juniper, although a dominant species in the OHP Project area, was not inventoried during the hardwood tree survey efforts.

No additional survey efforts were conducted following the release of the Draft EIS; therefore, no tree impacts were reassessed for the *Preferred Alternative*. Section 4.10.2.2 of the Draft EIS included a summary of the tree survey results and proposed impacts. Construction of the *Preferred Alternative* would require the removal of existing trees in order to accommodate the additional roadway width and maintain safety clearance zones for vehicle traffic. Although the final number of trees to be removed as a result of the proposed project would be determined once design has been finalized, TxDOT has committed to avoiding impacts to existing vegetation, including trees, as much as possible.

Members of the public have consistently identified several iconic trees that have a higher community value due to their size, location, or local history (**Figure 4-12**).

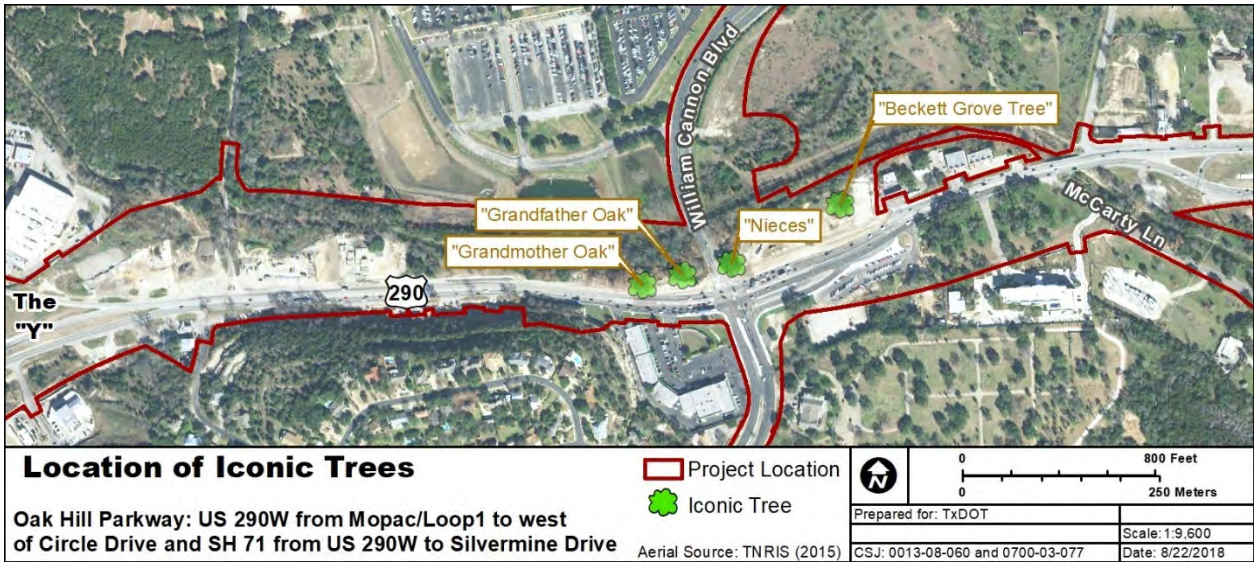

Figure 4-12. Location of iconic trees.

With that knowledge, the project team prioritized these trees for protection during project development. The *Preferred Alternative* would not remove the following iconic trees: "Beckett Grove Tree," "Grandmother Oak," "Grandfather Oak," or "the Nieces."

4.10.3 Fish and Wildlife Resources

The following sections identify the species that may be impacted or affected as a result of the *Preferred Alternative*.

4.10.3.1 Non-Rare Fish and Wildlife

Construction of the *Preferred Alternative* would directly impact any animals that reside within the path of the proposed roadway improvements. As with the vegetation, wildlife communities would be impacted by the permanent loss of habitat. Impacts to non-rare fish and wildlife would be minimized through initial project design considerations and through the avoidance and minimization of vegetation removal and stream channel disturbance. Construction activities would disturb only that which is necessary to construct the proposed project, including minimizing disturbance to inert microhabitats (e.g., snags, brush piles). The removal of native vegetation would be avoided to the greatest extent practicable, and BMPs would be utilized to avoid impacts to fish and wildlife within the project area during construction activities.

4.10.3.2 Federally Listed Species and the Endangered Species Act

Section 4.10.3.2 of the Draft EIS presented a comprehensive review and analysis of the potential effects to federally listed species resulting from the proposed OHP Project. The previous analysis and supporting *Biological Resources Technical Report* (Appendix J of the Draft EIS) concluded the proposed project would have no effect on the Golden-cheeked Warbler (*Setophaga chrysoparia*), Black-capped Vireo (*Vireo atricapillus*), or Bee Creek Cave Harvestman (*Texella reddelli*), and may affect the candidate species Bracted twistflower (*Streptanthus bracteatus*). TxDOT also concluded that the project had the potential to affect, but not adversely affect the BSS (*Eurycea sosorum*) and ABS (*Eurycea waterlooensis*). TxDOT completed informal consultation in December 2017 with the USFWS and received concurrence on the above effect determinations. Since the release of those documents, additional field investigations of geologic features have occurred within the *Preferred Alternative* alignment and new peer reviewed literature documenting range expansions for the BSS has been published. Additionally, although the project did not propose effects to the Black-capped Vireo, this species was delisted by the USFWS in April 2018 (USFWS, 2018). The discussion below is focused on providing an update to the existing conditions or baseline data for the ABS and BSS and on documenting the results of the revised GA with respect to listed species. The remaining discussion in Section 4.10.3.2 of the Draft EIS remains valid.

4.10.3.2.1 Edwards Aquifer Salamander Species

As discussed in the Draft EIS, until recently, both the BSS and the ABS were presumed to be endemic to the Barton Springs Complex; however, recent genetic analysis of salamanders collected at several locations in southwestern Travis County and northern Hays County that discharge water to the Barton Springs Segment of the Edwards Aquifer suggest otherwise (Chippendale, 2014; Devitt and Nissen, 2018). Of the four collection sites discussed by Chippendale (2014), two locations (Cold Springs and Blowing Sink Cave) are indirectly associated with the OHP Project area. Cold Springs is notable because the OHP Project area is partially located within the Cold Springs groundwater basin as mapped by Hauwert (2015), and his dye trace studies have shown flow paths linking Williamson Creek to this location during high flow events (Hauwert, 2009, 2015). Similarly, Blowing Sink Cave is located approximately 3.8 miles south of the MoPac/US 290 interchange, and flow paths to Barton Springs have been mapped from this location (Hauwert, 2009). Blowing Sink cave is located within the Slaughter Creek watershed, and stormwater runoff leaving the west end of the OHP Project area and draining into Devil's Pen Creek may contribute to recharge in this area. Additionally, in 2015, a single BSS was identified from a sampling well on Farm-to-Market Road (FM) 1626, approximately 9.5 miles south of the Barton Springs Complex (Texas Natural Diversity Database, 2016). In 2018, seven new occurrence records of the BSS were documented, which confirmed a significant range expansion for this species (Devitt and Nissen, 2018). Four of the new locations (Onion Creek drainage) were documented southwest of the OHP Project area and discharge from the Contributing Zone of the Edwards Aquifer (Devitt and Nissen, 2018). The remaining locations were from the Recharge Zone, one from Little Bear Creek, one from Bear Creek, and the last from Barton Creek. The Barton Creek location (Backdoor Spring) is located approximately 1.68 miles north of the MoPac/US 290/SH 71 interchange. As discussed by Devitt and Nissen (2018), the range extension of the BSS documented from the Onion Creek drainage in the Contributing Zone challenges the historical interpretation that the Edwards and Trinity aquifers are distinct hydrogeologic units. Although the majority of the OHP Project occurs within the Contributing Zone, no BSS have been documented from the Barton Creek watershed in the northern section of this zone.

According to the BSEACD, the Barton Springs segment of the Edwards Aquifer is approximately 155 square miles (BSEACD, 2003; Slade et al., 1986). Approximately 85 percent of recharge to the Barton Springs segment comes from six streams located within the Recharge Zone (USFWS, 2005). Williamson Creek and Slaughter Creek are two of these streams, and both occur or have tributaries within the OHP Project area. Three groundwater basins have been delineated within this segment: Cold Springs, Sunset Valley, and the Manchaca groundwater basins (Hauwert, 2009, 2015). In general, dye trace studies have concluded that most groundwater recharge in the Barton Springs segment discharges at Barton Springs, located approximately 4 miles northeast of the eastern project terminus (BSEACD, 2010; Smith et al., 2005). Although there remains debate regarding the divide between Cold Springs and Barton Springs basins, several studies have linked flow paths from upper Williamson Creek to

discharge sites at Cold Springs and from lower Williamson Creek to discharge sites at the Barton Springs Complex (Hauwert, 2009, 2015; Slade, 2014).

A revised GA was conducted for the portion of the *Preferred Alternative* occurring over the Edwards Aquifer Recharge Zone (HDR Engineering, Inc. [HDR], 2018; **Appendix E**). Six features were identified and described during an updated survey conducted in 2018 (see **Figure 4-2** for the geologic features). Four of these features were evaluated as sensitive, with potential for infiltration into the aquifer. Two additional features, Gaines Sink and Flea Market Sink, were described in the revised GA and summarized in **Section 4.4.1**. These features are outside the project area but were noted as recharge features with potential flow paths to either Cold Springs or Barton Springs. Because groundwater moves through highly permeable fractures, sinks, and voids, the aquifer has little ability to filter potential contaminants. This characteristic makes the Edwards Aquifer's water quality highly dependent on the quality of surface water flowing over the Recharge Zone and makes the aquifer species particularly susceptible to upstream contamination (Mahler and Massei, 2007).

Potential impacts to sensitive aquatic species associated with the construction and operational phases of roadways include impacts from altered hydrology and impacts from roadway-associated pollution. Pollutants can enter the aquatic environment via untreated stormwater runoff or spills, and the addition of impervious cover can influence the volume and quality of runoff leaving the project area. The Recharge Zone of the Barton Springs segment encompasses approximately 78 square miles (or 50,000 acres). Approximately 74.0 acres of impervious cover would be added to the water quality study area as a result of the *Preferred Alternative* (KFA, 2017, 2018). The new impervious cover would be less than 0.15 percent of the Barton Springs Recharge Zone total. Construction activities such as excavation, trenching, geotechnical boring, and vegetation clearing could increase the sediment loading in stormwater by loosening topsoil and increasing the erodibility of surfaces within the project area. This loosened sediment could be transported down-gradient and deposited in recharge features, stream terraces, or other water bodies by runoff or rainfall. Direct impacts caused by construction activities and indirect impacts caused by operation and maintenance of roadway facilities over time could have a negative impact on the water quality parameters mentioned above.

As discussed previously, no springs or caves occur within the *Preferred Alternative* alignment, and all known locations of BSS or ABS are at a considerable distance from the limits of construction. Direct effects to these species are most likely to occur if voids connected to the aquifer or containing groundwater are intersected during the down cutting of bedrock below the current grade or other excavation activities, such as for bridge piers. Preliminary design indicates that the *Preferred Alternative* would require the placement of approximately 167 columns within the Recharge Zone. Columns would reach depths between 19 and 33 feet, which would be shallower than all but one of the recorded wells near the project area. Therefore, any direct impacts, including mortality or physical harm caused by construction activities, are extremely unlikely to occur.

Nevertheless, based on the project-related increase in impervious cover, the project's location over the Recharge Zone of the Edwards Aquifer, and the known aquifer flow paths to Barton Springs from the impacted watersheds, this project may impact water quality through increased stormwater contribution; therefore, this project may contribute to the downstream degradation of water quality parameters that are essential to the BSS and ABS at discharge sites within the Barton Springs Complex. However, once stormwater leaves the OHP Project area and infiltrates into the subsurface environment (e.g., groundwater), the flow path and amount of mixing with other subsurface waters is unknown.

To mitigate for the increase of impervious cover as a result of the *Preferred Alternative* and to ensure protection of downstream resources (including salamanders), BMPs would be applied to reduce the intensity of stormwater runoff and amount of roadway pollutants entering Williamson and Slaughter Creeks. The proposed OHP Project would strictly adhere to the TCEQ standards for BMPs over the Edwards Aquifer and would commit to at least 80 percent removal of the incremental increase in TSS resulting from the proposed projects' addition of impervious cover. During its consultation with USFWS, TxDOT further committed that the final design of the project would result in a net decrease in annual TSS loading. A supplemental *Oak Hill Parkway TSS Removal Load Memorandum* (KFA, 2018) has been prepared to address permanent water quality BMPs for the OHP Project (**Appendix D**); in summary, the following BMPs have been recommended as permanent water quality protection measures for the OHP Project:

1. BMPs to protect water quality during both the construction and operation phases of the roadway will be implemented as defined by the WPAP and the SW3P.
2. Use of permanent BMPs, such as VFS, PFC, and up to 17 water quality treatment ponds, including bioretention ponds, batch detention ponds, and sand filter ponds, will be utilized throughout the OHP Project area.
3. Specific void mitigation measures will be followed for any unknown void encounters to protect the Edwards Aquifer from TSS during construction.
4. Buffers will be established to prevent impacts to the known recharge features in Williamson Creek during the construction phase of the project. BMPs, such as avoidance flagging or fencing, rock filter dams, and sediment control fencing, may be included to prevent impacts to these features.

As a result of coordination with the COA during the Draft EIS public comment period, TxDOT has committed to working with the COA during the final design phase of water quality facilities for the project to investigate possible enhancements to the water quality in the project area and has committed to providing an on-site environmental inspector during construction of the project to ensure compliance with the BMPs. TxDOT will require that the contractor prepare and implement an Environmental Compliance Management Plan. A third-party environmental compliance manager will be required; the manager will monitor the contractor's daily activities and will oversee those aspects of construction that could result in offsite impacts. The environmental compliance manager will report to both TxDOT and the contractor.

Although new scientific information regarding the species distribution of the BSS has been identified since the release of the Draft EIS, TxDOT has determined that this information would not impact the effect determinations previously proposed for this project because the range expansion of this species serves to increase the environmental baseline for the BSS. Only one of the new sites, site 7—Backdoor Spring on Barton Creek, is within the Recharge Zone located northeast of and potentially downgradient from the project site. No recent flow-path modeling or groundwater basin delineation maps for this spring are available; however, in 1997 the COA estimated that the Backdoor Spring groundwater basin roughly included all of the area between the spring on Barton Creek and US 290, which is approximately two square miles in size (COA, 1997). Although a portion of the *Preferred Alternative* may lie upgradient from Backdoor Spring, the proposed BMPs would protect surface water and groundwater in the OHP Project area by minimizing erosion, reducing TSS, and reducing the rate and velocity of discharged stormwater, which would decrease flood potential and thus reduce the amount of roadway contaminants potentially reaching the Barton Creek watershed during storm events. Accidental discovery plans, void mitigation measures, and water quality protection BMPs would further protect the Edwards Aquifer, including downgradient springs (Barton Springs, Cold Springs, and Backdoor Spring) from TSS during construction. TxDOT coordinated with the USFWS regarding new occurrence data for this species in November and December 2018. In light of this new information and TxDOT's commitment to the net reduction of TSS leaving the site, USFWS agreed that their December 20, 2017 concurrence letter remains valid. TxDOT has agreed to provide a copy of the application for the WPAP to the USFWS at the same time it is submitted to TCEQ for approval (**Appendix D**).

4.10.3.2.2 Bee Creek Cave Harvestman—Federal Endangered and State Species of Greatest Conservation Need

Impacts to the Bee Creek Cave harvestman were reassessed for the *Preferred Alternative*. Per this reanalysis, it was determined that no updated factual corrections were necessary for the species life history or effects determination, and Section 4.10.3.2 of the Draft EIS remains valid for that information. However, as a result of public comments and the revised *Preferred Alternative* design, an updated GA was conducted. The results of the GA are summarized below as they pertain to this species.

The closest occupied feature to the OHP Project area is located on the Barton Creek Greenbelt, approximately 2 miles northeast of the MoPac/US 290 interchange. A revised GA was conducted within the *Preferred Alternative* alignment for the area mapped as Karst Zone 3 (i.e., areas that probably do not contain endangered cave fauna), but a karst habitat assessment has not been completed (HDR, 2018). None of the features identified in the GA were described as having cave characteristics or were measured at a depth that would support constant temperatures and humidity (HDR, 2018). A detailed description of the karst features identified during the survey can be found in **Section 4.4.1**. Additionally, a review of Texas Speleological Survey data did not include any records for existing recharge or cave features within the project area (Texas Speleological Survey, 2008). Although the OHP Project occurs within the South Travis County Karst Fauna Region, the project area crosses Karst

Zones 3 and 4, areas that are unlikely to contain listed karst invertebrates (Veni and Martinez, 2007). The proposed project is not anticipated to affect the Bee Creek Cave harvestman.

Although the *Preferred Alternative* would minimize the need for excavation activities to the extent practicable, the potential for impacting an undiscovered cave or void remains. Excavation, geotechnical boreholes, and bridge pier drilling have the potential to alter a cave's ecosystem. However, due to the lack of suitable karst features identified during the GA and the fact that the OHP Project area is mapped as Karst Zone 3, the proposed project is not anticipated to have an effect on listed karst invertebrates. Accidental discovery plans, void mitigation, and protective BMPs would be utilized if a void were discovered during project construction as described in **Section 8.0**.

4.10.3.2.3 Bracted Twistflower—Federal Candidate and State Species of Greatest Conservation Need

Effects to the bracted twistflower were reassessed for the *Preferred Alternative*. Per this reanalysis, it was determined that no updated factual corrections were necessary. As a result of the revised *Preferred Alternative* design, there is now approximately 78.77 acres of potential suitable woodland habitat within the proposed alignment. This is an approximately 0.70-acre increase from the amount of habitat identified in the Draft EIS. While this species could possibly occur within the OHP Project area where gravelly clay and clay loam soils exist, it is not likely given the disturbed nature of the woodlands along the corridor and the prevalence of herbivores such as the white-tailed deer. Candidate species receive no statutory protection under the Endangered Species Act (ESA). If this species should become federally listed during the environmental review or construction phase of the OHP Project, additional coordination with the USFWS will occur.

4.10.3.3 State-Listed Species and Species of Greatest Conservation Need

Impacts to state-listed species and species of greatest conservation need (SGCN) were reassessed for the *Preferred Alternative*. Per this reanalysis and public comment, it was determined that no updated factual corrections or revisions to this section were necessary. Therefore, the results of the summary and analysis presented in Section 4.10.3.3 of the Draft EIS would not change under the *Preferred Alternative*. A brief summary of the potential impacts to these species as a result of the OHP Project are included below.

4.10.3.3.1 Plants

Eighteen SGCN plant species were identified to have potential suitable habitat within the *Preferred Alternative* alignment. These species would likely occur in either the mixed woodland or grassland vegetation communities or along the riparian corridors. The mixed woodland and grassland species are: Boerne bean (*Phaseolus texensis*), Buckley tridens (*Tridens buckleyanus*), Glass Mountains coral-root (*Hexalectris nitida*), Heller's marbleseed or Heller's false gromwell (*Onosmodium helleri*), plateau milkvine (*Matelea edwardensis*), Texabama croton (*Croton alabamensis* var. *texensis*), Texas almond (*Prunis minutiflora*), Texas amorpha (*Amorpha roemeriana*), Texas barberry (*Berberis swaseyi*), Texas fescue

(*Festuca versuta*), Texas milk vetch (*Astragalus reflexus*), Texas seymeria (*Seymeria texana*), tree dodder (*Cuscuta exaltata*), and Warnock's coral root (*Hexalectris warnickii*). The riparian or alluvial channel species are: gravelbar brickellbush (*Brickellia dentata*), low spurge (*Euphorbia peplidion*), narrowleaf brickellbush (*Brickellia epatoroides* var. *gracillima*), and rock grape (*Vitis rupestris*). According to TPWD data, all of these species have a range that extends across the Edwards Plateau, and none are restricted solely to the habitats occurring within the *Preferred Alternative* alignment.

4.10.3.3.2 Cave Myotis Bat

The cave myotis bat (*Myotis velifer*) inhabits a wide variety of habitats, many of which are associated with riparian areas or waterways within arid or semiarid environments. Its range stretches across the Southwestern U.S. into Central America. In Texas, they are common from the southwestern counties through the Edwards Plateau and into the northwestern portion of the Panhandle (Tuttle, 2003). Cave myotis bats commonly roost in rock crevices, caves, old buildings, bridges, and culverts and hibernate during the winter in groups (Tuttle, 2003). The following structures with National Bridge Inventory (NBI) numbers were investigated for suitable bat habitat: US 290 over Williamson Creek (NBI 142270011308022), William Cannon Drive over Williamson Creek (NBI 142270B03854003), SH 71 over Draw (NBI 142270070003013), SH 71 over Williamson Creek (NBI 142270070003012), and US 290 over Draw (NBI 142270011308048). None of these structures were noted to support bat colonies at the time of field investigation.

4.10.3.3.3 Plains Spotted Skunk

The plains spotted skunk (*Spilogale putorius interrupta*) is catholic in its range but is most often associated with wooded areas and tall grass prairies. Where available, rock outcrops and rocky canyons are preferred (Schmidly, 2004). Although urban habitation is less common, this species can be found around agricultural fields and low-density residential areas. Their den sites range from tree cavities to rock crevices, burrows under large rocks, and under buildings. Like many omnivores, the diet of this species consists of fruits, small mammals, bird eggs, and insects. Although the preferred habitat of tall prairie grasses is lacking in the project right-of-way, the small undeveloped tracts of land adjacent to the *Preferred Alternative* alignment cannot be excluded as potential habitat for this species, especially those areas along US 290 with rocky outcrops. No individuals or suitable den sites were identified during field investigations.

4.10.3.3.4 Guadalupe Bass

The Guadalupe bass (*Micropterus treculii*) is endemic to streams of the Edwards Plateau, including portions of the Brazos, Colorado, Guadalupe, and San Antonio river basins (Hendrickson and Cohen, 2015). The species is typically absent from extreme headwaters and prefers spring-fed streams with clear water and consistent temperatures, and lentic environments with flowing water, eddies, riffles, and deep pools (Hendrickson and Cohen, 2015; TPWD, 2015). The main branch of Williamson Creek is the only stream with potentially suitable habitat within the *Preferred Alternative* alignment. This species is unlikely to persist

year-round within Williamson Creek due to the perennial drought conditions that typically occur during summer months; however, individuals may migrate upstream in high-flow events during spawning periods (early March through May or June). Although juvenile fish were noted within Williamson Creek during field investigations, no identification or collection efforts took place.

4.10.3.3.5 Texas Garter Snake

The Texas garter snake (*Thamnophis sirtalis annectens*) generally inhabits mesic Hill Country streams with permanent water or soil moisture in floodplains but can be found in a wide range of habitats, including drainage ditches, metropolitan areas, and grassy or brush vegetation (Werler and Dixon, 2010). Although no individuals of this species were observed during site visits, the presence of Texas garter snakes in the riparian corridors associated with Williamson Creek, Wheeler Branch, Devil's Pen Creek, and the unnamed tributaries across the *Preferred Alternative* alignment cannot be ruled out.

4.10.3.4 Environmental Consequences

Pedestrian surveys were conducted where right-of-entry was granted in January, May, and June of 2016. No individuals of any state-listed species or SGCNs were identified during these surveys. Prior to construction, additional field reconnaissance would be conducted to assess whether any species or rare habitat communities would be impacted in areas that had not been previously studied.

Potential impacts to the SGCNs discussed above could be attributed to mobile species interacting with or avoiding construction machinery, the loss of wildlife habitat, habitat fragmentation, vehicle collisions, and the direct removal/disturbance of plant populations or individuals. The *Preferred Alternative* would require the removal of approximately 120.55 acres of non-urban vegetation that may provide suitable habitat for the species discussed above. Additionally, although no bridges within the project right-of-way exhibited suitable habitat for the cave myotis bat (the bridges lack the structural components typically utilized by bats), bats may roost in culvert locations, abandoned buildings, swallow nests, or rocky outcrops within the project area. No impacts to state-listed species or their habitats are anticipated.

4.10.3.5 Encroachment-Alteration Effects

The selection of the *Preferred Alternative* did not result in the identification of additional encroachment-alteration effects. The encroachment-alteration effects documented in Section 4.10.3.3 of the Draft EIS remain valid.

4.11 Cultural Resources

Section 4.11 of the Draft EIS presented a comprehensive review and analysis of the potential effects to cultural resources resulting from the proposed OHP Project. The previous analysis and supporting technical reports (Appendices K and L of the Draft EIS) documented TxDOT's

compliance with applicable regulatory requirements governing archeological and historical resources. Coordination with the Texas Historical Commission, the Texas State Historic Preservation Office, and Section 106 consulting parties was completed prior to release of the Draft EIS. The discussion below is focused on providing an update to the existing conditions or baseline data for the resources as a result of the revised *Preferred Alternative* design. The remaining discussion in Section 4.11 of the Draft EIS remains valid.

4.11.1 Archeological Resources

The following regulations were reassessed for the *Preferred Alternative*: NEPA and the National Historic Preservation Act of 1966 at the federal level, and the Antiquities Code of Texas at the state level. Per this review, and taking into consideration public comments received following release of the Draft EIS, it was determined that no updated factual corrections were necessary. The only revisions made were done to reflect the updated project footprint. Revisions were made to the following acreages: total acreage (from 385.58 to 390.5 acres), existing right-of-way (from 313.64 to 313.98 acres), proposed new right-of-way (from 70.39 to 71.15 acres, and remaining acres recommended for survey (from 53.58 to 52.10 acres). As such, the listed acreages have changed, but the summary, analysis, and environmental commitments presented in Section 4.11.2 of the Draft EIS would not change under the *Preferred Alternative*.

4.11.2 Historic Resources

Section 4.11.3 and Appendix L of the Draft EIS included a comprehensive discussion of the proposed project's affected environment and potential impacts on historic resources and culturally significant properties. Since the release of the Draft EIS, design changes proposed for the *Preferred Alternative* resulted in proposed right-of-way acquisitions on two parcels that were not previously within the area of potential effects (APE), as well as several driveway licenses. A supplemental Historic Resources Project Coordination Request has been completed to provide a summary of the design changes as they relate to historic resources, including updated figures and photographs. Only one of the parcels where new right-of-way is proposed has historic-age resources: the parcel containing Vans Holiday Park, a mobile home/RV park. This property is recommended not eligible for NRHP listing. As noted above, the proposed design changes resulted in the addition of driveway licenses on several parcels, including the three parcels within the historic district that are recommended as eligible as a result of the survey conducted for this project. However, due to the nature of the licenses, which provide TxDOT the right to reconstruct driveways, they do not pose an adverse effect to historic properties. Please see **Appendix G** for the supplemental *Historic Resources Project Coordination Request*, original *THC Concurrence Letter* and *THC Historical Marker Relocation Approval Letter*.

It was determined that no updated factual corrections or revisions were necessary due to design changes since release of the Draft EIS. Therefore, the summary and analysis presented in Section 4.11.3.1 of the Draft EIS would not change under the *Preferred Alternative*.

4.11.3 Encroachment-Alteration Effects

The encroachment-alteration effects were reevaluated for the *Preferred Alternative*. It was determined that the encroachment-alteration effects documented in the Draft EIS remain valid. The results of the analysis presented in Section 4.11 of the Draft EIS would not change under the *Preferred Alternative*.

4.12 Hazardous Materials

4.12.1 Existing Conditions

A *Hazardous Materials Technical Report* was produced for the OHP Project, and an initial site assessment (ISA) form was completed documenting hazardous materials within the project corridor. The ISA included a visual survey of the existing right-of-way and surrounding area, and research into existing and previous land uses was performed by the project team to identify possible hazardous materials within the project limits. Documentation of the ISA is maintained in the Austin District project files. Hazardous Materials were reevaluated after selection of the *Preferred Alternative*. It was determined that the existing conditions documented in the Draft EIS remain valid. Below is a summary of these conditions and an updated analysis of impacts based on the revised designs.

4.12.2 Review of Federal, State, and Supplemental Databases

A regulatory database search was performed by GeoSearch on August 3, 2015, (GeoSearch, 2015) and on January 20, 2016 (GeoSearch, 2016). In total, 190 records were identified in databases within the American Society for Testing and Materials (ASTM) search radius (GeoSearch, 2015, 2016). Of those records, 16 sites (primarily LPST and Voluntary Cleanup Program [VCP] sites) were determined to have the potential to impact the project corridor. This determination was based on the type of database listing, the information provided in the database report, and the distance and direction of the listing to the corridor. Additionally, 12 orphan or unlocatable sites were identified in the database search. One CERCLIS site was identified as an unlocatable site, the IMC Chemical Group. Homefacts.com plots the location of this site on US 290 between Oak Meadow Drive and Convict Hill Road. This site was archived by the EPA in 1980, which means no further clean up action or investigation at the site is required. A detailed discussion of hazardous sites is included in Section 4.12 of the Draft EIS.

4.12.3 Environmental Consequences

A computerized environmental database search was produced for the project area by GeoSearch on August 3, 2015, and on January 20, 2016. The databases searched included federal, state, local, and tribal databases as defined by ASTM E 1527-05. Several sites listed in the database reports were determined to have potential to impact the project corridor based on the type of database listing, the information provided in the database report, and the distance and direction of the listing from the corridor. In all, 190 findings were included in

databases within the ASTM search radius. Of those, 16 sites (including primarily LPST and VCP) were determined to have the potential to impact the project corridor based on the type of database listing, the information provided in the database report, and the distance and direction of the listing to the corridor. Further analysis of potential sites of concern should be considered during the preliminary design phase. The depth to groundwater should be determined for locations where construction is proposed to occur to determine the likelihood of reaching groundwater and to determine whether contaminants held in the groundwater would be likely to impact construction.

The *Preferred Alternative* would require the acquisition of approximately 71.75 acres of new right-of-way. In addition to small slivers of property along the existing facility, the acreage also includes acquisition of one residential and four commercial properties. Of particular concern for acquisition is the Speedy Stop gas station and convenience store (Circle K 3276), which was listed in the PST and LPST databases. The LPST case at the Speedy Stop resulted in a groundwater impact, but final concurrence has been issued and the case is closed. It is anticipated that contaminated soil and/or groundwater could be encountered during construction. Special provisions or contingency language would be included in the project's plans, specifications, and estimates (PS&E) to handle hazardous materials and/or petroleum contamination according to applicable federal and state regulations.

An ASTM-conforming Phase I environmental site assessment is recommended prior to any property acquisition (ASTM, 2015). Since the OHP Project requires acquisition of substantial portions of commercial properties, additional environmental assessment would be warranted. Property assessment should be in accordance with applicable ASTM standards to the extent practical in consideration of the highway right-of-way acquisition/eminent domain process.

The OHP Project includes the demolition of building structures. The buildings may contain asbestos-containing materials. Asbestos inspections, specification, notification, license, accreditation, abatement, and disposal, as applicable, would comply with federal and state regulations. Asbestos issues would be addressed during the right-of-way acquisition process prior to construction.

Construction contractors should be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors and maintenance personnel should be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.

4.12.3.1 Encroachment-Alteration Effects

Encroachment-alteration effects are those that result from changes in ecosystems, natural processes, or socioeconomic conditions due to the proposed action. Hazardous materials are not considered in this category; therefore, encroachment-alteration effects in relation to hazardous materials would not occur.

4.13 Visual and Aesthetic Resources

Highways and major transit facilities can affect the visual and aesthetic character of surrounding landscapes and the perceptions of individuals who live within and visit these environments. Certain design characteristics (e.g., elevated structures/bridges, signs, and lights) could have a visual/aesthetic impact on the surrounding area. The *Preferred Alternative* would alter the appearance of the wooded and suburban setting of the project area. On an individual scale, visual intrusion would be most obvious on sections where the alignments would be elevated and/or within proximity to existing residences or sensitive community facilities. As documented in Section 4.13 of the Draft EIS, the visual impacts of the *Preferred Alternative* are neutral.

The most visually significant impact of the *Preferred Alternative* is depicted in the artistic rendering below of the US 290/SH 71 interchange: the US 290 mainlanes would be depressed (**Figure 4-13**). Overall, the proposed OHP Project would be as aesthetically pleasing as possible to minimize any perceived visual intrusion. Design and construction of the *Preferred Alternative* would be consistent with TxDOT design standards and would incorporate several context sensitive solutions (CSS) identified during public outreach opportunities. No additional CSS public outreach has been conducted since the release of the Draft EIS in May 2018.

4.13.1 Method

As documented in the Draft EIS, the OHP Project area was organized into unique landscape units (LUs) defined by their similar visual features and homogeneous character (**Figure 4-14** and **Figure 4-15a–c**). An analysis of impacts to visual and aesthetic resources of each LU was conducted in accordance with the *Guidelines for Visual Impact Assessment of Highway Projects* (FHWA, 2015). Impacts were evaluated using on-site images, renderings depicting proposed alternatives, and conceptual design plans and profiles. Impacts within LUs were assessed using key observation points (KOPs), which provide representative examples of available views of the *Preferred Alternative* sites and their associated viewsheds.

KOPs were established to represent the most sensitive views in the project area, based on number of viewers, length of time a typical observer would see the view, and proximity of viewers to elements of the *Preferred Alternative*.

Figure 4-13. Artistic rendering of the *Preferred Alternative* at the US 290/SH 71 interchange.

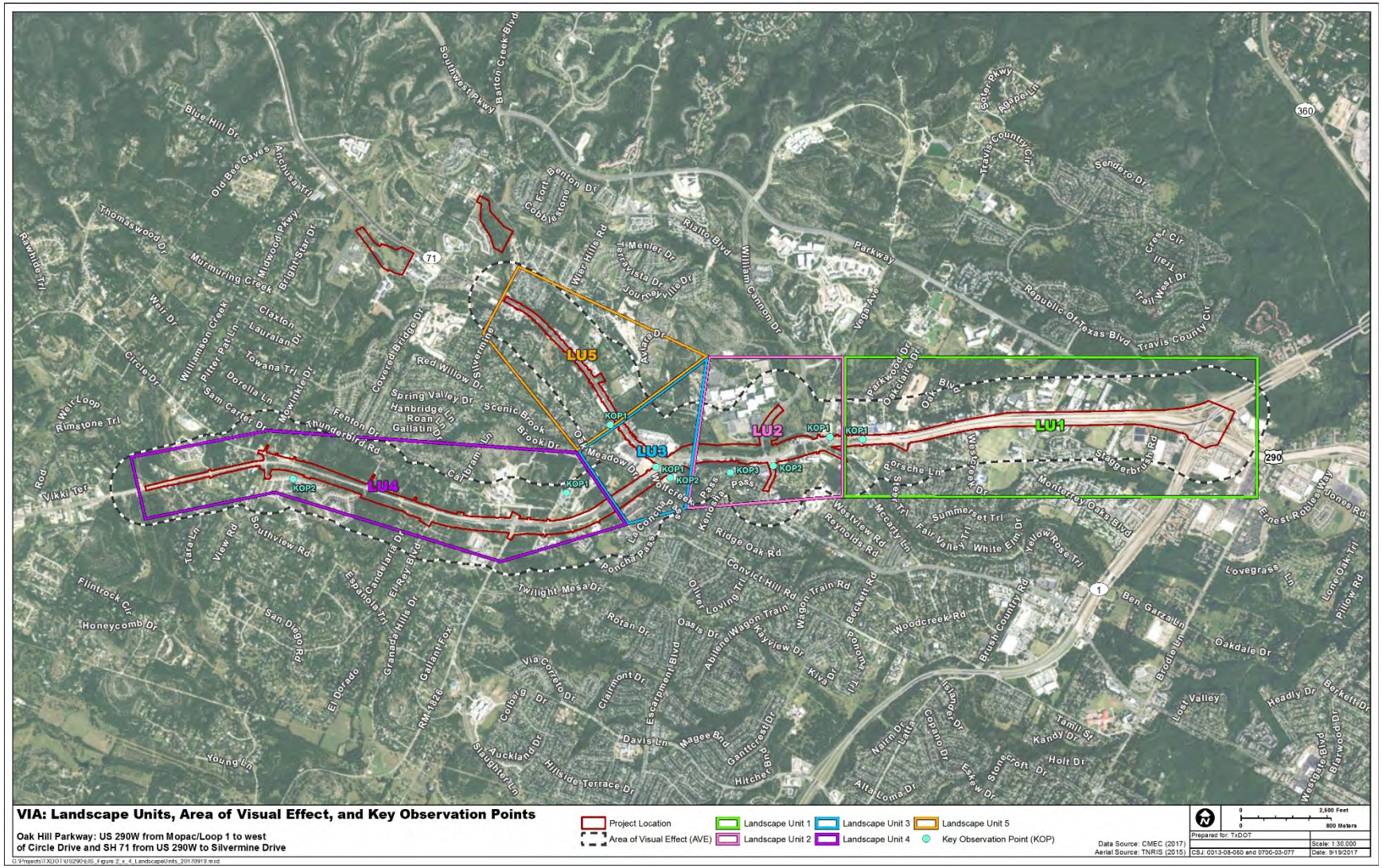

Figure 4-14. Visual impact assessment landscape units, area of visual effects, and key observation points.

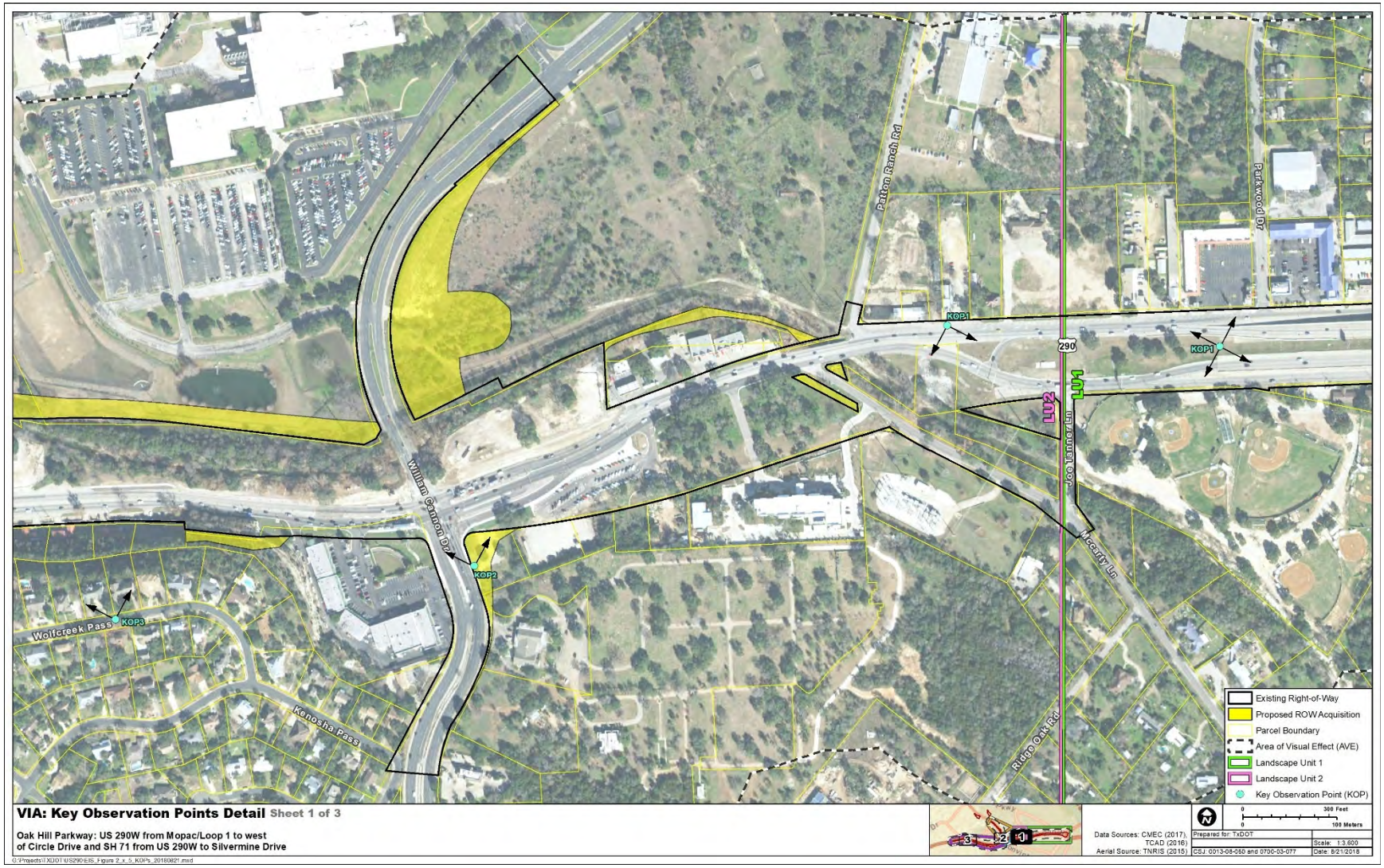

Figure 4-15a. Visual impact assessment key observation points, detailed view.

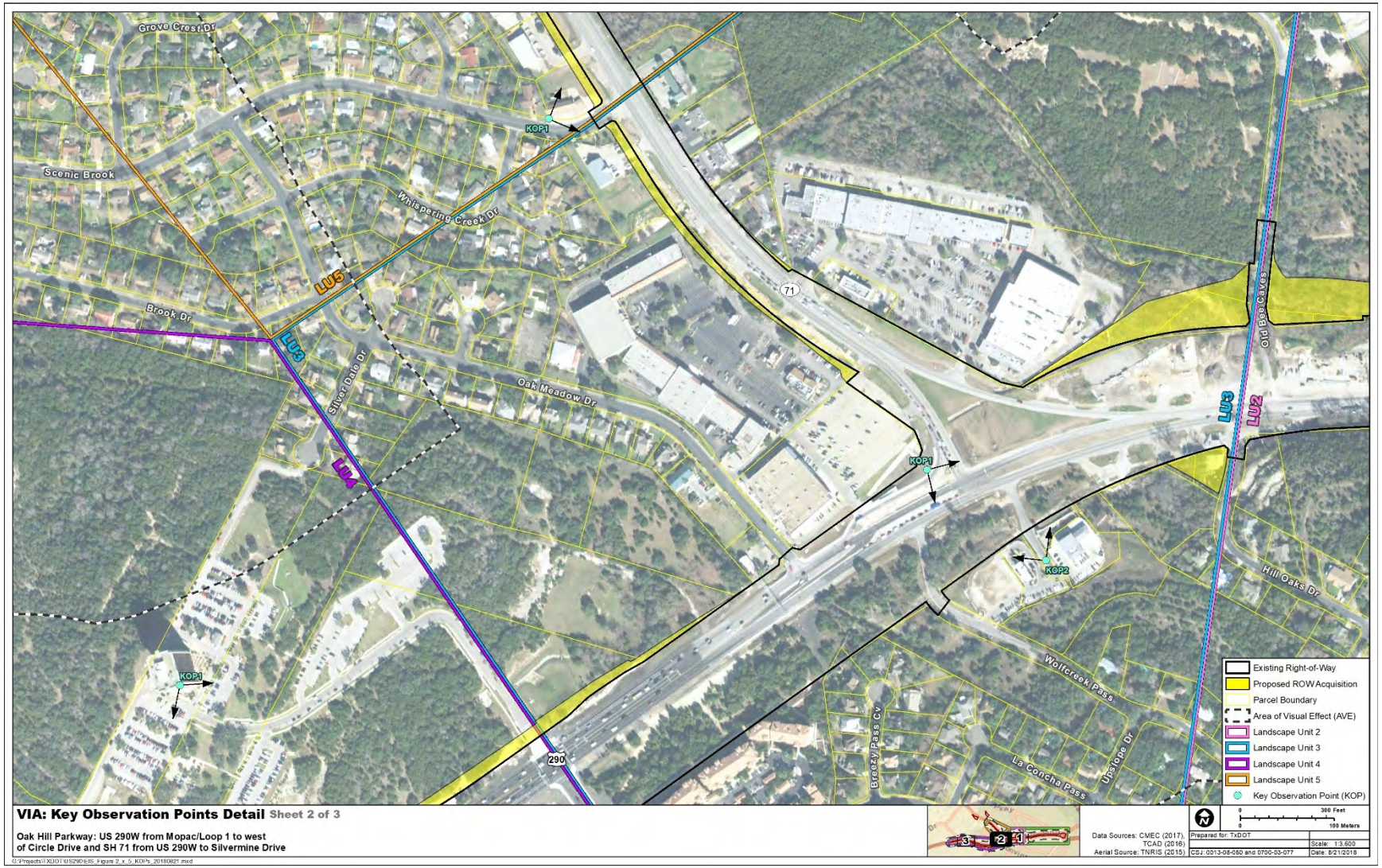

Figure 4-15b. Visual impact assessment key observation points, detailed view.

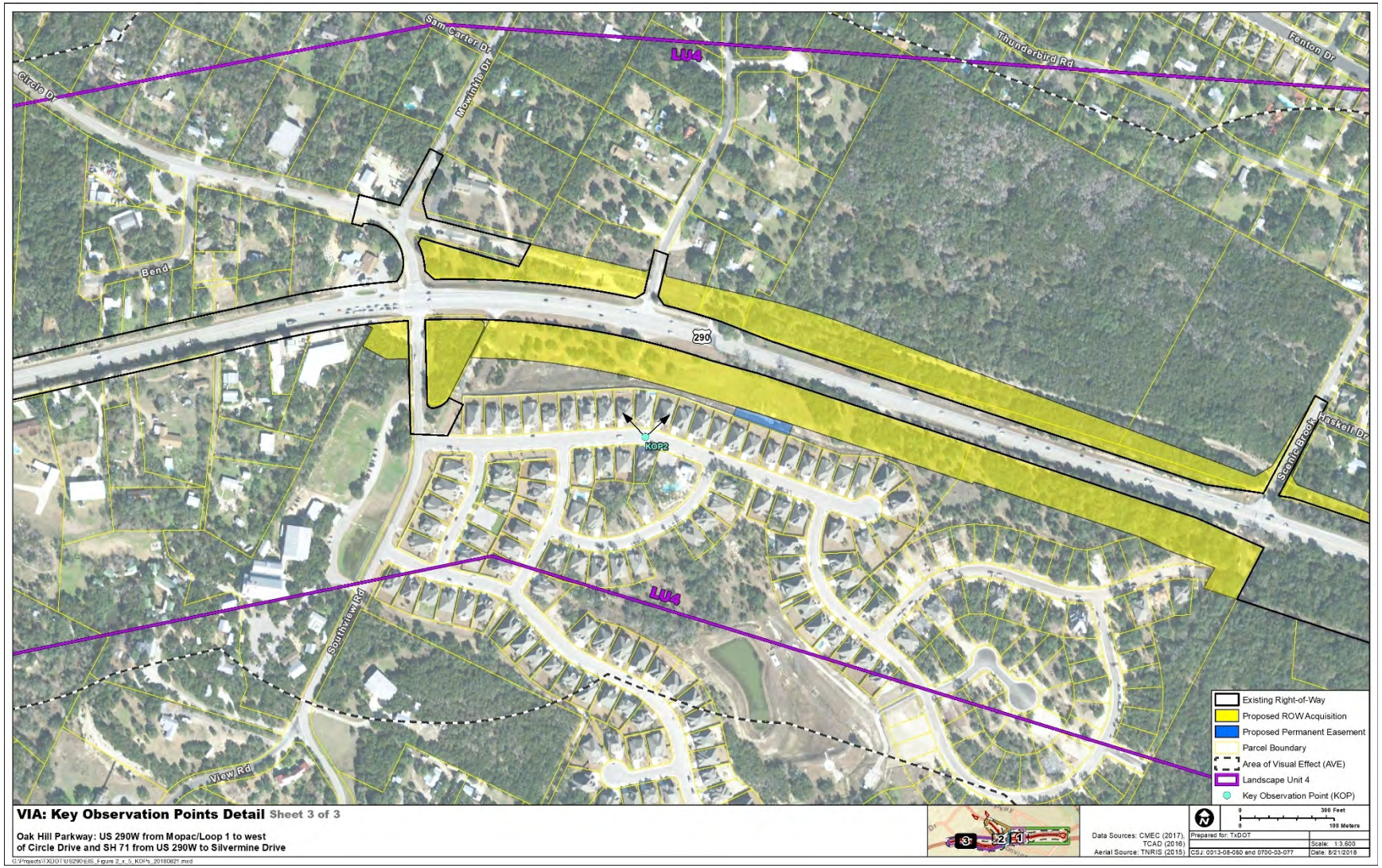

Figure 4-15c. Visual impact assessment key observation points, detailed view.

4.13.2 Affected Environment

The information presented about the affected environment in the Draft EIS for each LU is still valid.

4.13.3 Environmental Consequences

The assessment of visual impacts associated with the *Preferred Alternative* documented in the Draft EIS remains valid. *The Preferred Alternative* is the culmination of a design and public involvement process that has been ongoing since 2012, and opportunities have been identified to maximize compatibility with the existing built and natural environments. The structural design was developed through CSS and robust stakeholder involvement to be compatible with the surrounding natural and cultural environments and to minimize visual impacts. Where practicable, mitigation to improve the visual and aesthetic qualities of the project area would include the following features:

- Providing landscape plantings and revegetation per TxDOT's Green Ribbon Landscape Improvement Program, which allocates funds for trees and plants within roadway right-of-way.
- Promoting roadside native wildflower planting programs.
- Installing noise barriers.
- Providing adequate signage and easy access to roadway facilities.
- Treating the side surfaces and columns of the project using façade materials of varying texture, color, etc.
- Incorporating CSS and design elements from the Green Mobility Challenge. The Green Mobility Challenge was a sustainable design competition launched by the Mobility Authority, in partnership with TxDOT, in 2011.

The *Preferred Alternative* is the culmination of a design process that has been ongoing since 2012, and opportunities have been identified to maximize compatibility with the existing built and natural environments. The NEPA process incorporated CSS throughout the public involvement process, and other alternatives were eliminated earlier in project development due to more severe adverse visual impacts. The structural design elements were developed to be compatible with the surrounding natural and cultural environments to minimize visual impacts. In general, the visual impacts of the *Preferred Alternative* are neutral. The *Preferred Alternative* has a lower adverse visual impact and preferable connectivity to bicycle and pedestrian facilities.

4.13.3.1 Encroachment-Alteration Effects

No encroachment-alteration effects are anticipated as a result of the proposed project.

4.14 Energy Impacts

FHWA Technical Advisory T 6640.8A provides guidance on addressing energy impacts in NEPA documents (FHWA, 1987).

4.14.1 Environmental Consequences

Both the construction and operational energy requirements of the *Preferred Alternative* were considered. Roadway traffic would likely be the largest contributor to energy consumption over the lifetime of the OHP Project. Completion of the proposed OHP Project would compensate for the energy used during construction. By decreasing congestion, increasing the system connectivity, and diverting cut-through traffic from neighborhood streets onto the new faster-flowing facility, the proposed OHP Project would increase energy efficiency over current conditions. The proposed OHP Project is consistent with the Federal Energy Policy and Conservation Act.

The proposed OHP Project would increase system connectivity, decrease travel times, and ease congestion along the US 290/SH 71 corridor and in nearby areas. Therefore, the long-term operational energy savings would offset any initial construction energy use.

4.15 Greenhouse Gas and Climate Change

This section discusses greenhouse gases (GHGs) and the project's implications on climate change. "Greenhouse gases" are named for their ability to trap heat, like a greenhouse, in the lower part of the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO2), and other gases. Human activities, particularly fossil-fuel combustion, have been identified by the Intergovernmental Panel on Climate Change (IPCC) as primarily responsible for increasing the concentrations of GHGs in the atmosphere. Rising temperatures due to increasing GHGs may produce changes in precipitation patterns, storm severity, polar and glacial ice, and sea level. Collectively, this is commonly referred to as climate change. The IPCC's Fifth Assessment Report (Summary for Policymakers) states, "Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes… It is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century" (IPCC, 2014:17).

Emissions from combustion engines include GHGs. The traffic model for the 2040 design year for the OHP Project assumed a fleet mix of predominantly combustion-engine vehicles. These vehicles will travel through the project area whether the *No Build Alternative* or either of the *Build Alternatives* is selected. TxDOT has considered the potential GHG emissions and climate change implications of the OHP Project to distinguish between alternatives and to provide a perspective on this issue. For the OHP Project, a qualitative analysis was performed to assess GHGs relative to the alternatives under consideration. For each alternative, the amount of GHGs emitted would be proportional to the VMT, assuming other variables such as fleet mix

are the same for each alternative. The VMT estimated for the *Preferred Alternative* is slightly higher than that for the *No Build Alternative,* because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher GHG emissions for the *Preferred Alternative* along the highway corridor. Any reduction in VMT on adjacent roadways due to traffic using the new facility would result in a corresponding decrease in GHG emissions on those roadways. Additionally, the emissions increase on the *Preferred Alternative* is somewhat offset by lower GHG emission rates due to increased speeds. Also, regardless of the alternative chosen, emissions in future years would be highly influenced by changes in combustion-engine fuel efficiencies, conversion to electric vehicles, and transportation mode choices.

Beyond the project-level considerations indicated here, TxDOT has performed a statewide analysis to assess GHG emissions, consider climate change implications associated with the Texas on-road system, and to support project-level analysis where needed. This report, *Statewide On-Road Greenhouse Gas Emissions Analysis and Climate Change Assessment*, can be found on TxDOT's website at https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/impacts.html. This broader analysis also provides context on which to compare the scale and relative GHG contribution of any one project in relation to the entire roadway system in the State, along with total GHG emissions in the U.S. and the world.

4.16 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources were reassessed for the *Preferred Alternative.* Per this review and consideration of public comments following the release of the Draft EIS, it was determined that no updated factual corrections were necessary. As such, the summary presented in Section 4.16 of the Draft EIS would not change under the *Preferred Alternative*. However, due to the revised design of the *Preferred Alternative*, a decrease of total right-of-way is proposed for the project and therefore, this section has been updated to incorporate the revised information.

Construction of the *Preferred Alternative* would involve the commitment of natural, physical, human, and fiscal resources. The commitment of land to permanent project right-of-way would require 71.75 acres. This land includes residential and business properties, driveways, and natural areas. Land used for the proposed OHP Project would be considered an irreversible commitment during the period that the land is used for a transportation purpose. However, if a greater need arose, or if the highway were no longer needed, the land could be converted to another use. Presently, there is no reason to consider that such a conversion would be necessary or desirable.

The decision to commit these resources for construction of the proposed project would be based on the concept that residents in the immediate area, region, and state would benefit by the improved quality of the regional transportation system. The benefits would include

improved mobility and roadway safety, travel time savings on the improved transportation facility, and a transportation infrastructure designed to support population growth. The benefits would be expected to outweigh the commitment of resources.

4.17 Construction Impacts

Construction impacts occurring from the project were reassessed for the *Preferred Alternative.* No additions, revisions or corrections were identified; therefore, the analysis of Construction Impacts in Section 4.17 of the Draft EIS would not change under the *Preferred Alternative*.

5. INDIRECT EFFECTS

5.1 Guidance and Methodology

A technical addendum describing the detailed analysis conducted to assess indirect impacts associated with the proposed project as a result of changes following the release of the Draft EIS is provided in **Appendix H: *Indirect and Cumulative Impacts Analyses Technical Addendum***. The analysis in the technical addendum was developed using TxDOT's *2016 Indirect Impacts Analysis Guidance* which is based on the 2002 National Cooperative Highway Research Program (NCHRP) Report entitled *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (NCHRP, 2002) and the American Association of State Highway and Transportation Officials (AASHTO) *Practitioner's Handbook 12: Assessing Indirect and Cumulative Impacts Under NEPA* (AASHTO, 2016).

The indirect impact analysis is based on several central definitions. In addition to direct effects, major transportation projects may also have indirect effects on land use and the environment. As defined by the CEQ, indirect effects are

> caused by an action and occur 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)

It should be noted that guidance documents use different terms, including "indirect effects" (AASHTO guidance) and "indirect impacts" (TxDOT guidance). For the purpose of this analysis, both terms are used and the meanings are the same.

NCHRP Report 466 (2002) identifies three broad categories of indirect effects:

- Encroachment-alteration effects: These effects may result from changes in ecosystems, natural processes, or socioeconomic conditions that are caused by the proposed action but occur later in time or farther removed in distance. One example of this type of effect would be a change in habitat or flow regime downstream resulting from installation of a new culvert.
- 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 of an area, which in turn affects the area's attractiveness for development. Indirect impacts associated with induced development are also similar to direct impacts but would occur in association with future land use development undertaken by others over the development horizon within a larger project area beyond the direct footprint of the proposed project.

- 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.

As described in the *Indirect and Cumulative Impacts Analyses Technical Addendum*, encroachment-alteration effects are discussed in the Final EIS document following each resource's direct effects discussion, per current TxDOT direction. Encroachment-alteration impacts are summarized in Table 1 in the *Indirect and Cumulative Impacts Analyses Technical Addendum* (Appendix H).

The following six steps from TxDOT's *Indirect Impacts Analysis Guidance* are addressed in the induced growth impact analysis (TxDOT, 2016):

1. Define the methodology.
2. Define the AOI and study time frame.
3. Identify areas subject to induced growth in the AOI.
4. Determine if growth is likely to occur in the induced growth areas.
5. Identify resources subject to induced growth impacts.
6. Identify mitigation, if applicable.

Additional guidance utilized throughout the analysis includes the 2002 NCHRP report entitled *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (NCHRP, 2002) and the NCHRP Project 25-25 Task 22 report entitled *Forecasting Indirect Land Use Effects of Transportation Projects* (NCHRP, 2007).

5.2 Scoping and Area of Influence

The techniques used for this analysis are primarily Planning Judgment, for which data was acquired by administering questionnaires and conducting phone interviews with planning professionals in the project vicinity; Cartographic Techniques; and expert technical analysis consistent with the methods described in NCHRP Report 466 and NCHRP Report 25-25.

In October 2016, the project team held a scoping meeting for the indirect and cumulative impacts analyses. Project team attendees at this meeting included representatives from the TxDOT Austin District, the TxDOT Environmental Affairs Division, and consultant representatives. The project team decided to use major roadways and political boundaries to identify the AOI and recommended development of an AOI that would include the cities of Austin, Bee Cave, Dripping Springs, and Sunset Valley. The physical area of the AOI is bordered by Loop 360, RM 2244/Bee Cave Road, SH 71, RM 3238/Hamilton Pool Road, Crumley Ranch Road, FM 101/Fitzhugh Road, RM 12, RM 150, RM 1826, Slaughter Lane, and Brodie Lane. The AOI encompasses an area of approximately 85,281 acres. This AOI was based on the following factors: the neighborhoods and areas best served by the proposed roadway improvements; the areas most likely to be potentially opened for development following construction of the roadway; the natural resources that could be potentially indirectly

impacted; and discussions with local planning experts in the municipalities and counties in, adjacent to, and near the project area. The AOI includes some or all of the cities of Austin, Bee Cave, Bear Creek, Dripping Springs, and Sunset Valley. During the investigation process, questionnaires were submitted to these entities; none of those interviewed had questions or raised concerns about the proposed boundaries of the AOI, so no changes were made to the AOI as a result of the interview process. See **Figure 5-1** for a map illustrating the boundary of the AOI.

A temporal frame of reference is necessary when analyzing the range of impacts that may be caused by the proposed project in the future. The analysis considers indirect induced growth impacts that may occur between the time of project construction (2019) and 2040. This time frame captures the 2037 horizon year for the *Our Bee Cave 2037 Comprehensive Plan*, the 2039 horizon year for the COA's *Imagine Austin Comprehensive Plan*, and the 2040 horizon year for CAMPO's 2040 Plan.

The goals of the various communities in the AOI (the study area for the indirect impact analysis) are discussed in the technical report, including community planning goals, demographic and development trends, factors influencing growth, and areas of environmental or social sensitivity. Data for population and housing development are discussed to identify trends. For example, the COA and Travis County are expected to grow by 68 percent and 69 percent, respectively, between 2010 and 2040, while Hays County is expected to grow more than 150 percent (TWDB, 2016).

5.3 Analysis Results

Based on the amount of developable land within the AOI, the pace of development being documented in the municipalities represented in the AOI, and the response of local planning experts, the proposed project is not anticipated to generate significant induced development. Factors such as the large amount of land protected from development and local regulations that limit impervious cover would constrain the amount of induced growth possible in the AOI. The degree to which that development is specifically attributable to construction of the proposed project is limited for several reasons: there is a high growth rate in the area in general, there is limited development potential nearby due to undevelopable lands, and the area is surrounded by developments that are already underway.

A questionnaire regarding the potential for the project to induce development in the AOI was disseminated to various local planning experts in the area, including the Cities of Austin, Bee Cave, and Dripping Springs; other municipalities; and multiple agencies, organizations, and water supply corporations within the project's AOI. Based on the responses to the questionnaire, several respondents indicated that much of the planned development in the area would occur regardless of whether or not the proposed project is constructed. Detailed summaries of questionnaire responses are documented in **Appendix H**: ***Indirect and Cumulative Impacts Analyses Technical Addendum***.

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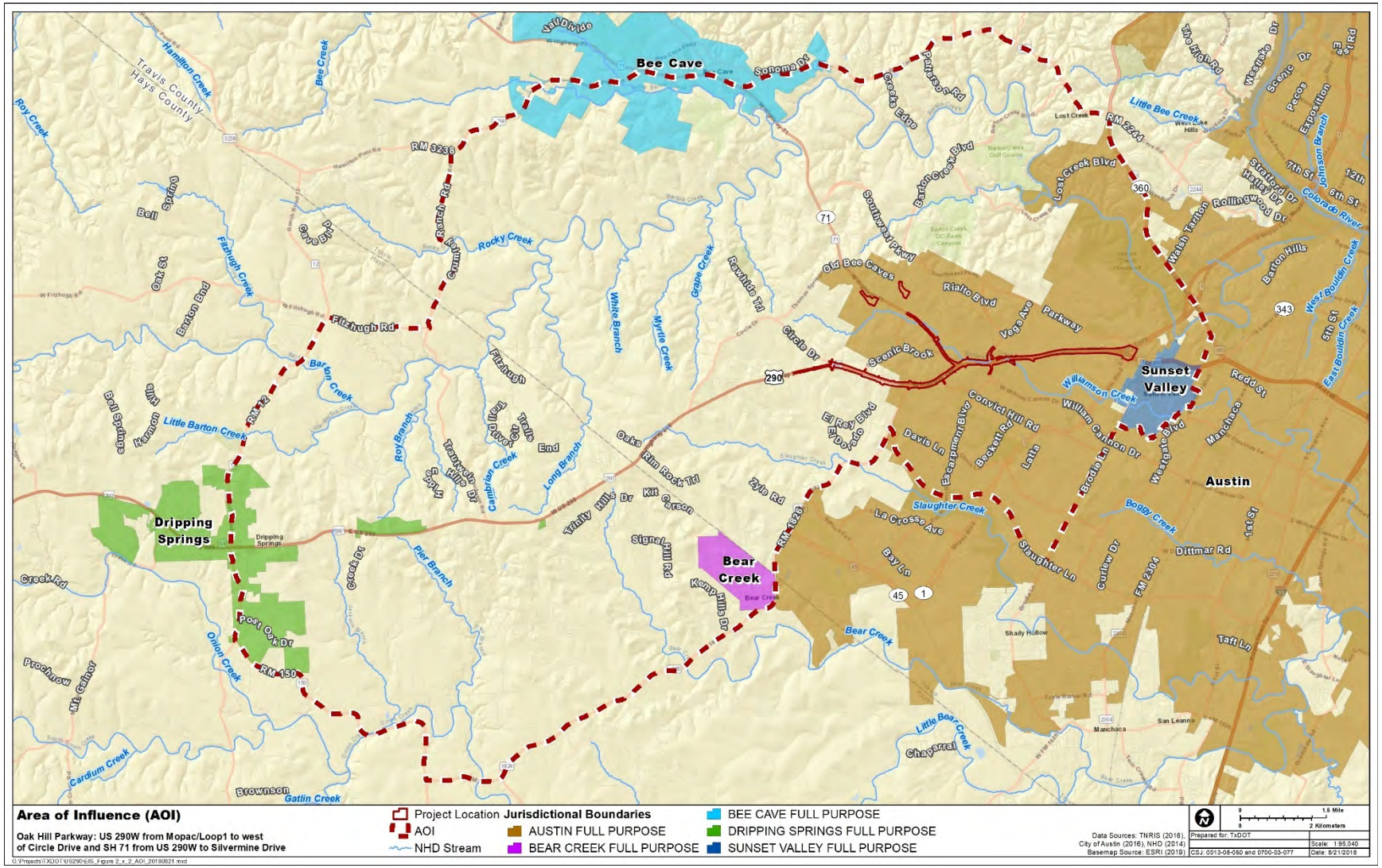

Figure 5-1. Area of influence and the OHP Project area.

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Within the 85,281 total acres of the AOI, approximately 49,081 acres (57.6 percent) are already developed (including roadways, state-owned right-of-way, and other developed land). Approximately 17,617 acres (20.7 percent) are undevelopable, including parks, floodplains, and water quality protection lands (WQPLs). Within the AOI, WQPLs (both those owned outright by the COA and those which have conservation easements placed on them) account for 9,563 acres (11.2 percent). WQPLs have been protected from development in perpetuity, and the COA notes that water or wastewater service would not be extended to any WQPL lands that belong to the COA or that have conservation easements on them. Floodplains cover 1,130 acres of the vacant land within the AOI and are also considered undevelopable.

There are currently approximately 8,446 acres of land in the AOI that are under construction or are planned or platted for development. This analysis assumes land that is under construction or already planned or platted for development would not be subject to induced development as a result of the proposed project. Development of land that is already planned or platted, regardless of development project status, is considered probable and reasonably foreseeable and not solely dependent on the proposed project.

Based on input from planning professionals and a cartographic assessment, approximately 10,192 acres of land have indirect induced growth potential within the AOI. Land that is already planned or platted for development was not included in this total as it is assumed that land would be developed. The developable land was identified through planner questionnaires and cartographic analysis, and its development is considered possible but not necessarily probable. Cartographic techniques were used to assess the sensitive resources that could be found within that developable land area. The detailed analysis in the technical report discusses the minimization and mitigation tools that would apply to development proposed by others in those areas.

5.4 Identified Resources Subject to Induced Growth Impacts

Induced growth could have some effect on water resources because induced development would result in increased impervious cover, which could in turn have an effect on water quality. However, the proposed project would not have a substantial adverse effect on water quality in the AOI because of the high percentage of managed areas and the implementation of regulations and BMPs.

Approximately 10,192 acres of undeveloped land within the AOI could be subject to development in the foreseeable future. Development projects that do occur within the planning horizons of the municipalities contacted (through 2040) would have to comply with the relevant land development code for projects within city limits and extra-territorial jurisdiction (ETJ) boundaries, where applicable. Areas outside municipal limits would be subject to federal laws such as the ESA, CWA, and Clean Air Act, and may also be subject to certain state regulations overseen by the TCEQ (such as the Edwards Aquifer Rules) and TPWD.

Existing regulatory processes would provide controls to avoid potential adverse water quality related impacts to threatened or endangered species. Impacts to individuals or habitat of federally listed species are subject to federal regulations under the ESA of 1973. The COA and Travis County's *Balcones Canyonlands Conservation Plan*, in addition to the Hays County *Regional Habitat Conservation Plan*, are available to developers to facilitate compliance with the ESA in the AOI. In addition, the Save Our Springs ordinance limits impervious cover and requires non-degradation levels of stormwater treatment for development of sites in the Barton Springs Zone.

5.5 Conclusion

With regard to potential indirect effects on water quality resulting from potential development by others in the AOI, regulations are in place and applicable to proposed developments to minimize impacts to the resource. These include TCEQ regulations requiring preparation of SW3Ps and WPAPs, including use of BMPs in addition to the COA drainage/water quality requirements. USACE Section 404 provisions of the CWA govern activities that would affect waters of the U.S. and wetlands, regardless of who proposes the development activity. Individual developers would be responsible for complying with these regulations.

The indirect effects that have been summarized in this section and described in the *Indirect and Cumulative Impacts Analyses Technical Addendum* (Appendix H) do not conflict with the various goals of planning and conservation entities in the AOI; are not expected to substantially worsen the condition of a sensitive resource; would not delay or interfere with habitat conservation planning efforts or species recovery efforts for sensitive species; would not eliminate a valued, unique, or vulnerable feature; and are not inconsistent with applicable laws. Therefore, additional mitigation is not proposed for the anticipated indirect induced-growth effects potentially caused by construction of the OHP Project.

6. CUMULATIVE EFFECTS

A technical addendum describing the detailed analysis conducted to assess cumulative impacts associated with the proposed project is provided in **Appendix H: *Indirect and Cumulative Impacts Analyses Technical Addendum***. The analysis in the technical addendum was developed using TxDOT's 2016 *Cumulative Impacts Analysis Guidelines*, in accordance with NEPA, TxDOT, and AASHTO policies and guidance (TxDOT, 2016). This report was updated following the release of the Draft EIS. Key steps in the analysis and major findings from this report are summarized below.

6.1 Scoping and Resource Study Areas

Scoping for the proposed project, including cumulative impacts, was conducted via the following methods: regular coordination among the project team and the proposed project's sponsors and stakeholders, agency stakeholder meetings, public involvement through public information meetings, and information obtained after the distribution of an indirect impacts questionnaire to local planning entities via e-mail and phone interviews. The scoping process, in addition to the direct and indirect impacts analyses, led to the identification of key resources for detailed cumulative impacts analysis. The following resources are analyzed in detail in **Appendix H: *Indirect and Cumulative Impacts Analyses Technical Addendum*** for potentially substantial cumulative impacts: threatened and endangered species, groundwater, and surface water. For each resource analyzed for cumulative impacts, RSAs, goals, trends, and current conditions were established. **Figure 6-1** depicts the RSAs. Additionally, cumulative energy impacts were also analyzed.

The *Indirect and Cumulative Impacts Analyses Technical Addendum* considered the ABS and BSS and their habitats, in addition to groundwater and surface water resources; discussed the health of these resources and relevant trends; and identified specific RSA boundaries and appropriate temporal boundaries for the analysis. Direct and potential indirect impacts are summarized for each sensitive resource. Past, present, and reasonably foreseeable actions are identified through research, interviews, and cartographic analysis. The construction of the proposed project was considered in conjunction with these other actions to consider cumulative impacts. This analysis provided detailed information about sensitive resources within the RSAs for the OHP Project and described the extensive controls that have evolved over time to help protect these resources.

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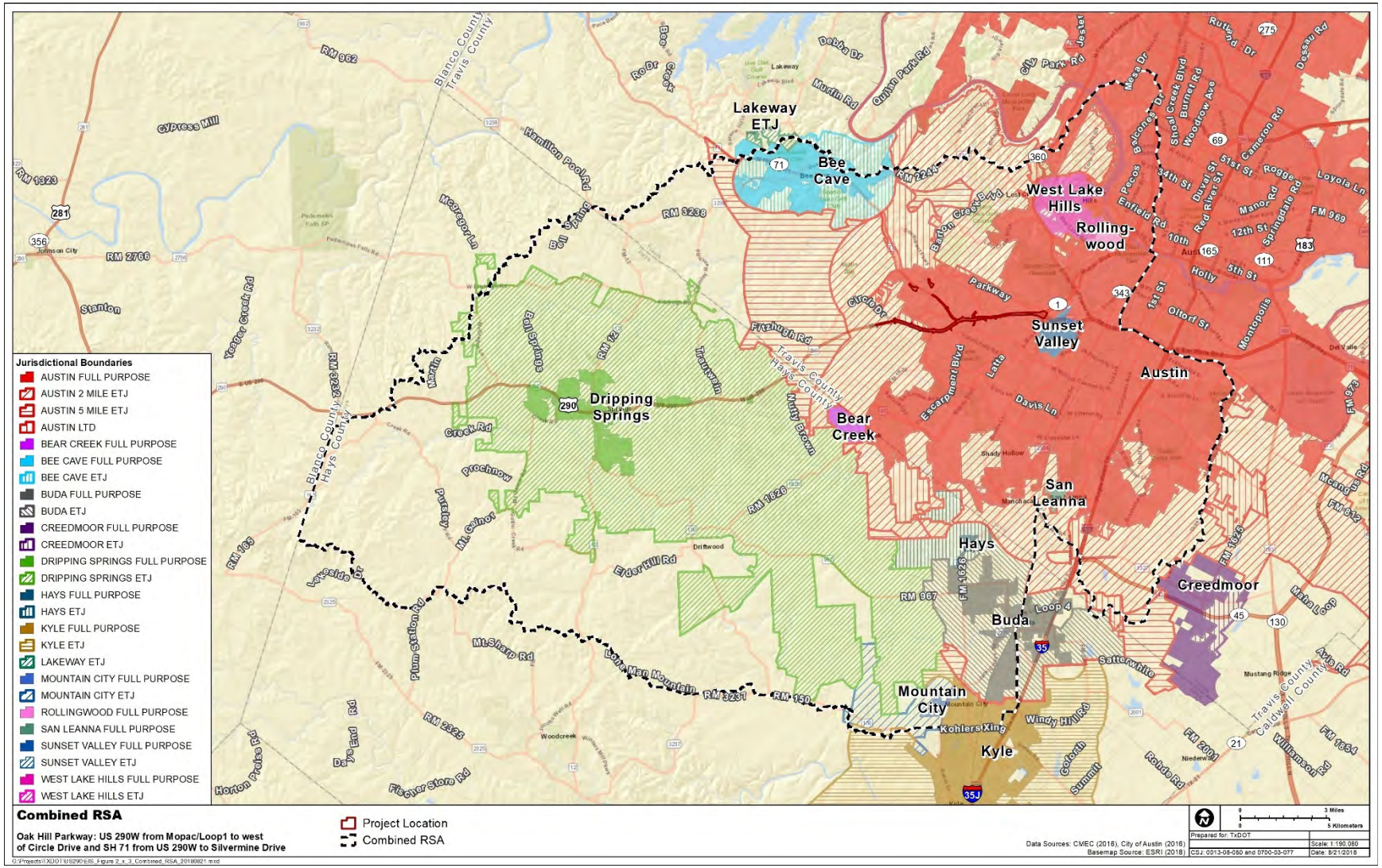

Figure 6-1. The OHP Project combined RSA.

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In addition to researching various published documents and plans, a simple questionnaire explaining the proposed project and requesting information about other actions was distributed to several entities, including the cities of Austin, Bear Creek, Bee Cave, Dripping Springs, and Sunset Valley, as well as Hays and Travis Counties. Additional research was conducted to identify transportation plans and future land use plans in smaller communities such as Dripping Springs. See **Figure 6-1** for a map depicting the boundary of the combined RSAs, which was established to identify other actions within that study area. A combination of planner interviews, cartographic techniques, and technical expert research and data collection was used in order to assess the overall effects of the proposed project combined with other actions within each RSA. The *Indirect and Cumulative Impacts Analyses Technical Addendum* analyzes sensitive resources within the RSAs and describes the extensive controls that have evolved over time to help protect these resources.

6.2 Analysis Results: Watersheds, Water Quality, and Threatened and Endangered Species

Implementation of the *Preferred Alternative* would add a total of approximately 74 acres of impervious cover to the water quality study area. Research has shown a strong correlation between the imperviousness of a watershed and the health of its receiving streams. Past activities have resulted in the development of land and changes in land uses in the watersheds within the RSAs. The extent of past growth is evident in the change in impervious cover in all watersheds in the groundwater RSA over time: 1970 (1.9 percent), 1990 (4.6 percent), 2012 (8.0 percent), and 2016 (9.0 percent).

As the trend for growth in the Austin area continues, the trend for increased impervious cover in the watersheds in the RSA is expected to continue. The various land use plans identified in the technical report indicate that the municipalities within the RSA anticipate future development, along with the preservation of open space. As discussed in the technical addendum, the correlation between increased impervious cover and decreased surface water quality is strong. However, with current regulatory measures and future planning efforts to protect water quality, future development would be less likely to adversely affect surface and groundwater quality when compared to the past.

Minimization of impacts to sensitive resources would be achieved through specific design measures and BMPs implemented for the proposed project, and similar requirements would be applicable to developers throughout a large portion of the RSAs, especially where construction is proposed over the Recharge and Contributing Zones of the Edwards Aquifer. Mitigation measures are required for impacts to endangered species habitat, and there are Habitat Conservation Plans in place in Hays County and Travis County (along with the COA) that provide a framework in which developers can comply with the ESA. The larger municipalities with jurisdiction within the RSA all have land development code requirements and plans for their future land use and transportation networks that generally reflect a common commitment to sustainable development. The conservation entities charged with

protecting endangered species and sensitive resources have plans in place to continue to protect sensitive habitats. A large portion of land within the RSAs would be protected in perpetuity through conservation easements or WQPLs specifically acquired for that purpose.

6.3 Conclusion

Direct impacts that would be caused by the proposed project would be limited in part by the implementation of extensive BMPs before, during, and after construction. Given the conservation initiatives underway within the RSAs and the incremental contribution the proposed project would make toward induced development in the AOI, within the context of the continuing development trends, the proposed project is not anticipated to result in substantial adverse indirect impacts to sensitive resources. The proposed project, in conjunction with other past, present, and reasonably foreseeable future projects, may contribute to cumulative impacts but is not likely to cause significant cumulative impacts to the resources assessed in this analysis.

7. PUBLIC AND AGENCY INVOLVEMENT

Section 7 of the Draft EIS summarized the complete history of public involvement activities that occurred for the OHP Project prior to the release of the May 2018 Draft EIS. The following section serves to summarize the public and agency involvement efforts that occurred throughout the OHP Project and document the public and agency involvement efforts following the release of the Draft EIS and public hearing.

7.1 Notice of Intent

In October 2012, FHWA, TxDOT, and the Mobility Authority published an NOI to prepare an EIS for the proposed project. The NOI, as required by NEPA, initiated the EIS scoping process. The NOI was published in the *Federal Register* on October 9, 2012, and in the *Texas Register* on October 19, 2012.

The NOI established the preliminary contents of the EIS, the required approvals by the federal government, details for scoping, and procedures expected for coordination and public involvement based on NEPA requirements. Copies of the published 2012 OHP Project NOIs are available for review at the TxDOT Austin District Office.

7.2 Lead Agencies

At project initiation in 2012, the Texas Division of the FHWA was the federal lead agency, and TxDOT and the Mobility Authority shared responsibility as joint lead agencies. In 2015, FHWA assigned the NEPA responsibilities to TxDOT.

TxDOT is the USDOT agency responsible for the NEPA analysis and independent review of the EIS. TxDOT would ensure that any design and mitigation commitments are included in the Record of Decision (ROD) and followed. TxDOT is also the project sponsor and responsible for producing the required environmental and engineering studies, producing the environmental document, and involving the public in the NEPA process.

As discussed in Section 1, the Mobility Authority's role in the OHP Project transitioned from that of a joint lead agency to a participating agency in 2018. As a participating agency, the Mobility Authority will continue to assist TxDOT with decision-making and approvals at various points in the project development process, review technical studies, provide technical guidance, and assist with procedural requirements conducted as part of the EIS process.

7.3 Public and Agency Coordination Plan

TxDOT and the Mobility Authority, in coordination with FHWA, prepared a project coordination plan to facilitate and document the Joint Lead Agencies' structured interaction with the public and other agencies during the project development process. Cooperating agencies are defined in 40 CFR 1508.5 as federal or state agencies with jurisdiction by law or special

expertise pertaining to the proposed project. Participating agencies include local, state, and federal resource agencies with a special interest in the proposed project. Cooperating and participating agencies are listed in **Table 7-1.**

Table 7-1. Cooperating and Participating Agencies

Role	Agency
Cooperating Agency	U.S. Environmental Protection Agency
Cooperating Agency	U.S. Fish and Wildlife Service
Participating Agency	Texas Parks and Wildlife Department
Participating Agency	Texas Commission on Environmental Quality
Participating Agency	Travis County
Participating Agency	City of Austin
Participating Agency	Capital Metropolitan Transportation Authority
Participating Agency	Central Texas Regional Mobility Authority

Source: Project Team, 2018.

7.4 Public Meetings and Outreach

7.4.1 Scoping Meetings

A public and agency scoping meeting was held on November 15, 2012. An agency scoping meeting was held on January 22, 2013. A complete summary of scoping meetings is included in Section 7 of the Draft EIS.

7.4.2 Open Houses

Following the initial scoping meeting (Open House No. 1), several open house-style public meetings were held throughout EIS and schematic development in order to build informed consent with the community and to ensure the design met both the mobility need and community values. The meetings were held on the following dates:

- May 23, 2013 — Open House No. 2
- October 22, 2013 — Open House No. 3
- June 17, 2014 — Open House No. 4
- January 20, 2015 — Open House No. 5
- October 29, 2015 — Open House No. 6

Virtual Open Houses made available on the project website (www.OakHillParkway.com) were held in conjunction with each open house. Each exhibit displayed at the open house meeting was available for view as a PDF file, and links were provided for participants to submit official comments. A complete summary of open houses is included in Section 7 of the Draft EIS.

7.4.3 Community Workshops

Throughout the process, the team held facilitated, issue-specific workshops to dig deeper into community concerns like tolling, water quality, and project aesthetics. The public were invited via various methods including email notifications, the e-newsletter, telephone calls to key stakeholders, and notifications on the website and twitter account. Meeting summaries are available for review at the TxDOT Austin District Office. The following community meetings were held:

- August 29, 2012 — Oak Hill Envisioning Mobility Workshop
- January 31, 2013 —Environmental Workgroup Meeting
- February 19, 2013 — Design Workgroup Meeting
- March 19, 2013 — Bike and Pedestrian Workshop No. 1
- May 16, 2013 — Concept Preview Meeting
- September 30, 2013 — Evaluation Workgroup Meeting
- March 22, 2014 — Finance Workshop
- August 26, 2014 — Stakeholder Workgroup Meeting
- October 9, 2014 — Context Sensitive Solutions Workshop No. 1
- February 17, 2015 — Bicycle and Pedestrian Workshop No. 2
- April 7, 2015 — Context Sensitive Solutions Workshop No. 2
- August 25, 2015 — Water Quality Workshop
- June 23, 2016 — Environmental Workshop
- May 23, 2017 — Project Update Workshop

7.4.4 Stakeholder Meetings

The project team held over 90 stakeholder meetings. Stakeholders included local neighborhood and community groups, organizations, major employers, chambers of commerce, interested citizens, and other groups. Summaries of these meetings are available for review at the TxDOT Austin District Office.

7.4.5 Additional Community Outreach

To maintain public involvement efforts as the project moved forward, several steps were taken to continue communication. This included a digital application of community outreach through the project website, e-newsletter, and Twitter account. A project website (www.OakHillParkway.com) was launched October 17, 2012, to provide the public with information regarding the proposed project in its entirety. The Mobility Authority created the

website and continues to update it regularly. E-Newsletter sign-ups were also promoted via Twitter, virtual open houses, and other agency communications.

During the development of the Draft EIS, e-newsletters were regularly distributed between February 2013 and May 2017. At the time of the Draft EIS circulation, over 824 tweets and retweets were posted, and the account has 497 followers. A complete summary of community outreach efforts is included in Section 7 of the Draft EIS.

7.5 Public Hearing

A public hearing was held by TxDOT and the Mobility Authority in May 2018 to gather public input regarding the OHP Project. The purpose of the hearing was to give the community an opportunity to share thoughts on the *Preferred Alternative,* its draft schematic design, and its potential environmental impacts, as detailed in the Draft EIS. The Draft EIS was available for review at the hearing and at www.OakHillParkway.com on May 4, 2018, and remains available on the website. The Draft EIS, maps, and other information concerning the proposed project were available for public inspection from May 4, 2018, to June 29, 2018, at the TxDOT Austin District Office, located at 7901 N IH 35, Austin, TX, 78753. The Draft EIS was on file and available for public inspection at the following locations: Mobility Authority Office, 3300 N. I-35, Suite 300, Austin, TX 78705, and the Hampton Branch at Oak Hill Austin Public Library at 5125 Convict Hill Road, Austin, TX 78749.

The hearing was held in the Bowie High School cafeteria, 4103 Slaughter Lane, Austin, Texas. The meeting included an open house between 6:15 and 7:00 p.m., followed by technical presentations and a public comment period. The event concluded at 9:00 p.m.

The hearing summary and the comment and response report for this event are available for review at the TxDOT Austin District Office. They are also available online at www.OakHillParkway.com.

7.5.1 Invitations

Letters were sent to elected officials within the project study area on May 1, 2018, advising them of the upcoming public hearing.

A legal notice for the public hearing was published in the *Austin American-Statesman* on May 4, 2018.

Color display advertisements for the public hearing were published in the *Hays News-Dispatch* on May 10, 2018; the *Lake Travis View* on May 10, 2018; and the *Wimberley View* on May 10, 2018. A Spanish version of the advertisement was published in *Ahora Sí* on May 10, 2018.

A direct mail notification of the hearing was mailed to property owners adjacent to the *Preferred Alternative* on May 7, 2018.

TxDOT and the Mobility Authority distributed a news release on May 21, 2018, regarding the upcoming event which mentioned the opportunity for media outlets to interview project officials and community residents.

E-newsletters announcing the public hearing were distributed to over 1,630 individuals and groups who had asked to be added to the study database on May 3 and May 21, 2018.

Information on the date, time, location, and purpose of the public hearing was posted on the project website, www.OakHillParkway.com. The meeting was also posted on the TxDOT Hearings and Meetings Schedule website, http://txdot.gov/inside-txdot/getinvolved/about/hearings-meetings.html.

Announcements about the public hearing and subsequent Virtual Open House were sent from the project's Twitter account @OakHillParkway from May 3, 2018, to May 25, 2018.

7.5.2 Hearing Information

In all, 267 people attended the public hearing, as well as three elected officials. Upon arrival at the event, attendees were asked to sign in and were offered a set of handouts which included the following items:

- Fact sheet
- Welcome Letter (including information on the Virtual Open House)
- Public hearing agenda
- Comment form

Twenty-three informational boards regarding the project and the EIS process were displayed around the room for public viewing. Information included the final evaluation criteria, renderings of the *Preferred Alternative*, CSS, and general information about the study. Schematic drawings of the *Preferred Alternative* were also on display.

During the open house session, representatives from TxDOT and the project team were positioned around the room to answer questions, facilitate discussion, and gather input from attendees. Tables were arranged so attendees could have a place to fill out comment forms. Boxes were available for attendees to leave their completed comment forms. A court reporter was also available to transcribe comments from attendees who desired to give their input verbally.

At 7:00 p.m., a formal presentation was given. The technical presentation included details of the public hearing format, an overview of the proposed project, a description of the project purpose and need, the public involvement process overview, a review of the alternatives analysis phase of the project, an overview of the results of the environmental studies, a review of the *Preferred Alternative*, and a brief explanation of the right-of-way acquisition process and the relocation assistance program. The hearing concluded with a public comment period. During the comment period, members of the public were invited to comment on issues related

to the proposed OHP. Speakers were each given a three-minute time period to express their thoughts. A total of 22 people spoke at the hearing. A court reporter transcribed each comment.

7.5.3 Virtual Open House

The Virtual Open House on the project website (www.OakHillParkway.com) was available for public view from May 4, 2018, through June 30, 2018. Each exhibit and schematic displayed at the public hearing was available for view as a PDF file. In addition, a PDF file of the presentation was provided for view as well as the Draft EIS. An online form was provided for participants to submit and/or upload official comments. The public hearing attendees were notified of the Virtual Open House through the Welcome Letter handout and the invitational methods listed above. The Virtual Open House recorded 3,970 visitors during the period in which it was available for view. Virtual attendees spent an average of 3:10 minutes on the homepage, which is above industry average.

7.5.4 Official Comment Period Extension

As a result of public interest and request, TxDOT extended the public comment period. The extension moved the end date from June 15, 2018, to June 29, 2018. On May 31, 2018, an email notification was sent to over 1,630 individuals and groups who had asked to be added to the study database.

7.5.5 Comments

In total, 446 comments were received during the official comment period, which ran from May 4, 2018, to June 29, 2018. Major themes among the comments included: support for the project to be built, requests for a smaller project footprint, concerns for oak trees and vegetation in the area, protection of Williamson Creek, and noise pollution concerns. Other comments involved concerns about the impact to local neighborhoods and businesses during construction, frustration with the process taking so long, support for bicycle and pedestrian accommodations, and requests for additional transit options.

7.6 Notice of Availability

The Notice of Availability for the Final EIS will be published in winter 2018, in the *Federal Register*. The Final EIS will also be distributed to federal, state, and local agencies and parties of interest as listed in the Distribution List provided in Section 11. The Final EIS will be published on the OHP Project website.

7.7 Community Impact to Design

Public participation in meetings, workshops, and open houses made substantive improvements to the proposed concepts and alternatives and resulted in a meaningful impact on project design. Some of these improvements included the following:

- Developing alternatives that address the traffic congestion in the corridor
- Proposing a design that separates through-traffic from local traffic, providing both mobility and safety enhancements
- Limiting the proposed elevation at the US 290/SH 71 intersection to one level instead of two levels above existing ground level (from the 2007 Alternative)
- Building new facilities for bicyclists and pedestrians, including sidewalks, a trailhead at William Cannon Drive, and a shared-use path along the entire corridor
- Lowering the US 290 mainlanes underneath cross street overpasses at Circle Drive, Scenic Brook Road, RM 1826, and Convict Hill Road for *Alternatives A* and *C*, and at the US 290/SH 71 intersection for *Alternative A*
- Looking to avoid or limit impacts to trees, especially the Grandmother Oak, Grandfather Oak, and the Nieces Oaks in the vicinity of William Cannon Drive, and preserving the Beckett Grove Tree (formerly known as the Taco Bell Tree)
- Extending the improvements west of Circle Drive and reducing the proposed project's footprint in that area
- Minimizing impacts to Williamson Creek, including in areas where bridges would be placed over Williamson Creek
- Adding natural treatments at Williamson Creek instead of a concrete culvert to channelize the waters; in fact, the proposed action would remove a significant amount of existing concrete from the creek by building new bridges
- Realigning William Cannon Drive to avoid large trees
- Potentially reducing flooding with upstream water detention ponds
- Planning for BMPs like grassy swales, sedimentation/sand filtration basins, and bioretention ponds for water quality
- Realigning the westbound US 290 exit to RM 1826 in order to improve access for students and teachers heading to ACC
- Improving access for businesses along SH 71 just north of US 290
- Improving access to Old Bee Cave Road
- Maintaining current access from streets and neighborhoods to the frontage roads
- Adding Texas turnaround U-turns to provide local access without sitting through a traffic light
- Adding transit bus pull-out locations
- Realigning the US 290 intersection with William Cannon Drive to save trees

- Making a minor adjustment to the westbound 290 entrance ramp location for control of access purposes for a property owner
- Correcting the control of access at eastbound 290 east of RM 1826

8. Environmental Permits, Issues, and Commitments

8.1 Introduction

Efforts have been made in the planning process to avoid adverse impacts to the natural and human environment. When impacts are unavoidable, steps are taken to minimize and mitigate impacts, as required under NEPA, FHWA, and TxDOT guidelines. According to CEQ regulations (40 CFR 1508.20), mitigation efforts include

- avoiding an impact altogether;
- minimizing the impact by limiting the degree or magnitude of the action;
- rectifying the impact by repairing, rehabilitating, or restoring the resource;
- reducing or eliminating the impact over time by preservation and maintenance activities; and,
- compensating for the impact by replacing or providing substitutes to the impacted resource.

Efforts were made when identifying the *Preferred Alternative* to avoid or minimize adverse effects where possible. Where impacts to resources would require coordination and permitting, processes in accordance with state and federal regulations would be followed with the appropriate jurisdictional agency.

The following sections identify mitigation and permitting that would be required for the implementation of the *Preferred Alternative*.

8.2 Soils and Geology

Construction activities proposed for the *Preferred Alternative* would result in a range of effects to existing soils. The potential for soil compaction, erosion, or sedimentation would increase along with most construction activities. BMPs and other erosion and sediment control measures would be utilized to minimize erosion and soil loss during these activities. These proposed actions would result in a reduction of project impacts to area soils.

Geologic resources within the project area would receive impacts from construction activities. Geologic units located near the ground surface may be exposed, resulting in erosion of those areas. Erosion effects would be minimized by utilizing preventive BMPs including dikes, berms, mulching, erosion control blankets, and other protective measures.

Four sensitive features occur within the project right-of-way and are described below:

- F1 is a solution cavity of about 2 square feet which is exposed in the bedrock. This feature was evaluated as sensitive with a moderate potential for infiltration.

- F4 is a karst zone that encompasses an approximately 100-by-30-foot area on a gently sloping hillside covered with live oak trees and Ashe juniper. As a result of the zone classification of this feature and its similarity with the regional structural trend, it was evaluated as sensitive.
- F5 is identified as the surface expression of the Mount Bonnell Fault within Williamson Creek which shows little evidence of solution enlargement. It was evaluated as sensitive with a moderate potential for infiltration.
- F6 is a solution cavity of about 2 square feet located along the southern limits of the TxDOT right-of-way south of US290. The feature was evaluated as sensitive with a moderate potential for infiltration.

Proposed protection measures for these sensitive features would include preventive BMPs including dikes, berms, mulching, erosion control blankets, and other protective measures.

Because the project area has been heavily modified by long-term development, impacts to geology and soils resulting from the *Preferred Alternative* would be largely consistent with the continued operation and maintenance of the existing facility, but due to the higher TSS removal some water quality impacts could be mitigated. Neither Flea Market Sink nor Gaines Sink would be impacted by the *Preferred Alternative* as they are both outside the construction boundaries of this project. Construction impacts, erosion, and sedimentation issues would be minimized by the use of BMPs both during and after project construction.

The following commitments would be required:

1. Prepare a SW3P (including erosion control, sedimentation control, and post-construction TSS removal requirements).
2. Prepare a WPAP according to 30 Texas Administrative Code Chapter 213 of the Edwards Aquifer Rules.
3. If voids or water flow are encountered, 30 Texas Administrative Code 213.5(f)(2) requires that construction cease in the vicinity of the void. As described in the "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zones" (TCEQ-0585-Instructions [Rev. 10-01-04]), a void is "a natural cavity or depression formed as a result of dissolution of limestone… [which is] not large enough for a normal-sized person to enter but appears to be part of a system of interconnected voids that connect the surface with the subsurface." Another type of void is a cave, which is described as "a natural underground open space formed by dissolution of limestone that is large enough for an average-sized person to enter" (TCEQ, 2004b). If, during construction, water is encountered in conjunction with a cavity or a cave, all potential pathways for contaminant movement to the Edwards Aquifer would be identified, and sufficient geologic information would be provided so that the appropriate BMPs can be designed and implemented. A geologist will evaluate the void and work with the design engineer, if necessary, to develop a void mitigation plan. The void mitigation plan must be

certified by a geologist, submitted to the TCEQ, and approved prior to the implementation of mitigation and before continuing construction in the vicinity of the void. A specific karst void discovery protocol would be developed for the project for all excavation phases.

8.3 Community Resources

Efforts were made during the planning stages of evaluating and selecting the proposed project to minimize adverse impacts to neighborhoods, adjacent residential areas, and community facilities. The OHP Project generally follows the existing roadway, and would not serve to further divide, separate, or isolate any neighborhood or community facilities, and would not affect community cohesion.

During construction there would be temporary changes in traffic patterns which may affect emergency responders in the short-term. Emergency service providers would receive notification prior to construction and/or temporary roadway closures or detours.

During construction, access to the Cook-Walden/Forest Oaks Funeral Home and Memorial Park may be temporarily affected. TxDOT would work with the funeral home to ensure their operations would be ongoing during construction.

8.3.1 Landscaping

Landscaping disturbed by construction of a highway would be reestablished for environmental and aesthetic reasons. During design, a project-specific landscaping plan would be developed incorporating appropriate native and adapted species.

8.3.2 Right-of-Way Design

Potential adverse impacts to community, public, and other sensitive resources would be reduced by minimizing right-of-way acquisition where feasible.

8.4 Pedestrian and Bicycle Paths

In accordance with the federal *Policy Statement on Bicycle and Pedestrian Accommodations Regulations and Recommendations* by the USDOT (March 2010), the *Preferred Alternative* would include a shared-use path designed to facilitate safe bicycle and pedestrian accommodations within the project area. All intersections would be designed in compliance with the ADA per federal requirements. Temporary impacts during construction would be minimized as much as possible.

8.5 Displacements and Relocations

One residential and four commercial displacements would occur under the *Preferred Alternative*, and several businesses on the south side of US 290 just east of the “Y” may be

affected due to changes in access; however, these displacements would not be expected to affect community cohesion.

Consistent with the USDOT policy as mandated by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, all property owners from whom property is needed are entitled to receive just compensation for their land. Just compensation is based on fair market value of the property. TxDOT would provide information and resources to the affected property owners.

8.6 Transportation Facilities

TxDOT would coordinate with the COA and Capital Metro during project design to minimize the temporary and permanent impacts to transportation and bicycle facilities to provide the same level of connectivity as the existing conditions, including a commitment by TxDOT to provide assistance to Capital Metro in providing a replacement park and ride facility in the Oak Hill area. The proposed project would provide continuity of sidewalks and shared-use lanes along the frontage road by adding sidewalks and pathways in areas as needed. New pedestrian crossings would be added at the major intersections and designed in accordance with ADA requirements.

8.7 Air Quality

During the construction phase of this project, temporary increases in PM and MSAT emissions may occur from construction activities. The primary construction-related emissions of PM are fugitive dust from site preparation, and the primary construction-related emissions of MSAT are diesel PM from diesel-powered construction equipment and vehicles.

The potential impacts of PM emissions would be minimized by using fugitive dust control measures contained in standard specifications, as appropriate. The TERP provides financial incentives to reduce emissions from vehicles and equipment. TxDOT encourages construction contractors to use this and other local and federal incentive programs to the fullest extent possible to minimize diesel emissions. The project as a whole is not expected to have encroachment-alteration impacts on air quality.

However, considering the temporary and transient nature of construction-related emissions, the use of fugitive dust control measures, the encouragement of the use of TERP, and compliance with applicable regulatory requirements, it is not anticipated that emissions from construction of this project would have any significant impact on air quality in the area.

8.8 Noise Abatement Measures

Existing and predicted traffic noise levels were modeled at receiver locations that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and that could potentially benefit from feasible and reasonable noise abatement. The

proposed project would result in traffic noise impacts. Therefore, the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of traffic noise barriers.

Traffic noise barriers were the only noise abatement measure that was deemed feasible and reasonable for the project. Noise barriers are proposed for incorporation into the project at several receivers. TxDOT would conduct meetings with the owners of the affected receiver properties and determine whether they want traffic noise barriers. The final decision to construct the proposed traffic noise barriers would not be made until completion of the project design, utility evaluation, and polling of property owners who are adjacent to the proposed noise barrier locations where abatement was determined to be reasonable and feasible.

Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

8.9 Water Resources

8.9.1 Ground Water

Placement of the roadway could encroach on the surface or subsurface drainage areas of unknown adjacent caves/sensitive recharge features, altering the hydrologic regime in those features. Additionally, any features that are uncovered during construction operations would be closed in accordance with TCEQ regulations.

Proposed water quality protection measures and BMPs to be utilized under the *Preferred Alternative* would remove at least 80 percent of the incremental increase in TSS that results from the project's addition of impervious cover in the Edwards Aquifer Recharge Zone, in compliance with the TCEQ's Edwards Aquifer Rules. In addition, the proposed water control facilities for the *Preferred Alternative* are anticipated to exceed the total TSS removal required by TCEQ. During its consultation with USFWS, TxDOT further committed that the final design of the project would result in a net decrease in annual TSS loading. The potential for pollutants in stormwater runoff from the construction site and completed roadway to enter the aquifer and the potential for changes in recharge rates to the aquifer resulting from increases in impervious cover would be minor. Impacts would be minimized by the use of robust BMPs during roadway construction and operation. These BMPs (outlined in the *Oak Hill Parkway TSS Removal Load Memorandum*, attached as **Appendix D**) include multiple levels of water quality treatment measures, water quality ponds, PFC pavement, and VFS. Stormwater runoff would be treated by BMPs over the entire project area, not just over the Recharge Zone.

TxDOT has also committed to working with the COA during the final design phase of water quality facilities for the project to investigate possible enhancements to the water quality.

8.9.2 Surface Water

Water quality impacts from the proposed project would include highway and bridge runoff, construction-related impacts, and maintenance-related impacts. Long-term operational effects on surface water quality would alter the volume of storm water runoff and constituents carried in the runoff. Runoff from the proposed OHP Project area could contain sediment or pollutants in quantities that could impact water quality. Impacts to surface waters in the project area would also be minimized using BMPs during both construction and operation of the proposed project. Over 5 acres of earth would be disturbed as a result of the *Preferred Alternative*, requiring preparation and implementation of a SW3P; an NOI for coverage under the TPDES Construction General Permit would also be required for the project. Stormwater runoff would be addressed through compliance with the TPDES and Edwards Aquifer Protection Plan.

Once construction has been completed, a Notice of Termination would be filed per permit requirements. Guidance documents, such as TxDOT's *Storm Water Management Guidelines for Construction Activities*, discuss temporary erosion control measures to be implemented to minimize impacts to water quality during construction (TxDOT, 2002).

During construction, project activities would be guided by an Environmental Compliance Management Plan, which would include protocols designed to avoid environmental impacts. A project-dedicated environmental inspector will be required to monitor the contractor's daily activities. The contractor would also take appropriate measures to prevent or minimize harm and control hazardous material spills in the construction assembly area. Removal and disposal of all waste materials by the contractor would be in compliance with applicable federal and state guidelines and laws.

Under Section 401 of the CWA, the TCEQ regulates water quality for waters of the state.

8.10 Floodplains

Section 60.3 (d)(3) of the National Flood Insurance Program regulations states that a community is to

> prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge." (FEMA, 2000)

Based on National Flood Insurance Program regulations, prior to issuance of any construction permits involving activities in a regulated floodway, an engineering or "no-rise" certification would be obtained. The request for certification must be supported by technical data stating that construction of the proposed project would not impact the base flood elevations, floodway

elevations, or floodway data widths that are present prior to construction. Coordination with the local floodplain administrator would be required prior to construction of the *Preferred Alternative*.

8.11 Wetlands and Other Waters of the U.S.

Discharges of dredged or fill material into waters of the U.S. regulated by the USACE would require authorization through evaluation of an NWP 14. When evaluating and selecting the *Preferred Alternative*, efforts were made to avoid impacts to waters of the U.S. Once design has been advanced and property acquisition has occurred, an assessment of impacts to jurisdictional waters of the U.S., including wetlands, would be performed for each stream and drainage channel crossing for the *Preferred Alternative*, including the proposed detention pond sites. Dependent on the findings of the level of impacts to waters of the U.S., it is anticipated that a NWP would be submitted to the USACE. A functional assessment and mitigation plan would be prepared for the level of impact determined for each type of permit to compensate for unavoidable adverse impacts to jurisdictional waters of the US, including wetlands, as necessary. The USACE's wetland and stream assessment procedures would be used to identify wetland and stream functions and services, which served as the basis to develop compensatory mitigation to be considered as part of the permit evaluation. Mitigation for wetland or stream impacts would likely be accomplished through the purchase of wetland or stream credits from an approved mitigation bank, as necessary.

8.12 Vegetation and Wildlife

Construction of the *Preferred Alternative* would unavoidably impact vegetative communities. An analysis of the vegetation types as mapped by the TPWD's Ecological Mapping Systems of Texas revealed approximately 50 percent of the proposed OHP Project area is listed as Urban and 50 percent is a mixture of mixed woodlands, grassland, riparian vegetation, and native invasive shrublands. Construction activities would permanently remove both the urban and non-urban vegetation communities within the limits of construction and replace each with additional impervious surface and maintained herbaceous species. In addition to the removal of vegetation communities, a number of large trees throughout the existing and proposed right-of-way would be removed in order to accommodate the *Preferred Alternative*. As discussed in Section 4.10.2.1 above, TxDOT is committed to protecting the following iconic trees: "Beckett Grove Tree," "Grandmother Oak," "Grandfather Oak," and "the Nieces" during construction of the *Preferred Alternative*. The Oak Hill community has expressed continued interest and support for developing landscaping enhancements that would help shape the future aesthetic quality of the corridor following construction. These efforts would continue throughout the development of final design for the *Preferred Alternative*.

During construction, areas of exposed soil within the project right-of-way would be revegetated with herbaceous species to minimize the introduction of eroded materials into receiving waters. Following construction, landscaping of the area would be in accordance with Executive

Order 13112 on invasive species and the Executive Memorandum on beneficial landscaping. Vegetation within the project right-of-way would be maintained according to standard TxDOT practices.

Potential impacts to wildlife would be mitigated through the construction of bridge structures over streams and drainage channels or the installation of culverts to provide wildlife the opportunity to travel under the roadway, rather than pass over the roadway and be exposed to possible predation or vehicle collisions. Landscaping would use native vegetation, and a maintenance mowing schedule would be developed that would allow for the reseeding of native species that would benefit wildlife species that use the herbaceous habitat outside the paved areas of the right-of-way.

Impacts to wildlife and habitat resources can be minimized through the use of a combination of any of the following generally recommended methods, as well as other BMPs not specifically identified below but which may be appropriate to address unanticipated site conditions.

- Minimize the crossing of flowing streams and use bridge spans to the greatest extent practicable (as opposed to fill) to minimize impacts on riparian and aquatic communities.
- Include construction and post-construction BMPs in the design and construction of the *Build Alternative* to manage stormwater runoff and control sediments.
- Limit the use of herbicides and other chemicals for right-of-way maintenance.
- Seed and/or plant the right-of-way with native species of grasses, shrubs, or trees in accordance with Executive Order 13112 on invasive species and the Executive Memorandum on beneficial landscaping. Soil disturbance would be minimized to ensure invasive species do not establish in the right-of-way.
- Schedule mowing for right-of-way maintenance to facilitate the natural reseeding of indigenous spring and autumnal herbaceous communities.
- Do not leave any trees within 30 feet of the roadway without roadside protection because of safety requirements. Trees outside the safety zone that are not affected by construction would be preserved.
- If nesting or wintering migratory bird species or rookeries are identified in the immediate vicinity of the right-of-way, defer especially loud or noisy activities in the adjacent areas until after the birds have left the area to reduce negative impacts to the species. Additionally, during the nesting season, birds and their nests are protected under the Migratory Bird Treaty Act from being taken, captured, or killed and from attempts to be taken, captured, killed, and/or possessed.

8.13 Threatened and Endangered Species

The project was determined to have an insignificant and discountable effect on two federally listed species (ABS and BSS). In a letter dated December 20, 2017, the USFWS concurred

with TxDOT's finding that OHP may affect, but is not likely to adversely affect, these federally listed species. New information regarding the BSS was published in March 2018; TxDOT coordinated with the USFWS regarding new occurrence data for the BSS in November and December 2018. In light of this new information and TxDOT's commitment to the net reduction of TSS leaving the site, USFWS agreed that their December 20, 2017 concurrence letter remains valid (**Appendix D**).

In addition to the water quality control measures presented in the Draft EIS, additional measures were evaluated in the *Oak Hill Parkway TSS Removal Load Memorandum* (**Appendix D**) in an effort to ensure that the project could achieve a net decrease in annual TSS loading as described in the 2017 consultation with the USFWS.

8.13.1 Permanent BMPs

Some combination of the following permanent BMPs would be utilized to minimize impacts to water quality:

- Upstream Stormwater Detention Ponds—Upstream stormwater detention basins or ponds are stormwater management facilities that would passively collect stormwater upstream of the OHP Project area and would mitigate any increase in downstream flooding risks associated with the changes to drainage patterns as a result of increases in impervious cover. Two upstream stormwater detention ponds are proposed for the OHP Project.
- Water Quality Ponds—Up to 17 water quality treatment ponds are proposed in the design of the *Preferred Alternative.* Three types of water quality ponds would be utilized at various locations along the corridor, including, bioretention, sand filter systems and batch detention basins. Bioretention ponds are structural stormwater controls that capture and temporarily store water runoff using soils and vegetation in shallow basins to remove pollutants. Sand filter systems are structural controls that use a sedimentation basin to capture large sediment and debris before stormwater is moved to the filtration basin, which catches and removes fine sediment. Batch detention ponds are structural impoundments that temporarily detain runoff and release it at a controlled rate over a specified period of time. Ponds would be a mixture of vegetated and non-vegetated systems depending on location (e.g., non-vegetated under roadway overpass).
- VFS—A VFS is a section of land located adjacent to the roadway shoulder or median that has moderate slopes designed to accept runoff as overland sheet flow. Pollutant removal is achieved through velocity reduction, filtration by vegetation, and infiltration. Optimal performance of a VFS relies on maintaining a dense mix of erosion-resistant vegetation. VFS would be utilized along pavement edges, within the medians as practicable, and along the shared-use path of the OHP Project.
- PFC—PFC pavement is a porous asphalt overlay that is applied over conventional concrete or asphaltic pavements. The pavement operates as a hydrologic source control; during rain events, water is conveyed along the boundary with the underlying impervious

pavement and discharged at the edge of the roadway where it can be diverted to a treatment area.

8.13.2 General BMPs

The following BMPs may be applied to the OHP Project to minimize downstream impacts to water quality and sensitive aquatic resources as practicable throughout the construction and operation phases of the project:

- Erosion Control—The project would incorporate temporary erosion control structures to minimize erosion. Erosion control measures, such as temporary seeding and mulching, hydro-mulch, and erosion control blankets, would be incorporated as a first step in construction and would be maintained throughout active construction activities. In addition, permanent stormwater quality BMPs, such as stormwater ponds, wetlands, or detention basins, may be required for projects that require coverage under the TPDES General Permit.
- Sediment Control—The SW3P would describe the temporary and permanent structural and vegetative measures for soil stabilization, runoff control, and sediment control for each stage of the project from initial land clearing and grubbing to project close-out. The SW3P would include a description of structural practices to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable.
- Roadside Drainage—Where feasible, vegetated swales would be used to assist with filtering sediment and other pollutants from stormwater before it reaches streams and adjacent wetlands.
- Revegetation—All temporarily disturbed areas created by construction activities would be revegetated following TxDOT specifications. Permanent revegetation would occur after sections are completed and would consist of a variety of grasses and forbs, including legumes, wildflowers, and cereals. The species used shall be suitable to the area and should not compete with permanently planted grasses. Temporary stabilization methods would include seeding and mulch consisting of hay, straw, wood fiber, or other suitable material that would be placed evenly after applying the seed mix.
- Equipment Service/Maintenance—The SW3P and TxDOT Environmental Permits, Issues, and Commitments form will require that any areas used for servicing or maintaining construction equipment be located away from streams, wetlands, and ponds and outside the 100-year floodplain. The contractor would submit a proposed plan designating staging areas, and this plan would be reviewed and approved by the engineer prior to construction. Fuel tanks located on-site would have double containment systems, and any fuels or other spills must be cleaned up immediately and in accordance with an approved spill response plan. Concrete or other material wash outs would be located in designated areas away from aquatic resources. All construction equipment would be maintained in proper

mechanical condition so fuel, oil, and other pollutants do not get into water bodies during construction activities.

8.13.3 Wetland/Stream Protection BMPs

The following BMPs may be applied to the OHP Project to protect wetlands and streams:

- Establish and/or maintain buffers around known or discovered recharge features.
- Locate, design, construct, and maintain stream crossings to provide maximum erosion protection.
- Maintain existing road ditches, culverts, and turnouts to ensure proper drainage and minimize the potential for the development of ruts and mud holes and other erosion-related problems.
- Stabilize, seed, and mulch eroded roadsides and new road cuts with native grasses and legumes, where feasible, in a timely manner to minimize impacts to water bodies.
- Implement erosion and sediment controls where appropriate. Maintain protective vegetative covers over all compatible areas, especially on steep slopes. Where necessary, gravel, fabrics, mulch, riprap, or other materials that are environmentally safe and compatible with the location may be used, as appropriate, for erosion control in problem areas.
- Water quality protection BMPs would have multiple levels of oversight to ensure their continued proper function. In addition to contractor inspectors who are responsible for daily monitoring of BMPs, TxDOT inspectors would conduct weekly inspections and would submit compliance reports to the project engineer. Additional oversight would be provided by the TxDOT project manager (who would be on site each day) and staff from the District Environmental Office, including the district environmental quality coordinator.

8.13.4 Bridge Construction and Geotechnical Drilling BMPs

The following BMPs may be applied to the OHP Project to protect voids and caves:

- Monitor drill shafts for voids and leave steel casings in place if water is encountered during drilling activities.
- Provide bridge deck drains that would capture bridge deck runoff and direct it to stormwater ponds.
- A specific karst void discovery protocol would be developed for the project for all excavation phases.

Several sensitive recharge features were identified; however, no features exhibited habitat characteristics required for listed karst invertebrates. Although the project would minimize the need for excavation activities to the extent practicable, the potential for impacting an undiscovered cave or void remains. Excavation, geotechnical boreholes, and bridge pier

drilling have the potential to alter a cave's ecosystem. However, due to the lack of suitable karst features identified during the GA and the location of the OHP Project in areas mapped as Karst Zone 3 (i.e., areas that probably do not contain endangered cave fauna), the *Preferred Alternative* is not anticipated to have an effect on listed karst invertebrates. Void mitigation and protection BMPs would be utilized if a void were discovered during project construction, as discussed in **Section 8.2** above.

8.13.5 Species-Specific BMPs

Habitat for 18 plants, 2 mammals (cave myotis bat and plains spotted skunk), 1 fish (Guadalupe bass), and 1 reptile (Texas garter snake) has the potential to occur within the OHP Project area; however, field investigation did not identify the presence of these species. Right-of-entry was not granted for the entire proposed right-of-way; therefore, additional field studies would be conducted once the right-of-way is acquired and prior to construction to assess these remaining areas for habitat suitability. In accordance with the TxDOT–TPWD MOU, the BMPs listed in **Table 8-1** would be utilized to minimize impacts to SGCN species within the project area. No BMPs are provided for the SGCN plants.

Table 8-1. BMPs to Be Used to Minimize Impacts on SGCN Species

Species	BMP
Plains spotted skunk	• Contractors would be advised of potential occurrence in the project area, to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.
Guadalupe bass	• TPWD coordination is required for projects within the range of an SGCN or state-listed fish and for which work is in the water.
Cave myotis bat	All bat surveys and other activities that include direct contact with bats shall comply with TPWD-recommended white-nose syndrome protocols located on the TPWD Wildlife Habitat Assessment Program website under "Project Design and Construction." The following survey and exclusion protocols should be followed prior to commencement of construction activities. For the purposes of this document, structures are defined as bridges, culverts (concrete or metal), wells, and buildings. • For activities that have the potential to impact structures, cliffs or caves, or trees, a qualified biologist would perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting. • For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats. • If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction. • Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area. See Section 2: Standard Recommendations for recommended acceptable methods for excluding bats from structures.

Species	BMP
	• If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features, as practicable. • Conversion of property containing cave or cliff features to transportation purposes should be avoided where feasible. • Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape. • Retain mature, large-diameter hardwood forest species and native/ornamental palm trees where feasible. • In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.
Texas garter snake	• Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas where feasible. If hydromulching and/or hydroseeding are not feasible due to site conditions, utilize erosion control blankets or mats that contain no netting or contain the preferred loosely woven, natural fiber netting. Plastic netting should be avoided to the extent practicable. • Inform contractors that if reptiles are found on project site, they should allow the species to safely leave the project area. • Avoid or minimize disturbing or removing downed trees, rotting stumps, and leaf litter where feasible. • Contractors should be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

Source: TxDOT–TPWD MOU September 2013.

In addition to the abovementioned BMPs, appropriate measures, including the measures listed below, would be taken to avoid adverse impacts on migratory birds.

- Between September 16 and February 28, the contractor would remove all inactive migratory bird nests from any structures that would be affected by the proposed project and complete any necessary vegetation clearing.
- The disturbance, destruction, or removal of active nests, including ground nesting birds, during the nesting season would be prohibited.
- The removal of unoccupied, inactive nests would be avoided as practicable.
- The establishment of active nests during the nesting season (between March 1 and September 15) on TxDOT-owned and -operated facilities and structures proposed for replacement or repair would be prevented.
- The collection, capture, relocation, or transportation of birds, eggs, young, or active nests without a permit would be prohibited.

TPWD's review of the Draft EIS served as Early Coordination with TPWD for the proposed OHP Project. Coordination with TPWD was concluded on July 18, 2018. Should a federally or state-listed species be identified within the *Preferred Alternative* right-of-way, coordination with the USFWS or TPWD would be initiated, and species-specific mitigation strategies would be

developed to avoid, minimize, and/or compensate for potential impacts to a threatened or endangered species.

8.14 Cultural Resources

Project archeologists evaluated the potential for the proposed project to affect archeological historic properties or state antiquities landmarks within the APE. Although two new archeological sites were documented within the existing US 290 right-of-way, neither site is recommended as eligible for listing as a state antiquities landmark or on the NRHP. No archeological resources that could provide new or important data concerning prehistory or history would be impacted by the *Preferred Alternative*. Based on the extensive disturbance noted in the project area, no additional archeological investigation is recommended within the existing right-of-way or the surveyed portions of the proposed right-of-way. However, approximately 52.10 acres of proposed right-of-way could not be accessed due to lack of right-of-entry. These areas require additional survey when right-of-entry is obtained or upon acquisition of the properties by TxDOT. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would cease, and TxDOT archeological staff would be contacted to initiate post-review discovery procedures.

The 1969 historical marker for Oak Hill will be relocated from its current location in a pullout on the north side of US 290, between Old Bee Cave Road and William Cannon Drive, to its new location about 500 feet east along the proposed shared-use path near the northwest corner of US 290 and William Cannon Drive.

8.15 Hazardous Materials

In all, 190 findings were included in databases within the ASTM search radius. Of those, 16 sites (primarily LPST and VCP sites) were determined to have the potential to impact the project corridor. Twelve orphan or unlocatable sites were also included in the database search. One CERCLIS site was listed as an unlocatable site: the IMC Chemical Group. Homefacts.com plots the location of this site on US 290 between Oak Meadow Drive and Convict Hill Road. This site was archived by the EPA in 1980, and no further clean up action or investigation at the site is required.

If hazardous constituents are unexpectedly encountered in the soil and/or shallow groundwater during construction operations, appropriate measures for the proper assessment, remediation, and management of the contamination would be initiated in accordance with applicable federal, state, and local regulations. In the event of an accidental spill of hazardous materials, TxDOT would work with other agencies and its contractors to secure the scene and implement appropriate spill response measures. Standard spill response procedures are outlined in 30 Texas Administrative Code 327. The following general recommendations were made relating to the project corridor.

- An ASTM-conforming Phase I environmental site assessment would be conducted prior to property acquisition.
- All construction contractors would be instructed to immediately stop all subsurface activities in the event that potentially hazardous materials are encountered, an odor is identified, or significantly stained soil is visible. Contractors and maintenance personnel would be instructed to follow all applicable regulations regarding discovery and response for hazardous materials encountered during the construction process.
- Special provisions or contingency language would be included in the proposed project's PS&E to handle hazardous materials and/or petroleum contamination according to applicable state, federal, and local regulations per TxDOT Standard Specifications. Hazardous items that require special handling would be removed only by certified and licensed abatement contractors having documentation of prior acceptable work.
- Further analysis of identified potential sites of concern and their proximity in the project area would occur during preliminary design development

8.16 Visual and Aesthetic Resources

If nighttime work occurs, the construction contractor would minimize project-related light and glare, consistent with safety considerations. Portable lights may be operated at the lowest practicable wattage and height would be minimized. Lights would be screened and directed downward toward work activities and away from the night sky and nearby residents. The number of nighttime lights used would be minimized.

Potential mitigation measures include landscaping treatments to enhance the visual character of the *Preferred Alternative*. Such treatments would include incorporating landscaping along the transportation corridor, as appropriate, to diversify the visual landscape. Landscaping would include regionally native plants for landscaping and implementing design and construction practices that minimize adverse effects on the natural habitat. To the extent possible, the proposed project would continue to be designed to create an aesthetically and visually pleasing experience for both roadway users and roadway viewers.

Other elements may include treatment of walls, incorporation of a variety of architectural finishes, and lighting treatments. These measures would help to enhance the local character, improve aesthetics, and reduce the visual scale of proposed project. The project designers and contractors would adhere to the landscape guidelines in TxDOT's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* (June 2004). Context-sensitive design elements could include the following items:

- Landscaping at the perimeter of the *Preferred Alternative*.
- Streetscape elements along adjacent frontage streets, such as sidewalks, street trees, and other aesthetic features.
- Architectural features on the columns and retaining walls, including varying materials.

All lighting would be in accordance with the Texas Health and Safety Code Title 5 425.002 regarding light pollution. To the extent possible, outdoor lighting fixtures would only be installed and operated if the purpose of the lighting cannot be achieved by the installation of reflective road markers, lines, warning or informational signs, or other effective passive methods. Additionally, full consideration would be given to conserving energy, reducing glare, minimizing light pollution, and preserving the natural light environment. An example of commonly used lighting meeting these considerations is the use of high-pressure sodium lamps equipped with glare shields.

Where practicable, mitigation to improve the visual and aesthetic qualities of the project area would include the following features:

- A project-specific landscaping program promoting roadside native wildflower planting programs
- Noise barriers
- Providing adequate signage and easy access to roadway facilities
- Treatment of the side surfaces and columns of the project using façade materials of varying texture, color, etc.
- Incorporation of CSS and design elements from the Green Mobility Challenge

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10. List of Preparers

Table 10-1. List of Preparers

Name and Title	Years of Experience	Role
Central Texas Regional Mobility Authority		
Dee Anne Heath, Director of External Affairs	27	Public Involvement and Media Relations
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Oscar Solis, P.E., Senior Project Manager	21	Mobility Authority Project Manager
Jori Steck	20	Communications Manager
Texas Department of Transportation—Austin District		
Heather Beatty, P.G., District Geologist	20	Geology and Water Quality
Jon Geiselbrecht, Environmental Specialist	21	Environmental Project Manager
Sonya Y. Hernandez, P.G., Environmental Specialist	13	Project Coordination, QA/QC
Rose Marie Klee, P.E., CFM, Hydraulics Engineer	16	H&H Discipline Lead
Shirley Nichols, District Environmental Supervisor	28	QA/QC
Adeliza Ramirez, P.E., Transportation Engineer	12	Project Manager
Texas Department of Transportation—Environmental Affairs Division		
Lindsey Kimmitt, Environmental Specialist	12	Project Coordination, QA/QC
Carlos Swonke, Director, TxDOT Environmental Affairs Division	30	Document Approver
Atkins		
Carol Fajkus, Public Involvement Coordinator	20	Public Involvement, Document Preparation
Ryan Hill, Environmental Planner	32	Management, Document Preparation, Public Involvement, Environmental QA/QC
Enoch Needham, P.E., Project Director	34	Project Management Oversight
Elizabeth Story, Public Involvement Manager	13	Public Involvement, Document Preparation
Cox|McLain Environmental Consulting, Inc.		
Larry W. Cox, Principal	25	Document Preparation, QA/QC
Chris Dayton, PhD, RPA, Cultural Resources Program Manager	17	Archeological Permitting and Survey, Document Preparation, QA/QC
Courtney H. Filer, AICP, Senior Planner	13	Document Preparation, QA/QC
Heather D. Goodson, Historic Preservation Manager	14	Historic Resources Survey

Name and Title	Years of Experience	Role
Sara Laurence, GIS Manager	8	GIS, QA/QC
Meghan P. Lind, Ecologist/Project Manager	11	Habitat Assessments, Lead Document Preparation, QA/QC
L. Ashley McLain, AICP, Principal	20	Document Preparation, QA/QC
Walt Meitzen, Environmental Scientist	15	Document Preparation, QA/QC
Claire Parra, AWB, Ecologist	7	Habitat Assessments, Document Preparation, QA/QC
Emily Reed, Historic Resources	8	Historic Resources Survey
David Sandrock, Archeologist	7	Archeological Survey, Document Preparation
Heather Stettler, Ph.D., Technical Editor	16	Technical Editing and Formatting, QA/QC
Matthew C. Stotts, GIS Analyst, Environmental Scientist, Archeologist	15	Archeological Survey, Document Preparation, GIS analysis, Figure Preparation
CP&Y		
Wade Strong, P.E., Project Manager	34	Project Management, Document Preparation
H&H Resources, Inc.		
Eric Friedrich, P.E., President/Senior Project Manager	33	Hydrology and Hydraulics Study, Report Preparation
HDR Engineering, Inc.		
Terri Asendorf Hyde, Environmental Project Manager	11	Document Preparation
Peggy Jones, Environmental Scientist	32	Document Preparation
Keith Lay, Air Quality Specialist	17	Air Quality Analysis
Paula Jo Lemonds, P.G., P.E., Water Resources Engineer	14	Karst Survey, Document Preparation
Christine Magers, CWB, Environmental Scientist II	11	Water Resource Section Author, Lead Wetland Delineator
Sara Moren, Environmental Scientist	13	Document Preparation
Mike Parsons, P.E., INCE, Senior Traffic Noise Engineer	18	Traffic Noise Analysis
Adam Roberts, Environmental Scientist	10	Document Preparation
Shane Valentine, P.G., Senior Project Manager	20	Lead Document Preparation, QA/QC
K Friese & Associates		
Charlotte Gilpin PE, CFM; Vice President	16	Water Quality Project Manager
Leigh Ruhnau, PE, Project Engineer	4	Water Quality Project Designer
Danielle Skidmore, PE, CFM, Former Vice President	24	Water Quality Manager and Designer

Name and Title	Years of Experience	Role
Nancy Ledbetter & Associates, Inc.		
Randall Dillard, Senior Associate	32	Public Involvement
Kerry Neely, Public Involvement Manager	31	Public Involvement Support
Rifeline, LLC		
Jessica Engelhardt, Vice President, Rifeline	17	Public Involvement
Melissa Hurst, Director of Communications and Strategy	11	Public Involvement
Lynda Rife	30	Public Involvement
Rodriguez Transportation Group		
T. Scott Bond, P.E., Senior Engineer	35	Conceptual Alternative Development, Schematic Design Oversight
Brian Enns, PE, Senior Engineer	20	QC
Chris Kelarek, PE, Senior Engineer	30	Schematic Design
Samuel Kunz, E.I.T.	3	Conceptual Construction Sequencing
Lance Peltier, Senior Engineer Tech	25	Schematic Design
Robert Robbins, PE,	18	Project Manager
RVi Planning		
Mark W. Smith, Vice President/Principal/ Professional Landscape Architect	37	Project Management, Context Sensitive Solutions, Concept Development
Robin Winter: Landscape Designer	4	Project Designer, Rendering, Document Preparation
Surveying and Mapping LLC (SAM)		
William R. Herring, RPLS, Senior Project Manager	15	Survey

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11. DISTRIBUTION LIST

Table 11-1. Distribution List

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Federal Agencies		
Al Alonzi Division Administrator Federal Highway Administration Texas Division 300 East 8th Street, Room 826 Austin, TX 78701		1
Omar T. Martinez Sole Source Aquifer Coordinator Ground Water/Underground Injection Control Section USEPA Region 6 1445 Ross Avenue, Suite 1200 Mail Code: 6WQ-SG Dallas, TX 75202-2733		1
Robert C. Patrick Regional Administrator Federal Transit Administration, Region 6 Fritz Lantham Federal Building 819 Taylor Street, Room 14A02 Fort Worth, TX 76102		1
Rhonda Smith Deputy Director, Region 6 Tribal Program U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, TX 75202-2733		1
Adam Zerrenner Field Supervisor Austin Ecological Services Office U.S. Fish and Wildlife Service 10711 Burnet Road, Suite 200 Austin, TX 78758		1
Salvador Salinas State Conservationist U.S. Department of Agriculture Natural Resources Conservation Service 101 South Main Street Temple, TX 76501		1

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Michaela E. Noble Director, Office of Environmental Policy and Compliance U.S. Department of the Interior Main Interior Building 1849 C Street, NW Washington, D.C. 20240		1
Stephen Spencer Regional Environmental Officer U.S. Department of the Interior Office of Environmental Policy and Compliance Albuquerque Region 1001 Indian School Road, NW, Suite 348 Albuquerque, NM 87104		1
Colonel Calvin C. Hudson, III Commander, Fort Worth District U.S. Army Corps of Engineers 819 Taylor Street Fort Worth, TX 76102		1
State Agencies		
Carter P. Smith Executive Director Texas Parks and Wildlife Department 4200 Smith School Road Austin, TX 78744		1
Mark Wolfe, Executive Director Texas Historical Commission State Historic Preservation Office P.O. Box 12276 Austin, TX 78711		1
Toby Baker (MC 109) Executive Director Texas Commission on Environmental Quality P.O. Box 13087 Austin, TX 78711-3087		1
George P. Bush Commissioner Texas General Land Office Asset Management P.O. Box 12873 Austin, TX 78711-2873 Attention: Amy Nunez		1

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Organizations		
Dr. Paul Cruz Superintendent Austin Independent School District 1111 W. 6th Street Austin, TX 78703		1
Dr. Eric Wright Superintendent Hays Consolidated Independent School District 21003 Interstate 35 Kyle, TX 78640		1
Darryl W. Pruett Oak Hill Association of Neighborhoods, President C/o The Weichert Law Firm 3821 Juniper Trace, Suite 106 Austin, TX 78738		1
Local Agencies		
Mayor Steve Adler City of Austin Attn: Lesley Varghese PO Box 1088 Austin, TX 78767		1
Council Member Ellen Troxclair District 8 City of Austin PO Box 1088 Austin, TX 78767		1
Mike Personett Acting Director City of Austin Watershed Protection Department 505 Barton Springs Road, 12th Floor Austin, TX 78704		1
Rob Spillar, P.E. Director, Austin Transportation Department City of Austin PO Box 1088 Austin, TX 78767-1088		1

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Kevin Shunk, P.E. Supervising Engineer City of Austin Floodplain Management City of Austin Watershed Protection 505 Barton Springs Road, 12th Floor Austin, TX 78704		1
Judge Sarah Eckhardt Travis County PO Box 1748 Austin, TX 78767		1
Commissioner Gerald Daugherty Travis County PO Box 1748 Austin, TX 78767		1
David K. Greear, P.E. County Executive Transportation and Natural Resources Department Travis County PO Box 1748 Austin, TX 78767		1
Jon A. White Natural Resources/Environmental Quality Division Director Travis County Transportation and Natural Resources Department PO Box 1748 Austin, TX 78767		1
Judge Bert Cobb, M.D. Hays County 111 E. San Antonio St., Ste. 300 San Marcos, TX 78666		
Mayor Todd Purcell City of Dripping Springs PO Box 384 Dripping Springs, TX 78620		1
Mayor Caroline Murphy City of Bee Cave 4000 Galleria Parkway Bee Cave, TX 78738		1

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Alicia Reinmund-Martinez General Manager Barton Springs Edwards Aquifer Conservation District 1124 Regal Row Austin, TX 78748		1
Phil Wilson General Manager Lower Colorado River Authority PO Box 220 Austin, TX 78767		1
Ashby Johnson Executive Director Capital Area Metropolitan Planning Organization (CAMPO) 3300 N. Interstate 35, Suite 630 Austin, TX 78705		1
Todd Hemingson, AICP Vice President Planning and Strategic Development Capital Metropolitan Transportation Authority Attn: Planning Department 2910 East 5th Street Austin, TX 78702		1
Texas State Senators		
Senator Kirk Watson Texas State Senator—District 14 PO Box 12068 Capitol Station Austin, TX 78711		1
Senator Dawn Buckingham Texas State Senator—District 24 PO Box 12068 Capitol Station Austin, TX 78711		1
Senator Donna Campbell Texas State Senator—District 25 PO Box 12068 Capitol Station Austin, TX 78711		1

Name and Address	Hard Copy, Letter with Weblink, and Notice of Availability	Letter with Weblink and Notice of Availability
Texas State Representatives		
Representative Paul D. Workman Texas State Representative—District 47 PO Box 2910 Austin, TX 78768		1
Representative Donna Howard Texas State Representative—District 48 PO Box 2910 Austin, TX 78768		1
Representative Gina Hinojosa Texas State Representative—District 49 PO Box 2910 Austin, TX 78768		1
Representative Jason Isaac Texas State Representative—District 45 PO Box 2910 Austin, TX 78768		1