Silverbell Road
Grant Road to El Camino del Cerro Road

Final Environmental, Design, and Mitigation Report

April 2011

Tucson Department of Transportation

HDR

April 20, 2011

Catesby Suter
Tucson Department of Transportation
201 N. Stone Avenue, 6th Floor
Tucson, AZ 85701

RE: *Final Environmental, Design, and Mitigation Report*
Silverbell Road, Grant Road to El Camino del Cerro

Dear Ms. Suter:

We are pleased to submit the *Final Environmental, Design, and Mitigation Report* for the above-referenced project. Please feel free to contact me at (520) 584-3670 if you have any questions.

Sincerely,

HDR Engineering, Inc.

Scott Stapp
Senior Environmental Planner

Attachments

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Prepared for:
Tucson Department of Transportation
201 N. Stone Avenue, 6th Floor
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I. Introduction

The Silverbell Road corridor, from Grant Road to Ina Road, lies in three jurisdictions: the Town of Marana, Pima County, and the City of Tucson. Silverbell Road is an urban principal arterial and scenic route that parallels Interstate 10, extending north from St. Mary's Road to Twin Peaks Road. It serves as a key north-to-south route that links the western side of Tucson to Marana. A location map, vicinity maps, and feature maps are provided as Figures 1, 2, 3, and 4 (see Part VII, Exhibits). This project would be constructed in two phases, the northern and southern phases. This report addresses the southern phase of the project, which runs from Grant Road to El Camino del Cerro. This phase would be constructed first, beginning in mid 2011.

Silverbell Road is located at the base of the Tucson Mountains. There are small rolling hills along the western side of the roadway. The eastern side of the roadway is flat. Silverbell Road is relatively straight except to curve around the existing rolling hills.

Silverbell Road is classified as an urban principal arterial by the City of Tucson in its *Major Streets and Routes Plan* with an ultimate minimum right-of-way (R/W) width of 150 feet. It is also designated as a scenic route from Grant Road to the western city limit north of Sunset Road. Additionally, the *Tucson Metro Bike Map* shows a bike route with a striped shoulder and signs from Sunset Road to Congress Street. Pima County's *Major Streets and Scenic Routes Plan* designates Silverbell Road as a scenic, major route with a 150-foot R/W. Marana's *Major Routes Rights of Way Plan* also shows a 150-foot R/W but does not specifically label it as a scenic route. As the population around the Silverbell Road corridor continues to grow, traffic volumes are increasing to a point where roadway improvements would be necessary.

A. Description of the Project

This document is based on a preliminary design of the proposed project and involves the development of a Design Concept Report (DCR) to improve Silverbell Road from a two-lane road to a four-lane, divided arterial street. The project limits begin at Grant Road and extend north approximately 3.5 miles to El Camino del Cerro. The recommended roadway cross section would consist of two 12-foot travel lanes and a 5-foot bike lane in each direction, a 6-foot-wide to 20-foot-wide raised median, sidewalks, and a pavement drainage system. New R/W, drainage easements, or temporary construction easements would be required from some parcels within the project limits.

B. Floodplain Locations

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the project area (project area FIRM panels 04019C1605K, 04019C1610K, 04019C1616K, 04019C1618K, 04019C1619K) indicate that this project is located within portions of the 100-year floodplain of the Santa Cruz River. Several main washes crossing Silverbell Road have been delineated as FEMA floodplains, including Idle Hour Wash, Sweetwater Wash, Roger Wash, Camino de Oeste Wash, and Painted Hills Wash.

C. Recommendation and Findings of Advance Planning and Alternatives Assessment

A formal report on advance planning and alternatives assessment is not being produced for the proposed project. All of the information developed during the design phase will be documented in the DCR.

D. Mayor and Council Direction

The Mayor and Council have not provided any action or direction at this stage of project development. When the DCR is complete, the Mayor and Council would have to approve the document before the project could proceed.

II. Inventory of Existing Conditions

This section of the report addresses only the existing conditions of the natural and man-built environment within the study area. Section III of this report discusses potential impacts to these resources. Throughout this document, the term "project area" is used to represent the construction footprint (area of disturbance), while the term "study area" also includes surrounding lands, outside but adjacent to the project limits. The term "project vicinity" is used to denote a more expansive landscape context.

The proposed project is located on Silverbell Road from Grant Road to Ina Road and is to be constructed in two phases, the northern and southern phases. This report addresses the southern phase of the project, which runs from Grant Road to El Camino del Cerro. The southern phase would be constructed first, beginning in mid 2011.

Silverbell Road is classified as an urban principal arterial street and is considered a scenic route by both the City of Tucson and Pima County. Silverbell Road runs parallel to Interstate 10. The road generally consists of two lanes, the width of which varies from 11 to 12 feet. Sidewalks are provided only near the Grant Road intersection. Between Goret Road and Grant Road, 6-foot paved shoulders are provided. Paved shoulders vary in width from 4 to 6 feet from Goret Road to Sunset Road (Kittelson & Associates 2009).

Silverbell Road is situated along the transition between the Santa Cruz River valley and the foothills of the Tucson Mountains. In general, the eastern side of the road is flat and open with sweeping vistas of the Tucson basin and mountain ranges to the north, east, and south. The west/southwest side of the road is more confined by the rising bajada and more varied visually as the slopes open and close to reveal views to the Tucson Mountains (McGann & Associates 2010).

Grant Road to Goret Road

This section is nearly fully developed, with a mix of existing retail, commercial, and residential land uses. North of the Grant Road intersection, the majority of existing development on both sides of the roadway includes low- to moderate-density residential subdivisions (Kittelson & Associates 2009).

Goret Road to El Camino del Cerro

Much of the land along the western side of Silverbell Road between Goret Road and Sweetwater Drive was purchased and rezoned as Open Space by the City of Tucson. Further development on the eastern side is limited by the Santa Cruz River and its floodplain (Kittelson & Associates 2009).

A. Environmental

1. Topography

The project area is in the Arizona Upland subdivision of the Sonoran desertscrub biotic community at elevations ranging from approximately 2,240 to 2,320 feet above mean sea level (amsl). The terrain is gently sloping, with elevations decreasing on a mostly northeastern gradient from the Tucson Mountains toward the Santa Cruz River, approximately 0.25 to 1 mile east of the project area. The

Tucson Mountains are approximately 2 miles west of the project area, the Santa Catalina Mountains are approximately 8 miles northeast, and the Tortolita Mountains are approximately 14 miles directly north.

2. Drainage

The Silverbell Road corridor, between Grant Road and El Camino del Cerro, is located at the base of the Tucson Mountains. The upstream watershed is located within the Tucson Mountains, in which runoff flows southwest to northeast into the adjacent Santa Cruz River. The majority of the runoff crosses the existing roadway in dip sections, some reinforced with cutoff walls at the downstream edge of the road.

Two multi-cell concrete box culverts and two pipe culverts exist along Silverbell Road. Seven wash crossings occur along Silverbell Road in the southern project area. There are 36 drainage crossings identified along the existing roadway alignment, with drainage areas that vary from several acres to thousands of acres in size. (HDR Engineering, Inc. 2010).

All runoff from the major washes, presented in Table 1, crosses the top of Silverbell Road with the exception of Greasewood Wash and Painted Hills Wash. These washes have multicell concrete box culverts to convey the runoff under the existing roadway (HDR Engineering, Inc., 2010). Of the remaining two pipe culverts one is associated with Painted Hills Wash and the remaining pipe culvert is not associated with a wash.

The seven major washes that yield a 100-year peak discharge in excess of 1,000 cubic feet per second are shown in Table 1 (HDR Engineering, Inc., 2010).

Table 1. Major washes (100-year peak flow in excess of 1,000 cubic feet per second)

Wash name	Station[1]	100-year peak flow (cubic feet per second)
Camino del Cerro Wash	285+42	1,710
Sweetwater Wash	314+11	3,894
Roger Wash	334+70	4,790
Trails End Wash	365+10	3,285
Camino de Oeste Wash	409+36	6,055
Painted Hills Wash	437+35	1,518
Greasewood Wash	465+68	3,646 (2,900 FE)

[1]Station locations are presented in Figure 4

3. Vegetation

The project is located within the Arizona Upland subdivision of the Sonoran desertscrub biotic community (Brown 1994). Additional vegetation communities include xeroriparian along the washes and disturbed upland primarily along the existing road. The existing vegetation composition and species were identified by site reconnaissance (SWCA 2009). Vegetative cover within the project area was estimated to range from 1 percent at the disturbed shoulder areas to 50 percent, and the dominant

vegetation included: velvet mesquite (*Prosopis velutina*), foothill paloverde (*Parkinsonia microphylla*), blue paloverde (*Parkinsonia florida*), whitethorn acacia (*Acacia constricta*), catclaw acacia (*Acacia greggii*), creosote bush (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), and burroweed (*Isocoma tenuisecta*). Additional species included Mexican paloverde (*Parkinsonia aculeate*), brittlebush (*Encelia farinosa*), cattle saltbush (*Atriplex polycarpa*), fishhook barrel cactus (*Ferocactus wislizeni*), prickly pear cactus (*Opuntia* sp.), chainfruit cholla (*Opuntia fulgida*), staghorn cholla (*Opuntia versicolor*), walkingstick cactus (*Opuntia spinosor*), ocotillo (*Fouqueria splendens*), saguaro (*Carnegiea gigantea*), globe cactus (*Mammillaria* sp.), night-blooming cereus (*Peniocereus greggii*), desert broom (*Baccharis sarothroides*), Coues' cassia (*Senna covesii*), purple threeawn (*Aristida purpurea*), spidergrass (*Aristida ternipes*), and fluffgrass (*Dasyochloa pulchella*). Nonnative species included saltcedar (*Tamarix ramosissima*), stinkgrass (*Eragrostis cilianensis*), prickly Russian thistle (*Salsola tragus*), buffelgrass (*Pennisetum ciliare*), bermudagrass (*Cynodon dactylon*), as well as ornamental plant species used in adjacent commercial and residential landscaping. Xeroriparian vegetation associated with the washes included desert broom, velvet mesquite, wolfberry (*Lycium* sp.), spiny or desert hackberry (*Celtis ehrenbergiana*), graythorn (*Ziziphus obtusifolia*), whitethorn acacia, singlewhorl burrobrush (*Hymenoclea monogyra*), and cane bluestem (*Bothriochloa barbinodis*).

The Arizona Native Plant Act (Arizona Revised Statutes § 3-901) obliges protection of native plants (including federally recognized threatened and endangered species). The following species occurring within the project area are protected under the Arizona Native Plant Act: velvet mesquite, foothill and blue paloverde, whitethorn and catclaw acacia, ocotillo, fishhook barrel cactus, saguaro, and various species of cholla. No federally recognized threatened or endangered plant species were identified within the project area (SWCA 2009).

The Sonoran Desert Conservation Plan is a Pima County program that identifies species considered vulnerable in Pima County and has determined priority conservation areas for each species. Priority conservation area for the federally endangered Huachuca water umbel occurs throughout the project limits (SWCA 2010).

4. Wildlife

The project's proximity to the Santa Cruz River, and its position between the Tortolita, Santa Catalina and Tucson Mountains and Saguaro National Park likely provides critical travel and forage habitat for a variety of wildlife, including bobcat (*Lynx rufus*), javelina (*Pecari tajacu*), kit fox (*Vulpes macrotis*), mule deer (*Odocoileus hemionus crooki*), Sonoran desert tortoise (*Gopherus agassizii*), cave myotis (*Myotis velifer*), and pocketed free-tailed bat (*Nyctinomops femorosaccus*) (SWCA 2010). The project area is located between two wildlife linkages identified by the Arizona Wildlife Linkages Assessment workgroup: Linkage 80 (Saguaro-Tortolita), and Linkage 87 (Tucson Mountains-San Xavier, San Robles Pass) (SWCA 2010). Based on the results of the *Wildlife Crossing Initial Assessment* (SWCA 2010) prepared for this project, priority crossing zones are located at Roger Wash (station 332+61), two smaller drainages south of Roger Wash connecting Christopher Columbus Regional Park and Pima County open space (stations 344+79 and 348+36), Trails End Wash (station 365+10), and a drainage crossing Silverbell Road just west of the man-made ponds at Christopher Columbus Regional Park (station 378+84).

The project area was reviewed for special status species protected under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service; state protected species managed by the Arizona Game and Fish Department; and the species recognized in the Sonoran Desert Conservation Plan.

The Arizona Game and Fish Department (AGFD) on-line environmental review tool (project search identification #20090603008960) of the Arizona Heritage Data Management System provided occurrence records of special status species within 3 miles of the project vicinity. The following federally-recognized species were identified by the on-line review tool: endangered desert pupfish (*Cyprinodon macularius*) and Gila topminnow (*Poesciliopsis occidentalis occidentalis*); candidate species yellow billed cuckoo (*Coccyzus americanus*); and species of concern fulvous whistling-duck (*Dendrocygna bicolor*), Sonoran population of desert tortoise (*Gopherus agassizii*), and Western burrowing owl (*Athene cunicularia hypugaea*). Additionally, the tool identified AGFD state-recognized wildlife species of concern occurring within the project vicinity: black-bellied whistling-duck (*Dendrocygna autumnalis*), Great Plains narrow-mouthed toad (*Gastrophryne olivacea*), and an unspecified bat colony.

The U.S. Fish and Wildlife Service list of threatened and endangered species for Pima County was reviewed for species with the potential to occur within the project area. The federally endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), and the federally recognized species of concern, the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), were determined to have the potential to occur within the project area. A Sonoran Desert Conservation Plan priority conservation area for the lesser long-nosed bat occurs approximately 5 miles west of the project area. Additionally, the project area is within the forage range of an active maternity roost and known non-maternity roosts within the Tucson area. A cactus ferruginous pygmy-owl priority conservation area is located within 1 mile of the project limits.

Sonoran Desert Conservation Plan priority conservation areas were identified within and adjacent to the project area for the federally recognized species of concern western burrowing owl (also identified by the AGFD on-line environmental review tool as occurring within 3 miles of the project vicinity), as well as the following federally recognized species of concern and state recognized wildlife species of concern: lowland leopard frog (*Rana yavapaiensis*) and California leaf-nosed bat (*Macrotus californicus*). The giant spotted whiptail (*Aspidoscelis burti stictogrammus*) is a state recognized wildlife species of concern, with no federal standing, with a priority conservation area near the project area. Priority conservation areas for two species with no federal or state standing occur within and near the project area: Abert's towhee (*Pipilo aberti*) and the desert box turtle (*Terrapene ornate luteola*).

5. Viewsheds – Visual Analysis

Silverbell Road is a two-lane paved road with graded shoulders and no existing landscaping within the R/W. Much of the corridor is located adjacent to open space or low-density residential development with naturally occurring vegetation or cleared land making up the majority of the foreground view. Some landscaped areas are in buffer areas associated with high-density residential and commercial development at the southern end of the project. The middle-ground views, outside the developed area, consist of City of Tucson park and golf course development, low-density residential development,

industrial development, and disturbed open space. Mountain ranges can be seen in the distance from all directions (McGann & Associates 2010).

Distant vistas are an important part of the visual experience when driving the roadway. Foreground and middle-ground views are less significant. The opening and closing effect caused by hills on the west/southwest side of the roadway create a visual rhythm. The foreground and middle-ground clutter of industry, stockpiles, disturbed land, and barren land detract from the overall scenic quality of the corridor (McGann & Associates 2010).

6. Historical, Cultural, and Archaeological

Located in the Tucson Basin, the proposed project area parallels the Santa Cruz River, an area rich in cultural resources. Human occupation in the region spans from the Paleoindian period, which began approximately 12,000 years ago (9500–8000 BC); through the Early and Middle Archaic periods (8000–2000 BC); the Early Agricultural period (2000 BC–AD 200); the Ceramic period, during which the Hohokam cultural tradition developed and thrived (AD 200–1450); the Protohistoric period (AD 1450–ca. 1700); the Historic period (1700–1950); to the present.

Because the project requires Section 404 Clean Water Act permitting by the U.S. Army Corps of Engineers (Corps), it is considered a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA). The Corps is the lead federal agency for Section 106 consultation. The consultation process prescribed in Section 106 of the NHPA requires a determination of the effect of a federal undertaking on historic properties within the area of potential effects (APE). Historic properties are defined as archaeological sites; historic buildings, structures, or objects; archaeological or historic districts; and traditional cultural properties (TCPs) included in or eligible for inclusion in the National Register of Historic Places (National Register).

To be determined eligible for inclusion in the National Register, properties must be important in American history, architecture, archaeology, engineering, or culture. They also must possess integrity of location, design, settings, materials, workmanship, feeling, and association, and meet at least one of the following four criteria:

- Criterion A: be associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B: be associated with the lives of persons significant in our past
- Criterion C: embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master, or possess high artistic values, or represent a significant distinguishable entity whose components may lack individual distinction
- Criterion D: have yielded, or may be likely to yield, information important in prehistory or history

Properties can be of local, state, or national importance. Typically, historic properties are at least 50 years old, but younger properties can be considered for listing if they are of exceptional importance.

The project APE is defined as the proposed expanded corridor (150 feet west of the road and 250 feet east of the road) along Silverbell Road as it extends from Grant Road to El Camino del Cerro (Figure 2). The APE totals 218.1 acres: 75.5 acres of City of Tucson-owned land and 142.4 acres of private land.

Historical

The Pima County Tax Assessor's MapGuide Interactive Map was examined to identify parcels with buildings aged 50 years or older (built on or before 1960). A total of eight parcels were identified as having potentially historic buildings. The buildings have not been evaluated for National Register eligibility. Table 2 presents a list of those parcels.

Table 2. Tax parcels with buildings aged 50 years or older

Parcel number	Address	Construction date
103-04-009B	4755 N. Silverbell Rd., Tucson, AZ 85745	1959
103-04-0210	4627 N. Silverbell Rd., Tucson, AZ 85745	1955
103-04-0220	4617 W. Lost Horizon Dr., Tucson, AZ 85745	1955
103-08-002E	3333 N. Silverbell Rd., Tucson, AZ 85745	1944
103-21-022E	2715 N. Silverbell Rd., Tucson, AZ 85745-1113	1952
103-21-023A	2705 N. Silverbell Rd., Tucson, AZ 85745	1947
103-21-0210	2625 N. Silverbell Rd., Tucson, AZ 85745-1115	1930, 1952
103-21-025C	2706 N. Silverbell Rd., Tucson, AZ 85745	1913, 1955

Cultural

It is unknown if TCPs exist within the APE. Initiation of Section 106 consultation for the project should facilitate the identification of TCPs or highlight the need for further research (ethnographic and/or archival) to ascertain whether TCPs are present.

Archaeological

SWCA Environmental Consultants (SWCA) performed a Class I literature review and a Class III survey to identify archaeological resources within the APE (Petersen et al. 2010). The Class I literature review included information obtained from the AZSITE and National Register online databases, reports at the Arizona State Museum library, the Center for Desert Archaeology, Desert Archaeology, Inc., and Bureau of Land Management General Land Office plat maps and land patent records. A total of 14 cultural resource surveys (including the SWCA survey) covered portions of the APE. SWCA surveyed 190.3 acres of the APE; 27.8 acres could not be surveyed because of lack of access.

SWCA survey resulted in the documentation of 16 archaeological sites—4 prehistoric period (representing Archaic, Early Agricultural, and Ceramic period occupation), 11 historic period, and 1 multicomponent (prehistoric and historic periods)—within the APE. The prehistoric period sites consist of habitations and one resource procurement area. Historic period site types include: limekilns,

a canal, a road, habitations or possible habitations, trash scatters, and a manufacturing/production area. Of the 16 sites, 11 are National Register-eligible historic properties. A total of 4 have been *determined eligible* for National Register listing, 7 are *recommended eligible*, 1 has been *determined ineligible*, and 4 are *recommended ineligible*. (Table 3)

Table 3. Documented National Register-eligible historic properties within the APE

Site Number	Site Type	Period of Occupation	National Register Eligibility Status
AZ AA:12:46 (ASM)	Habitation	Archaic, Ceramic	Determined eligible
AZ AA:12:93 (ASM)	Habitation	Ceramic	Determined eligible
AZ AA:12:96 (ASM)	Habitation, disposal	Early Agricultural, Ceramic, Historic	Determined eligible
AZ AA:12:105 (ASM)	Habitation	Early Agricultural, Ceramic	Determined eligible
AZ AA:12:106 (ASM)	Limekiln	Historic	Recommended eligible
AZ AA:12:999 (ASM)	Habitation	Historic	Recommended eligible
AZ AA:12:1079 (ASM)	Disposal, possible habitation	Historic	Recommended eligible
AZ AA:12:1080 (ASM)	Manufacturing/production; possible habitation	Historic	Recommended eligible
AZ AA:12:1082 (ASM)	Disposal; possible habitation	Historic	Recommended eligible
AZ AA:12:1083 (ASM)	Habitation	Historic	Recommended eligible
AZ AA:12:1085 (ASM)	Artifact Scatter	Prehistoric	Recommended eligible

The APE overlaps an area designated in the Pima County Sonoran Desert Conservation Plan as the River Confluence Priority Archaeological Site Complex. SWCA's survey revealed a nearly uninterrupted deposit of cultural resources within the APE. For that reason, SWCA recommends the area be designated the Silverbell Archaeological District, eligible for National Register listing under Criterion D for its potential to contribute significant information regarding prehistoric and historic period occupation and land use along the Santa Cruz River.

7. Air Quality

The U.S. Environmental Protection Agency has established National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: ground-level ozone), carbon monoxide (CO), nitrogen dioxide sulfur dioxide, particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) and lead. The proposed project area is in an attainment area for all NAAQS. The Tucson area is currently in attainment for CO with a Limited Maintenance Plan (LMP). Because the Tucson area is in attainment for all the NAAQS pollutants, with an LMP for CO, project-level conformity requirements do not apply. Rather, transportation conformity under the LMP is demonstrated by the Pima Association of Governments based on its regional modeling efforts. There is a nearby PM_{10} non-attainment area, the Rillito non-attainment area; this area begins at the intersection of Silverbell Road and Ina Road, so it is outside of the proposed project area.

8. Water Quality

This section addresses washes regulated under Section 404 of the Clean Water Act (CWA) and regulated by the Corps, and project activities subject to Section 402 of the CWA

The proposed project is in the Upper Santa Cruz and Avra Basin, a sole source aquifer designated area. The Silverbell Road corridor, between Grant Road and El Camino del Cerro, is located at the base of the Tucson Mountains. The upstream watershed is located within the Tucson Mountains, in which runoff flows southwest to northeast into the adjacent Santa Cruz River.

A preliminary Jurisdictional Delineation (JD) has been prepared and will be submitted to the Corps for approval. The JD addresses both the southern and northern portion of the project. The southern portion of the project, the subject of this EDMR, has 59 washes crossing Silverbell Road. Among these washes, 23 have been proposed to be jurisdictional. The largest wash, Roger Wash, drains approximately 2,400 feet within the proposed project area. The major proposed jurisdictional washes within the project area are detailed in Table 3.

Table 3. **Major proposed jurisdictional washes within the project area**

Wash name	Station[1]	Drainage length within the project area (feet)	Area of each drainage in project area (acres)
Greasewood Wash (Wash 5)	465+58	490	0.537
Nursery Wash (Wash 7/8)	456+52	720	0.133
Painted Hills Wash (Wash 18)	437+35	190	0.463
Camino de Oeste Wash (Wash 27)	409+36	1,070	0.852
Trails End Wash (Wash 44)	365+10	570	0.498
Roger Wash (Wash 52)	332+61	2,400	1.042
Sweetwater Wash (Wash 58)	314+11	440	0.582

[1]Station locations are presented in Figure 4

After the Corps has issued a preliminary JD, the City of Tucson will determine if a nationwide or individual 404 permit would be appropriate for the proposed project.

Under Section 402(p) of the CWA, an Arizona Pollutant Discharge Elimination System (AZPDES) general permit from the Arizona Department of Environmental Quality is required for construction activities when one acre or more of land would undergo excavation and/or grading during construction.

B. Neighborhood

1. Adjoining Land Uses

Land use adjacent to Silverbell Road consists of private land and property owned by the City of Tucson, Pima County, or the Town of Marana. All land east of Silverbell Road, between El Camino del Cerro and Introspect Drive (See Figure 4), is primarily owned by the City of Tucson. Christopher

Columbus Park and the Silverbell Golf Course are located within this segment of roadway, both owned by the City of Tucson. South of Introspect Drive, property ownership consists of single family developments with the exception of two commercial locations. The first location is situated directly west of West Burlwood Way and consists of small businesses. The second location is at the intersection of Grant Road and Silverbell Road. At this location, there is a shopping center with small businesses along the northwestern corner, a convenience store at the northeastern corner, a bank along the southeastern corner, and a gas station at the southwestern corner. These businesses generate high traffic volumes (Kittelson & Associates 2009).

2. Recreation

Recreation venues along this corridor include Christopher Columbus Park and the Silverbell Golf Course. In addition, there is a designated bike route with a striped shoulder along Silverbell Road. There are other unimproved equestrian/hiking trails within the roadway corridor. These include the unpaved portion of the shoulders of Silverbell Road, land between the shoulders and the Santa Cruz River, the Santa Cruz River, and several of the larger washes.

3. Access

There are 15 minor cross streets, 21 residential driveways, and 12 commercial driveways that directly access Silverbell Road in the project area. There are no turning restrictions for vehicles accessing Silverbell Road. Access for alternative modes is discussed in the Alternative Modes section.

4. Character

This project area has a suburban feel, with residential subdivisions on both sides of the roadway interspersed with some commercial development (McGann & Associates 2010).

5. Utilities

Utilities are located within and immediately adjacent to the current R/W. Utilities identified within the potential project area are: Tucson Electric Power, both overhead and underground power lines, Southwest Gas underground gas lines, Comcast underground cable lines, Qwest underground lines, and City of Tucson Water underground water lines and Pima County Regional Wastewater Reclamation Department's underground sewer lines.

6. Noise

Existing traffic noise levels within the project area were evaluated pursuant to Title 23 Code of Federal Regulations Part 772 and the Pima County Department of Transportation's Procedure 03-5, Traffic Noise Analysis and Mitigation Guidance for Major Roadway Projects. These policies and the criteria included therein were developed to provide procedures for noise studies and noise abatement measures. These policies and the methods used in evaluating existing traffic noise levels are presented in detail in the draft noise report (Kittelson & Associates 2010) prepared for this project.

Pima County's noise abatement policy considers a traffic noise impact to occur if the predicted exterior noise level for a sensitive receptor is 66 A-weighted hourly noise equivalent in decibels (dBA), or above. Sixty-four receptors along the roadway corridor were used to provide a

comprehensive evaluation of noise impacts throughout the project area. The locations of the receptors were chosen to represent areas where frequent outdoor activity could be expected (i.e., in the backyard, near the house). Refer to Figures 3.1–3.7, extracted from the noise report, in Appendix A, for the location of each receptor.

Existing traffic noise levels were calculated using the Federal Highway Administration-approved Traffic Noise Model version 2.5 (TNM 2.5). Existing conditions were entered into TNM 2.5, including the existing roadway alignment, traffic volumes and vehicle mixes, as well as elevations of the roadway and surrounding areas, and existing fences and walls that may affect sound transmission from the roadway. Existing sound levels at the 64 receptors range from 41 to 68 dBA. TNM 2.5 predicted traffic noise levels resulting in noise impacts to occur at four of the receptor locations. Receptor S27, located west of Silverbell Road and south of El Camino del Cerro, and receptor S31, located west of Silverbell Road and south of Hill of Gold Drive, were predicted to experience noise levels at 68 dBA under existing conditions. Receptor S28, located west of Silverbell Road and north of Lost Horizon Drive, and receptor S57, located east of Silverbell Road and north of Silverbell Vista Place, were predicted to experience noise levels at 66 dBA under existing conditions. Refer to Table 5 extracted from the noise report, in Appendix A, for modeled existing traffic noise levels at each receptor.

C. Alternative Modes

1. Bikeway Facilities

Along the project area, Silverbell Road, is designated as a bike route with striped shoulders. Currently, the shoulder width varies from 4 to 6 feet in the project area. The Silverbell Road corridor is a favorite route for bike enthusiasts (Kittelson & Associates 2009).

2. Pedestrian Facilities

Pedestrian facilities in the project area are primarily unpaved and, in some segments, ungraded shoulders. There is a sidewalk in the vicinity of the commercial properties at Grant Road. Crosswalks are provided only at the signalized intersection. A number of unimproved equestrian/hiking trails are located within the roadway corridor. These include the shoulders of Silverbell Road itself, the Santa Cruz River, and along several of the larger washes. Because of the limited shoulder width, pedestrian activity is limited. The limited shoulder width, as well as the relative low density of both residential and commercial development, result in low pedestrian demand along the corridor. Crossing Silverbell Road on foot to get to the Santa Cruz River is a more frequent occurrence (Kittelson & Associates 2009).

3. Public Transit Facilities

Local Bus Route 21 (West Congress/Silverbell) currently provides weekday and weekend service on Silverbell Road between St. Mary's Road and Goret Road. There are five bus stops between Grant Road and Goret Road. Bus schedules range from 30 minutes during the daytime to 60 minutes in the evening. Sun Tran does not plan to expand transit service along Silverbell Road. In addition to Sun Tran buses, school buses also frequently use Silverbell Road during the morning and afternoon pickup

hours. Ten different public schools have pickup locations within the study area (Kittelson & Associates 2009).

III Detailed Environmental Impact Assessment

For each issue evaluated in the previous section of this report, *Existing Conditions*, this section of the report addresses the impacts to the natural and man-built environment that may occur as a result of the proposed project.

A. Environmental

1. Topography

The project area's gently sloping terrain, with the Tucson Mountains on the west and the Santa Cruz River on the east, along with the various washes within the existing roadway would change with the proposed project. The road profile would be elevated by as much as 5 to 6 feet from existing grade in some areas.

2. Drainage

Part of the purpose of this proposed project is to improve the drainage on Silverbell Road. Generally, this road has a series of dips where drainages cross over the existing road. This would be improved by raising the profile of the road and having the drainage flow under the road through a series of culverts and piping to improve the quality and safety of the road, making this an all weather road. Some of these culverts would be built large enough to serve as wildlife crossings (HDR Engineering, Inc., 2010). Camino de Oeste Wash will have a bridge built over it. The proposed new pipe and box culvert locations are shown in Table 4.

Table 4. **New pipe and box culvert locations**

Wash name	Pipe or Box Culvert	Station [1]	Jurisdictional Delineation wash number
Unnamed Wash 59 (north of Sweetwater Wash)	Box	300+00	59
Unnamed Wash 59	Pipe	305+06	59
Sweetwater Wash	Box	314+11	58
Sweetwater Wash	Box	315+71	58
Unnamed Wash 56	Pipe	319+78	56
Unnamed Wash 57	Box	321+60	57
Unnamed Wash 55	Pipe	327+51	55
Roger Wash	Box	332+61	52
Roger Wash	Box	334+70	52
Roger Wash	Pipe	337+50	52
Unnamed Wash 48	Box	344+79	48
Unnamed Wash 45	Pipe	348+36	45
Not associated with a wash	Pipe	360+00	N/A
Trails End Wash	Box	365+10	44

continued on next page

Table 4. **New pipe and box culvert locations** *(continued from previous page)*

Wash name	Pipe or Box Culvert	Station [1]	Jurisdictional Delineation wash number
Unnamed Wash 41	Pipe	370+56	41
Unnamed Wash 39, 40 & 41	Pipe	372+23	39, 40& 41
Unnamed Wash 38	Pipe	373+71	38
Unnamed Wash 31	Pipe	378+83	31
Unnamed Wash 31	Box	379+81	31
Unnamed Wash 35	Pipe	381+42	35
Unnamed Wash 35	Pipe	384+29	35
Unnamed Wash 33	Box	385+51	33
Unnamed Wash 32	Pipe	392+92	32
Unnamed Wash 31	Pipe	395+00	31
Unnamed Wash 32	Pipe	396+81	32
Camino de Oeste Wash	Box	406+77	28
Not associated with a wash	Pipe	411+46	N/A
Not associated with a wash	Pipe	413+47	N/A
Not associated with a wash	Pipe	415+80	N/A
Unnamed Wash 26	Pipe	416+93	26
Not associated with a wash	Pipe	421+22	N/A
Not associated with a wash	Pipe	424+41	N/A
Not associated with a wash	Pipe	428+80	N/A
Painted Hills Wash	Box Extension	437+35	18
Unnamed Wash 17	Pipe Extension	440+50	17
Unnamed Wash 13	Pipe	449+40	13
Unnamed Wash 12	Pipe	449-92	12
Nursery Wash	Pipe	455+51	7/8
Nursery Wash	Box	456+52	7/8
Greasewood Wash	Box	465+58	5

[1]Station locations are presented in Figure 4

For additional information, see section *III. A. 8.Water Quality.*

3. Vegetation

The project would involve ground-clearing, thus removing naturally growing vegetation from the existing R/W. No federally protected or Sonoran Desert Conservation Plan priority vulnerable species occur within the project area (SWCA 2009). Depending on where construction would occur within the R/W, the following species protected under the Arizona Native Plant Act would be affected: velvet mesquite, foothill and blue paloverde, whitethorn and catclaw acacia, ocotillo, barrel cactus, saguaro, and various species of cholla. The Arizona Department of Agriculture requires notification for protected plants impacted by construction.

Impacts to plants would be minimized to the maximum extent practicable. Landscaping and revegetation plans would be developed consistent with the mitigation measures outlined in the City of Tucson Native Plant Preservation Ordinance.

4. Wildlife

Habitat fragmentation caused by development such as roadway construction and increasing mortality associated with wildlife-vehicle collisions are significant threats to biodiversity and the persistence of rare and threatened species (SWCA 2010). The project area provides critical wildlife connectivity, and priority wildlife movement areas were identified within the project limits. Widening the roadway without adequate accommodation for wildlife connectivity would likely result in negative impacts to the long-term persistence of species currently using the area for movement, as well as continued risk of collision to motorists and wildlife. Therefore, roadway design features to accommodate wildlife crossings are recommended at the priority wildlife movement zones. Recommendations for wildlife underpass structures were provided in the *Silverbell Road Wildlife Linkage Initial Assessment: El Camino del Cerro Road to Grant Road* (SWCA 2010) prepared for this proposed project. Table 5 presents a comparison of the recommended wildlife structures and the proposed drainage structure at each priority crossing zone.

Table 5. Comparison of recommended wildlife structures with proposed drainage structures

Station[1]	Wildlife Recommendation[2]	Proposed Drainage Structure[3]	Comments
332+61 (Roger Wash)	12’ x 8’ RCBC	six 12’ x 8’ RCBC	proposed meets recommended
344+79	10’ x 5’ RCBC	two 10’ x 4’ RCBC	larger structure may be considered
348+36	36” RCP	three 10’ x 4’ RCBC	proposed meets recommended
365+10 (Trails End Wash)	12’ x 8’ RCBC	four 12’ x 8’ RCBC	proposed meets recommended
378+84	8’ x 5’ RCP	three 36” RCP	larger structure may be considered

RCBC – reinforced concrete box culvert, RCP – reinforced concrete pipe

[1]Station locations are presented in Figure 4

[2]SWCA 2010

[3]Personal communication with Terri Bainbridge, HDR Engineering, Inc., on October 6, 2010.

These drainage structures, as well as others of suitable dimension and location within the project area would provide connectivity for wildlife crossing Silverbell Road, thus increasing the possibility of safe passage across the road for wildlife.

The project is within the forage range of a known maternity roost of the lesser long-nosed bat, and within 5 miles of priority conservation area for this species. However, the project area does not contain agave species appropriate to the bat’s diet, and it does not support sufficient numbers of saguaros to provide a suitable forage resource. The project is expected to have no effect on the lesser long-nosed bat (SWCA 2009).

A priority conservation area for the cactus ferruginous pygmy-owl occurs within 1 mile of the project. The project area was reviewed for suitable habitat; however, no suitable habitat for breeding or

dispersing pygmy-owls was identified within the project area. Scott Richardson, biologist with the U.S. Fish and Wildlife Service, provided information to SWCA during personal communication (in 2009) indicating the likelihood of direct impacts to the species is low based on the current distribution of cactus ferruginous pygmy-owls within the Tucson area (SWCA 2009). Therefore, the project is expected to have no effect on the cactus ferruginous pygmy-owl or its habitat (SWCA 2009).

No natural perennial waterways occur within the project area; therefore, the desert pupfish and Gila topminnow would not occur. Riparian vegetation of the Santa Cruz River does not extend into the project limits, nor is the vegetation structure suitable for yellow-billed cuckoo habitat; therefore, the yellow-billed cuckoo is unlikely to occur. (SWCA 2009).

Additional federally listed species of concern (fulvous whistling duck, Sonoran desert tortoise, and Western burrowing owl), state wildlife species of concern (black-bellied whistling duck, Great Plains narrow-mouth toad), and an unspecified bat colony have been documented occurring within 3 miles of the project vicinity. No potential bat roost sites occur within the project area (SWCA 2009). According to the wildlife linkages initial assessment (SWCA 2010) prepared for this project, western burrowing owls are not expected to occur, however individuals may use the area for movement between preferred habitat. The Sonoran desert tortoise was a target species identified in the wildlife linkages assessment. Impacts of the widened roadway on the tortoise will be minimized to the maximum extent practicable through the implementation of wildlife crossings where feasible and reasonable, as recommended in the wildlife linkage initial assessment (SWCA 2010) prepared for this project.

Priority conservation areas occur within and around the project area for several additional species: lowland leopard frog, California leaf-nosed bat, giant spotted whiptail, Abert's towhee, and desert box turtle. The lowland leopard frog, giant spotted whiptail and desert box turtle are not expected to occur within the project area due to the ephemeral nature of the Santa Cruz River within the project area; however, the presence of the California leaf-nosed bat, Abert's towhee and desert box turtle within the project area is unknown (SWCA 2010).

5. Viewsheds – Visual Analysis

Based on the project scope, there would be impacts to visual resources within the project area. This project would widen the road from two to four lanes, adjust both the vertical and horizontal alignments, make drainage improvements, and construct new cut slopes.

Widening the roadway would change the visual quality of the area in two ways. First, the paved area of the road would more than double; therefore, there would be more paved surface throughout the landscape. Secondly, removal of existing vegetation would have a substantial impact given that the current vegetation provides a screen to industrial areas east/northeast of the roadway (McGann & Associates 2010).

Changes to the horizontal alignment would have the potential to affect the visual resources due to the potential removal of additional vegetation. Also, this shift in alignment may make the roadway visible to hillside residents who do not currently see the existing roadway (McGann & Associates 2010).

The new roadway would be constructed mostly on fill material. The roadway would be elevated above existing grades as much as 5 to 6 feet in some areas. Therefore, the views from the road would be more prominent, particularly middle-ground views to the east/northeast. In addition, the roadway would be more prominent to adjacent residences and businesses on the west/southwest side of the roadway (McGann & Associates 2010).

The proposed drainage improvements would channel drainage under the roadway. In addition to providing for drainage, some of the structures would be built as wildlife crossings. Because there would be vegetation removal during construction, these drainage improvements would be highly visible from the roadway.

6. Historical, Cultural, and Archaeological

The proposed scope of work, which involves roadway widening and considerable ground disturbance in areas adjacent to the existing roadway, would adversely affect known and, possibly, as yet unidentified historic properties.

Historical

A total of 8 parcels with buildings of historic age occur within the APE; however, a historic inventory would be required to determine the eligibility status of these buildings. Because a historic building inventory has not been completed, whether or not historic buildings or structures exist within the APE is currently unknown. Project construction, which will be preceded by R/W acquisition, may cause direct impacts such as loss of or destruction to a given property. An increase in traffic volumes resulting from roadway widening may have indirect auditory or visual impacts. The potential for and severity of direct and indirect impacts cannot be measured until the presence or absence of historic buildings or structures has been determined.

Cultural

Potential direct and indirect impacts to TCPs cannot be ascertained because it is unknown whether TCPs are present within the APE.

Archaeological

Direct impacts could include destruction of identified or as yet unknown archaeological sites as a result of project construction. The project-related increase in vehicular traffic could result in a higher volume of foot traffic within site boundaries, which could lead to artifacts being removed from the site or the destruction of surface features.

7. Air Quality

Some short-term deterioration of air quality may be experienced during construction of the proposed project attributable to the operation of construction equipment and the slower traffic speeds associated with a construction zone. Since these conditions are related to construction, they are only temporary. Fugitive dust generated from construction activities must be controlled in accordance with applicable Tucson and Pima County dust control rules, and special provisions. Prior to initiating any construction activities such as earthmoving, trenching, or roadway construction, the contractor will obtain an activity permit from the Pima County Department of Environmental Quality. The contractor will monitor dust generation from the construction area and limit the amount of dust generated to a maximum opacity of 20 percent. The contractor will follow City of Tucson Department of Transportation standard specifications for dust suppression during construction and will comply with the Stormwater Pollution Prevention Plan (SWPPP) prepared for this project.

8. Water Quality

Of the 59 project area washes, 23 washes have been proposed to be jurisdictional. A preliminary JD has been prepared and will be submitted to the Corps for approval. These washes all drain directly to the Santa Cruz River, a traditionally navigable water.

Because the project would disturb more than 1 acre of land, the project would also require a CWA Section 402 permit for compliance with the AZPDES program. The SWPPP identifies potential sources of stormwater pollution at the construction site and defines methods for preventing stormwater pollution. These best management practices include erosion and sediment control, good housekeeping measures (i.e., site cleanup, hazardous materials management, and equipment maintenance), efforts to protect natural resources, and maintenance/inspection procedures. The SWPPP also identifies procedures to comply with requirements in the General Construction Permit.

Project construction would temporarily disturb and expose soil along the R/W and temporarily introduce potential stormwater pollutants associated with construction equipment and materials. Soil disturbance and excavation will also occur in washes during the installation of the box culverts and associated piping with this project.

Because of drainage improvements contained in this proposed project, impacts to washes would be greater than if the dip crossings were left in place. However, raising the roadway to eliminate dip crossings at washes will decrease soil erosion and water pollution associated with wind, water, and vehicle disturbance.

B. Neighborhood

1. Adjoining Land Uses

The traffic along Silverbell Road within the proposed project area is predicted to grow, based on the Pima Association of Governments model, ranging from 41 percent to 91 percent in the next 30 years. As a result, the project area adjoining land uses are predicted to intensify. Some of this area is planned residential development, but most of the growth will come from areas that are already zoned industrial and have some industrial facilities in the project area (Kittelson & Associates 2009).

2. Recreation

The proposed project would enhance recreation in the area. By adding multiuse paths, sidewalks, and improving the bike lanes, this project would improve connectivity throughout the area and encourage people to use this corridor for recreational purposes (see section III. C. Alternative Modes).

3. Access

Although direct access to Silverbell Road from the adjoining driveways, intersections, and subdivision entrances (minor cross streets) currently exists, the American Association of State Highway and Transportation Officials (AASHTO) considers a divided roadway with a raised median the preferred cross section for arterial streets with a design speed of 45 mph or greater, particularly with high volumes of through traffic. Several of the advantages and disadvantages of a raised median on an arterial street include:

- Advantages:
  - discourages strip development and encourages large planned development (this could also be a disadvantage)
  - reduces mid-block crashes
  - reduces vehicle conflicts at driveways
  - reduces crash severity
- Disadvantages:
  - increases U-turn volume at median openings and intersections
  - can reduce left-turn capacity at a signalized intersection
  - restricts direct access to adjoining properties

Considering that Silverbell Road would function as a principal arterial roadway, and as such the roadway design would provide a high level of traffic safety and operations, a raised median is appropriate. The proposed access plan minimizes the number of median opening while providing as much direct access to adjacent properties as possible while considering the median opening criteria specified by each agency for an arterial roadway (Kittelson & Associates 2009). There would be one full access median opening for each commercial property. In addition, there would be one full access median opening to all dedicated streets, multiple homes, and subdivisions. However, not all driveways will have full access. No access has been eliminated, but in some cases access has been modified, due to the median, and some drivers may have to make a U-turn to access driveways.

4. Character

While the character of the project area would remain suburban, the roadway would take on more urban characteristics by being raised 5 to 6 feet in some areas and the dips in the proposed roadway project would be leveled. Additionally, the sidewalks, multiuse paths and widened bike lanes would increase the urban characteristics of the road. The widening of the roadway from two lanes to four lanes, with the raised center medians would also affect the character of the area giving it a more urban feel.

5. Utilities

The project team would coordinate with all utilities during the planning phase to identify potential impacts. This would continue into final design. The utilities would likely need to relocate some of their facilities, including: Tucson Electric Power overhead and underground lines, Southwest Gas underground gas lines, Comcast underground cable television lines, Qwest overhead phone lines, City of Tucson Water underground water lines and Pima County Wastewater Reclamation Department's underground sewer lines.

6. Noise

The proposed roadway realignment and widening, and associated increase in traffic volumes, would result in an increase in traffic noise levels at noise-sensitive properties within the project area. TNM 2.5 was used to predict traffic noise levels for 2040 based on the proposed roadway alignment and future traffic volumes and vehicle mixes. Future traffic noise levels at the 64 receptors were evaluated for traffic noise impacts and noise abatement consistent with Pima County Department of Transportation's noise abatement policy. The methods, policies, and results are presented in detail in the draft noise report (Kittelson & Associates 2010) prepared for this project. Refer to Figures 3.1–3.7, extracted from the noise report, in Appendix A, for the locations of the receptors and the existing and future traffic noise levels associated with each receptor.

According to Pima County Department of Transportation's noise abatement policy, traffic noise abatement shall be considered if, after applying a 3 dBA benefit for the use of rubberized asphalt concrete (RAC), the predicted exterior noise level at a receptor is 66 dBA or above, or if the future predicted exterior noise levels at a receptor are 15 dBA or greater over existing noise levels. Where noise abatement is warranted for consideration, the measures must be feasible, reasonable, and desired by the affected individuals. Feasibility is the ability to provide abatement in a given location with consideration for the physical and acoustical limitations of the site (i.e., topography, access, and whether or not other noise sources are present). Pima County considers a barrier as noise abatement to be reasonable if the barrier will provide a minimum 5-dBA noise reduction without being more than 10 feet in height, the barrier will benefit more than one sensitive property, and the cost of the barrier does not exceed $35,000 per benefited receiver, at $25 per square foot of constructed barrier.

With no mitigation measures applied (i.e., 3-dBA reduction for RAC, barriers), predicted future traffic noise levels ranged from 46 to 69 dBA at the receptors. These traffic noise levels ranged from a 1 dBA reduction to a 10 dBA increase when compared with existing levels. Receptors located on the eastern side of Silverbell Road between Silver Ridge Lane and Belmont Road were predicted to experience the greatest increase over existing levels under the proposed project, with traffic noise levels

increasing between 8 and 10 dBA over existing conditions. Without the 3-dBA reduction for RAC, traffic noise levels were predicted to meet the 66 dBA threshold for consideration for noise abatement at 17 receptors. With the 3-dBA reduction applied for the use of RAC in the project design, traffic noise levels would be reduced to below the threshold for noise abatement consideration at 16 of the 17 receptors. One receptor (receptor 27) would warrant consideration for traffic noise abatement with a future traffic noise level of 66 dBA after the 3-dBA reduction. This receptor was located west of Silverbell Road, south of El Camino del Cerro. Refer to Table 5 extracted from the noise report, in Appendix A, for the existing and future traffic noise levels associated with each receptor. Table 6 extracted from the noise report, in Appendix A, presents the future traffic noise levels at receptors warranting consideration for noise abatement with the 3-dBA reduction for RAC applied.

Consistent with Pima County's noise abatement policy, a noise barrier was evaluated as noise abatement at this location. The length of the evaluated noise barrier was limited by the sight distance required by motorists at the nearby intersection. Additionally, the location of driveways limited length and/or resulted in openings, rendering the barrier ineffective in providing the 5-dBA noise reduction required to be considered reasonable under Pima County's noise abatement policy. The construction of a noise barrier as mitigation at this location is not recommended.

C. Alternative Modes

1. Bikeway Facilities

The bikeway facilities would be improved as a result of the proposed project. The design would include 6-foot wide bike lanes in both directions for the length of the project.

2. Pedestrian Facilities

The pedestrian facilities would be improved as a result of the proposed project. The east side of the roadway would have a 10-foot-wide asphalt multiuse path from Ina Road to Goret Road. Although there would not be a path or sidewalk on the west side of the roadway, there would be a level area behind the curb (5 to 8 feet wide) for a clear zone that would be compacted earth and could be used by pedestrians and equestrians. South of Goret Road to Grant Road, there would be 5-foot-wide concrete sidewalks on both sides of Silverbell Road.

3. Public Transit Facilities

While Sun Tran has no current plans to extend service along the corridor, the traffic report recommends that bus pullouts be provided on the north and south side intersections of Grant Road.

IV. Proposed Design Features and Mitigation Measures

Additional mitigation measures for this project would be developed by the City during final design; however, below are some proposed standard mitigation measures.

City of Tucson Responsibilities

- The City of Tucson will communicate traffic control measures with the public, local officials, and the media prior to and during construction activities. Communication may include, but is not limited to, media alerts, direct mailings to area businesses and property owners, information on roadway variable message signs, and paid newspaper notices.
- The City of Tucson will provide a construction notice to residents, businesses, and parks in the general project area at least 7 days prior to construction.
- The City of Tucson will ensure that a SWPPP, meeting the requirements of the current AZPDES General Permit for Discharge from Construction Activities to the Waters of the United States issued by ADEQ, is prepared and approved for the project.
- The City of Tucson will approve the SWPPP and, upon approval, shall file a Notice of Intent (NOI) to ADEQ. Upon final acceptance of the project, the local government shall file a Notice of Termination (NOT) for the project to ADEQ.
- No work will occur within jurisdictional waters of the United States until the appropriate CWA 404 permit is obtained.
- An NOI would be filed with the Arizona Department of Agriculture for impacts to plants protected under the Arizona Native Plant Act at least 60 days prior to construction onset. Landscaping and revegetation plans would be developed consistent with the mitigation measures outlined in the City of Tucson Native Plant Preservation Ordinance.
- The City of Tucson will employ a biologist to complete an initial pre-construction survey for burrowing owls 6 months prior to construction in all suitable habitat that will be disturbed. The biologist will possess a burrowing owl survey protocol training certificate issued by the Arizona Game and Fish Department. Upon completion of the surveys, the City of Tucson Department of Transportation Environmental Projects Coordinator will be contacted at (520.837.6624) to provide survey results.
- If unoccupied or occupied burrows are located during the initial pre-construction survey, the City of Tucson will employ a biologist to complete follow-up surveys consistent with the Arizona Game and Fish Department's *Burrowing Owl Project Clearance Guidance for Landowners* (2010) and 96 hours prior to construction consistent with Arizona Department of Transportation guidelines. The biologist will possess a burrowing owl survey protocol training certificate issued by the Arizona Game and Fish Department. Upon completion of the surveys, the City of Tucson Department of Transportation Environmental Projects Coordinator will be contacted at (520.837.6624) to provide survey results.
- If any burrowing owls are located during pre-construction surveys or construction, the City of Tucson will employ a biologist holding a permit from the U.S. Fish and Wildlife Service to relocate burrowing owls from the project area, as appropriate.

- If burrowing owls or active burrows are identified during the pre-construction surveys or during construction, no construction activities shall take place within 100 feet of any active burrow until the owls are relocated.
- If possible, the City of Tucson will conduct a Class III cultural resources survey prior to construction, for those areas not surveyed due to lack of access.
- The City of Tucson will carry out a Section 106 consultation and will submit that consultation to the U.S. Army Corps of Engineers for review prior to submitting the consultation to the State Historic Preservation Office.
- The City of Tucson will perform a historic building inventory and evaluation to identify whether any National Register-eligible buildings aged 50 years or older are present or adjacent to the area of potential effect. Buildings determined eligible for National Register listing that would be adversely affected by the project would be mitigated for.
- The City of Tucson will conduct a traditional cultural properties assessment and will consult with Native American Tribes, to identify traditional cultural properties that could be affected by the project.
- The City of Tucson will prepare and implement a treatment plan for phased data recovery investigations and inadvertent discoveries prior to any ground-disturbing activities associated with roadway improvements in order to avoid adversely affect contributing elements to the district's National Register eligibility.

Contractor Responsibilities

- The Contractor shall notify the public, business owners, and schools of temporary access changes during construction at least 7 calendar days in advance of the change.
- At least 7 calendar days prior to construction, the Contractor shall place advance-warning signs at locations designated by the City of Tucson to notify motorists, pedestrians, and bicyclists of construction-related delays.
- With the exception of temporary, short-term closures (less than 3 hours) of driveways, the Contractor shall maintain driveway access to all businesses, residences, and parks throughout construction. If a given property has multiple driveways, at least one shall remain open at all times.
- Access to adjacent businesses, residences, and parks shall be maintained throughout construction.
- Prior to initiating any construction activities such as earthmoving, trenching, or roadway construction, the Contractor shall obtain an activity permit from Pima County Department of Environmental Quality. The Contractor shall monitor dust generation from the construction area and limit the amount of dust generated to a maximum opacity of 20 percent. The Contractor shall follow City of Tucson Department of Transportation standard specifications for dust suppression during construction and shall comply with the SWPPP prepared for this project.

- The Contractor shall implement and prepare a SWPPP. The Contractor shall also prepare an NOI and an NOT meeting the terms and conditions of the AZPDES general permit.
- Upon approval of the SWPPP, the Contractor shall file an NOI to ADEQ. Upon final acceptance of the project by the City of Tucson, the Contractor shall file an NOT for the project to ADEQ. The Contractor shall provide copies of the completed final SWPPP and the Contractor NOI and NOT to the City of Tucson.
- No work shall occur within jurisdictional waters of the United States until the appropriate CWA 404 permit is obtained.
- If burrowing owls or active burrows are identified during the pre-construction surveys or during construction, no construction activities shall take place within 100 feet of any active burrow until the owls are relocated.
- If any Sonoran desert tortoises are encountered during construction, the contractor shall adhere to the attached Arizona Game and Fish Department's Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects (Revised October 23, 2007).

V. Preliminary Road Design

Currently, preliminary design plans are available for the southern phase of this project. (See Part VII, Exhibits.) This design will be refined and redefined as a part of the DCR and future plans.

A. Identification of Design Elements

This proposed project would take Silverbell Road from two to four lanes. In order to conform to AASHTO guidelines, there would be both horizontal and vertical alignment changes. Drainage improvements including box and pipe culverts would be installed to eliminate the dip crossings where the water over tops the roadway. As a result the roadway will be raised up to five to six feet in some areas. In addition, this proposed project would construct multiuse lanes adjacent to travel lanes and would be suitable for use by bicyclists, disabled vehicles, and other users. Multiuse paths, decomposed granite trails, sidewalks, lighting, and drainage improvements (see the sections, Neighborhood and Alternative Modes, for more information) would also be included. Multiuse paths are separated from the roadway and are intended for use by nonmotorized traffic, including pedestrians and bicyclists. The locations and extents of the multiuse paths, trails, and sidewalks would be finalized during final design.

This project would also include landscaping and hardscaping to improve the look and feel of the area.

VI. Conclusion and Recommendation

The proposed action would widen Silverbell Road from two lanes to four lanes from Grant Road to El Camino del Cerro. The recommended roadway cross section would consist of two 12-foot travel lanes and a 5-foot bike lane in each direction, a 6- to 20-foot-wide raised median, sidewalks, and a pavement drainage system. Additional improvements to Silverbell Road would include: wildlife crossings along the project area; drainage improvements that would raise the roadway at the current dip crossings and place culverts under the roadway, allowing stormwater to flow under the roadway, making this an all weather roadway. In addition, raising the roadway at the dip crossings and vertical and horizontal alignment shifts, would improve the safety of Silverbell Road.

With implementation of the proposed action, the impacts to the environment would include native vegetation removal, and a potential 404 permit for loss of waters of the United States. Recommendations based on a Class III cultural resources survey would result in a Section 106 consultation. There would also be utility relocations and therefore disruptions in service. These disruptions would be coordinated to minimize impacts on businesses and residences. In addition, there will be temporary impacts to air quality during construction. Due to the City of Tucson and Pima County required dust control measures some of these impacts will be mitigated.

VII. Exhibits

A. Maps

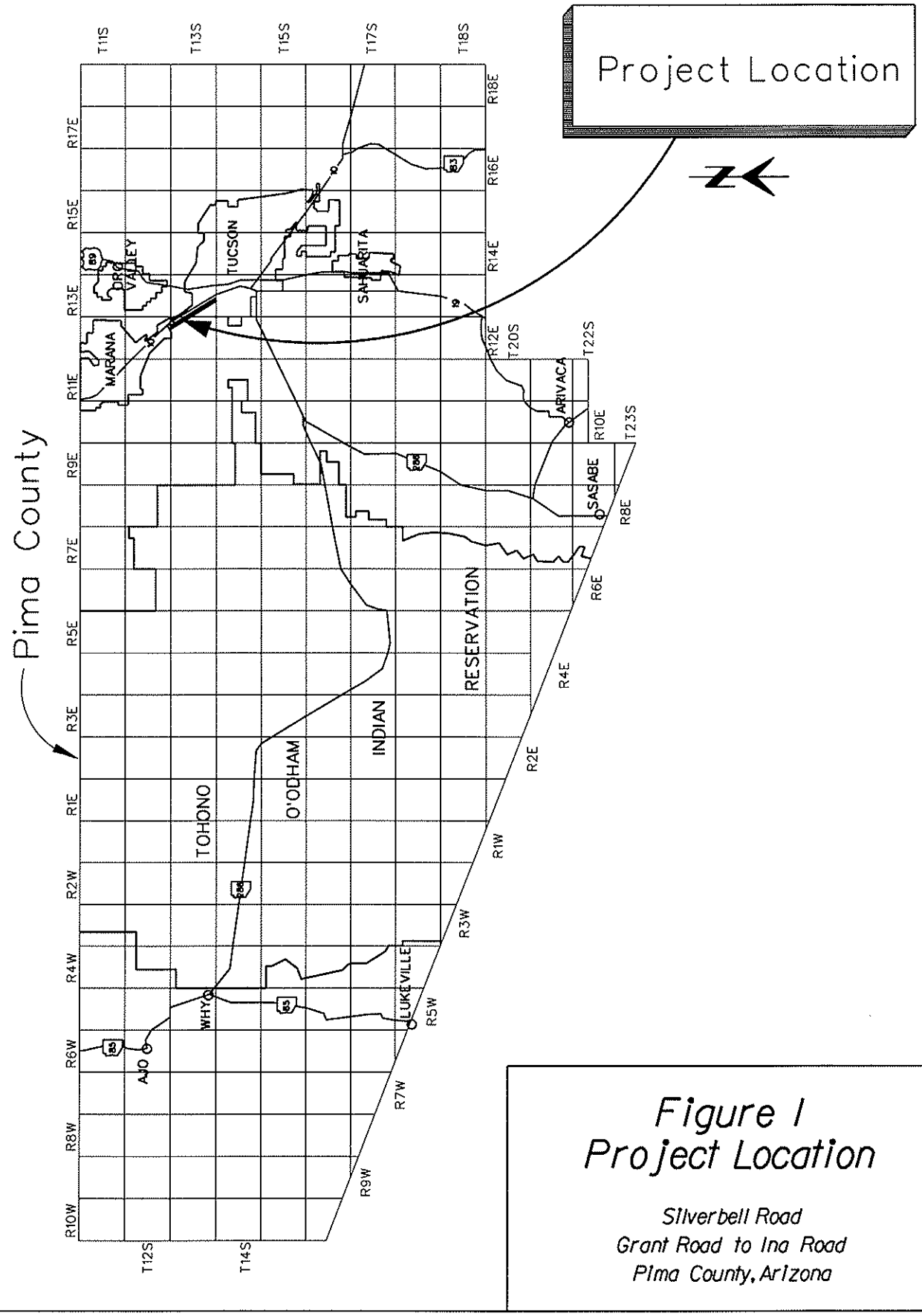

Figure 1
Project Location

Silverbell Road
Grant Road to Ina Road
Pima County, Arizona

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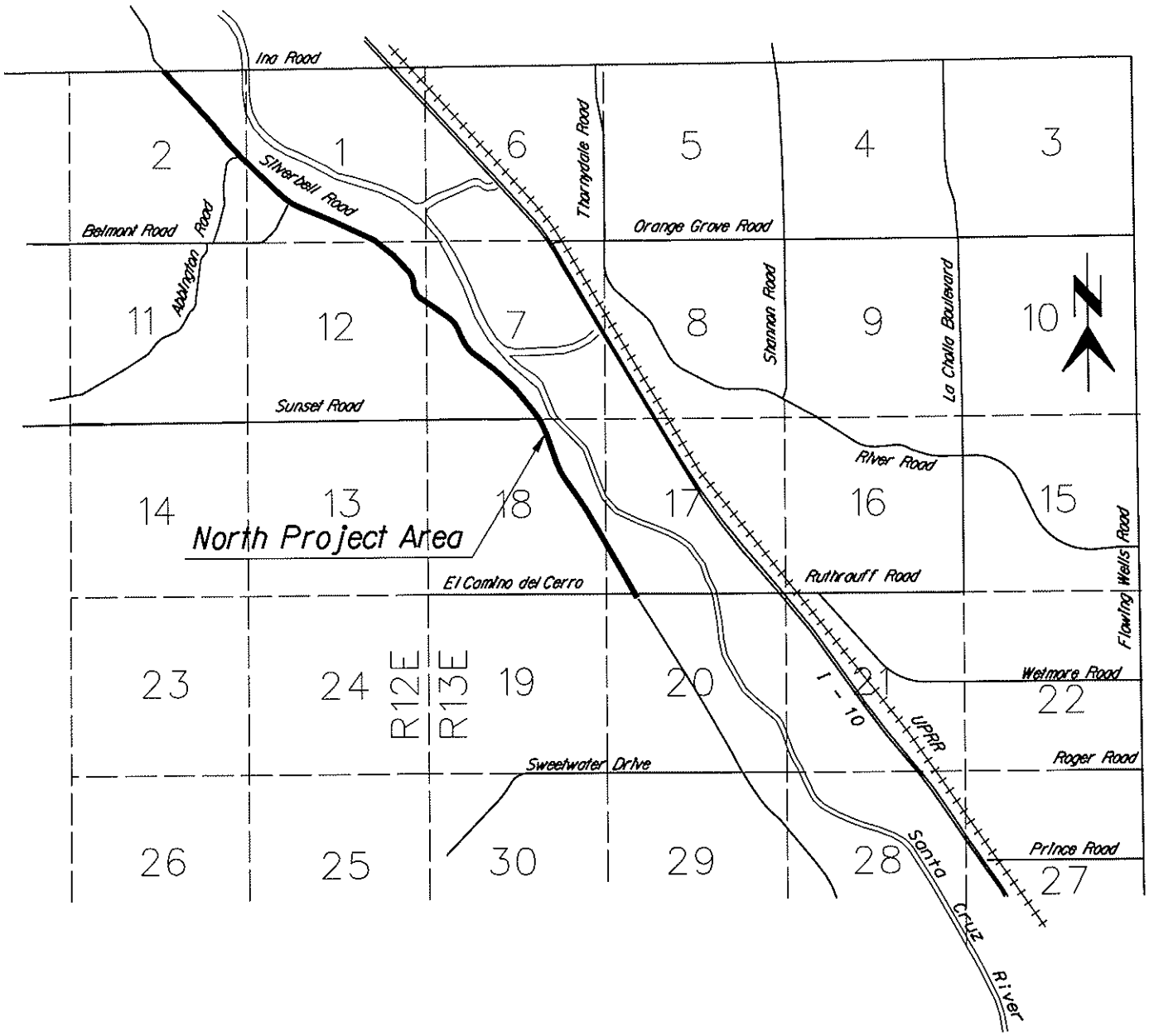

Figure 2
North Project Vicinity

Silverbell Road
El Camino del Cerro to Ina Road

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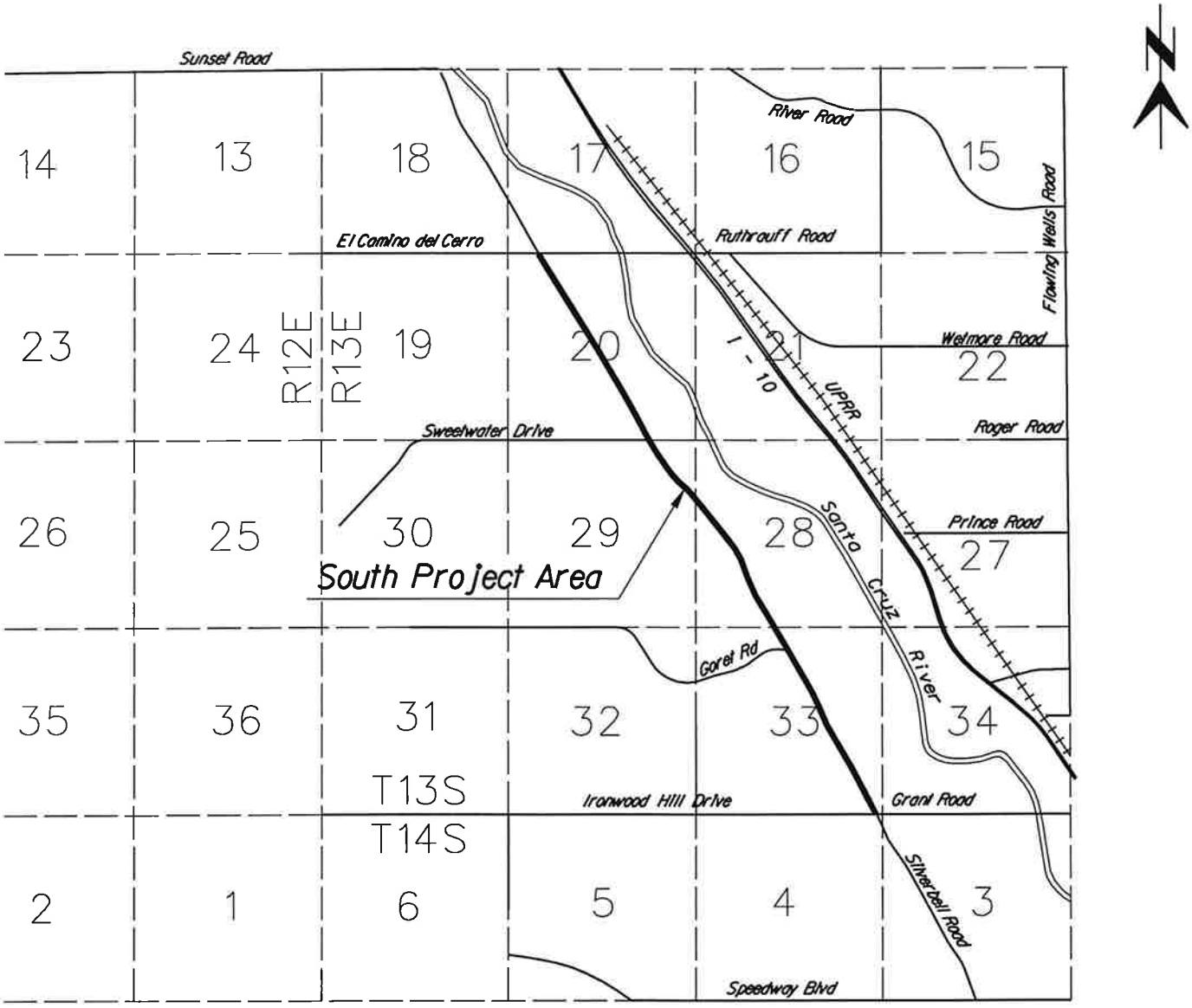

Figure 3
South Project Vicinity

Silverbell Road
Grant Road to El Camino del Cerro

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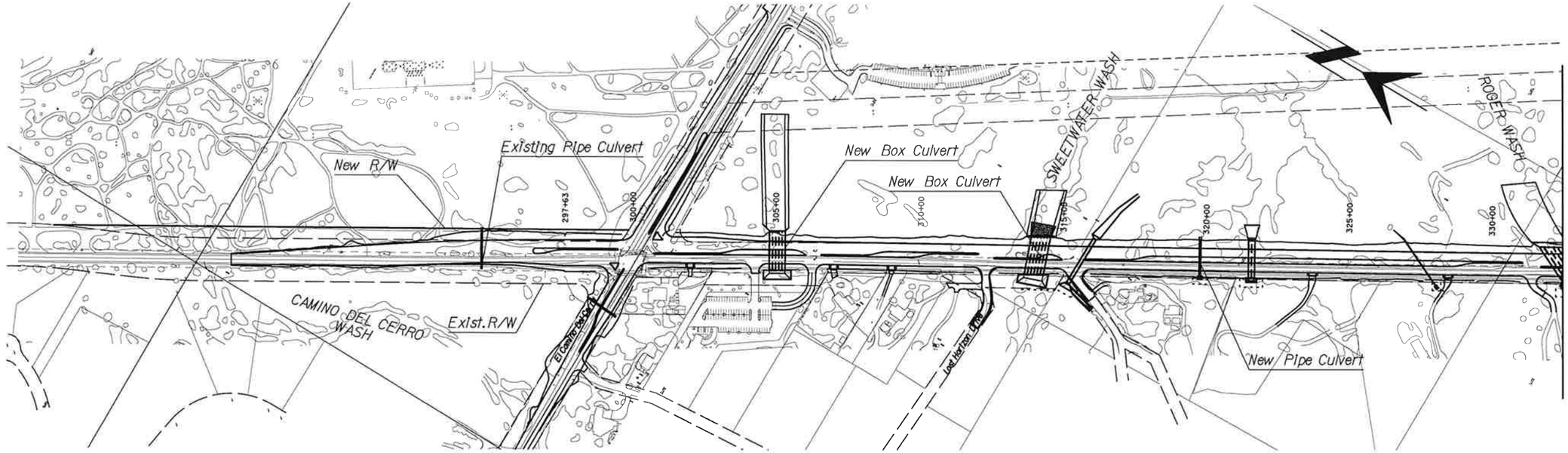
Figure 4. Project limits for Silverbell Road, Grant Road to El Camino del Cerro



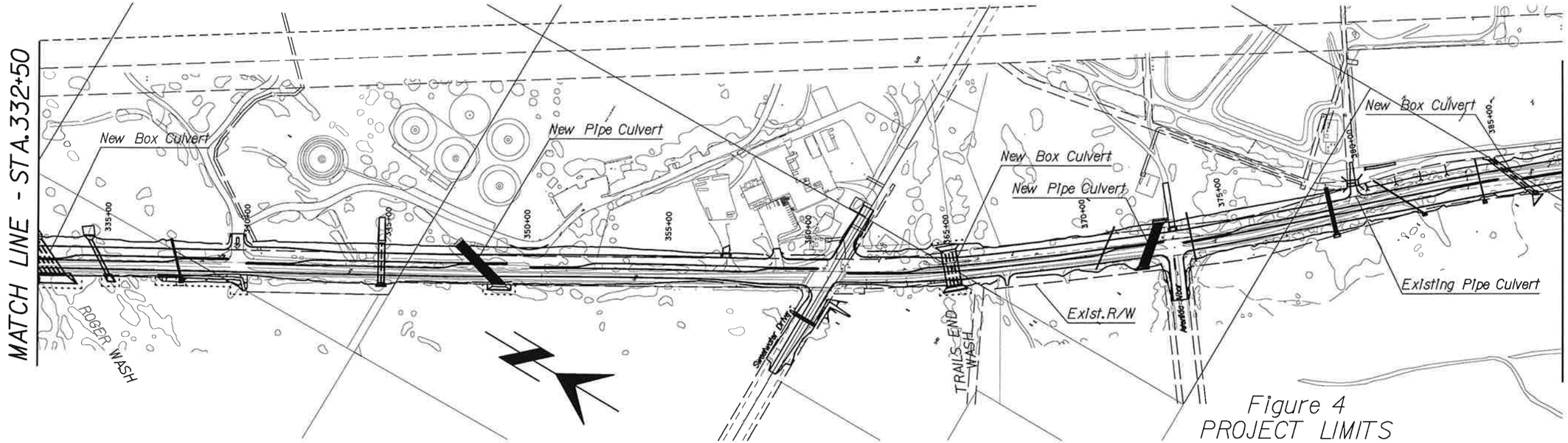


Figure 4
PROJECT LIMITS
SILVERBELL ROAD
El Camino del Cerro to Grant Road

Scale 1"=400' Sheet 1 of 2

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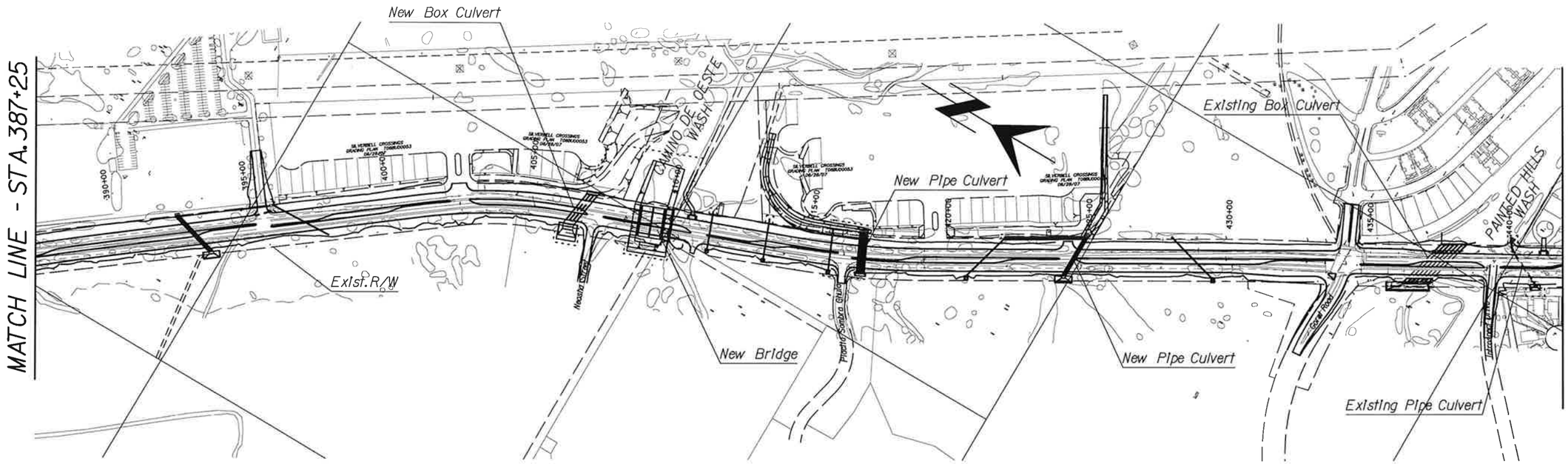

Figure 4
PROJECT LIMITS
SILVERBELL ROAD
El Camino del Cerro to Grant Road

Scale 1"=400' Sheet 2 of 2

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B. Preliminary Road Design Documents

VIII. References

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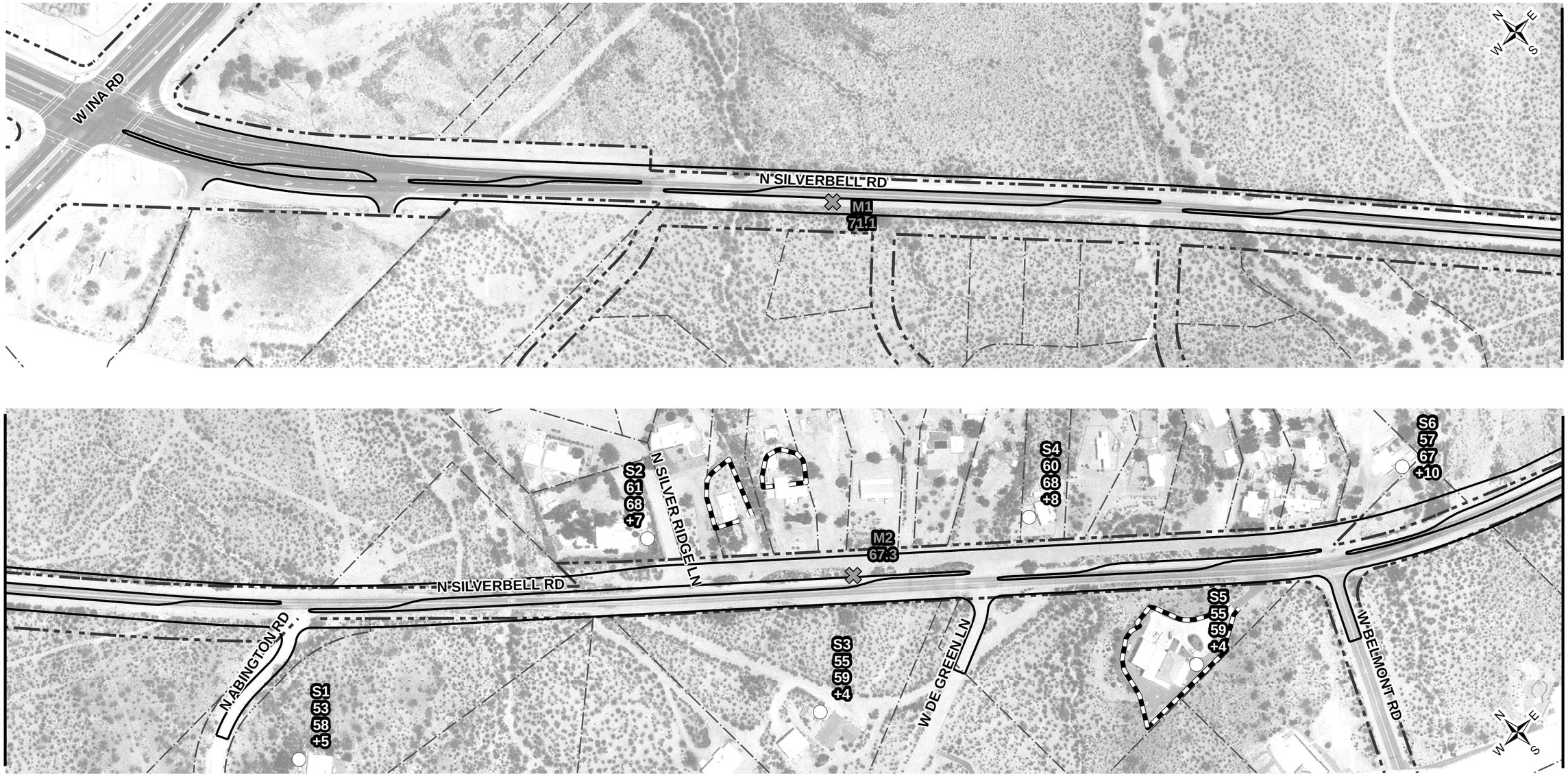
IX. Abbreviation and Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
APE	area of potential effects
AZPDES	Arizona Pollutant Discharge Elimination System
AZSITE	Arizona Register of Historic Sites
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
dBA	A-weighted decibel (scale approximates the sensitivity of the human ear)
DCR	Design Concept Report
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
JD	Jurisdictional Delineation
LMP	Limited Maintenance Plan
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
National Register	National Register of Historic Places
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
PM_{10}	particulate matter (10 microns)
RAC	rubberized asphaltic concrete
R/W	right-of-way
SWPPP	Stormwater Pollution Prevention Plan
TCPs	traditional cultural property
TNM	Traffic Noise Model 2.5

Appendix A

Supplemental Noise Information



LEGEND

- NEW ROADWAY CURB LINE
- WALLS INCLUDED IN MODEL
- EXISTING ROW
- EXISTING PROPERTY LINE

- MEASURED SOUND LEVEL LOCATION
- M4 - MEASURED SOUND LEVEL RECEIVER NUMBER
- 57.4 - MEASURED SOUND LEVEL
- APPROXIMATE PREDICTED SOUND LEVEL LOCATION
- S9 - PREDICTED SOUND LEVEL RECEIVER NUMBER
- 57 - 2010 PREDICTED SOUND LEVEL AT RESIDENCE
- 61 - 2040 PREDICTED SOUND LEVEL AT RESIDENCE
- +4 - SOUND LEVEL INCREASE (2010 TO 2040)

NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE
3.1

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

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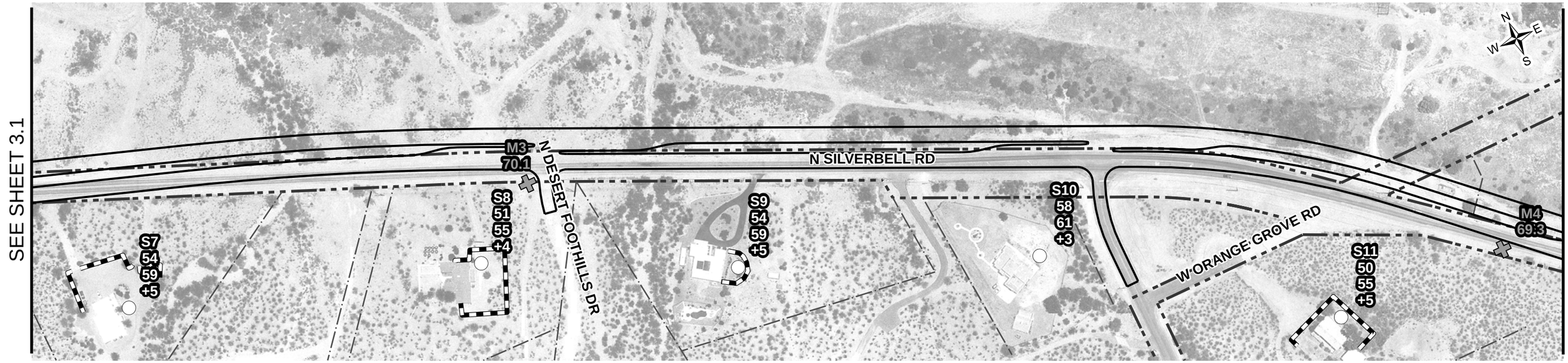

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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.2**

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LEGEND

- NEW ROADWAY CURB LINE
- WALLS INCLUDED IN MODEL
- EXISTING ROW
- EXISTING PROPERTY LINE
- ✖ - MEASURED SOUND LEVEL LOCATION
- M4 - MEASURED SOUND LEVEL RECEIVER NUMBER
- 57.4 - MEASURED SOUND LEVEL
- ○ - APPROXIMATE PREDICTED SOUND LEVEL LOCATION
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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.3**

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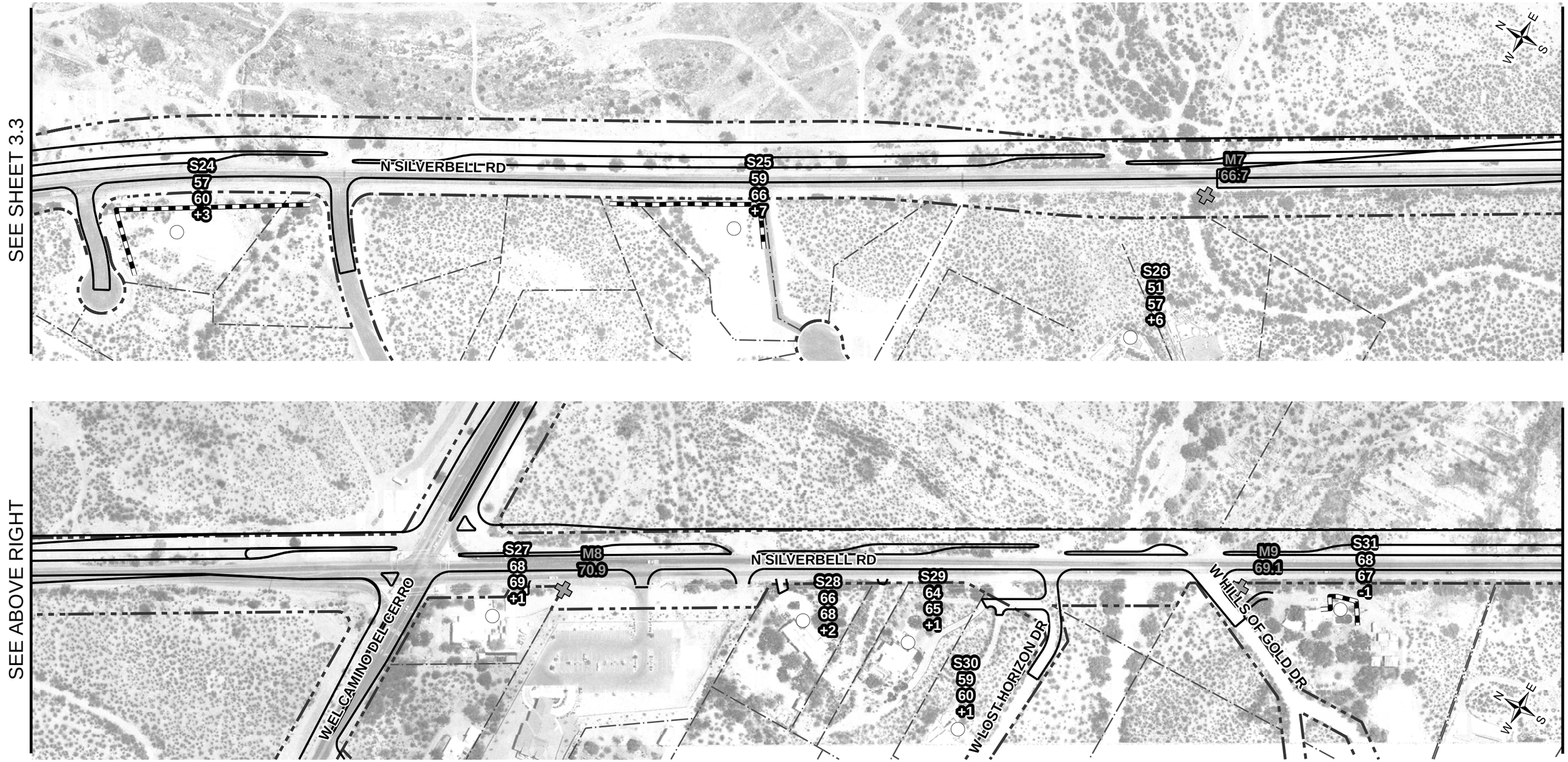

LEGEND

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- WALLS INCLUDED IN MODEL
- EXISTING ROW
- EXISTING PROPERTY LINE

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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.4**

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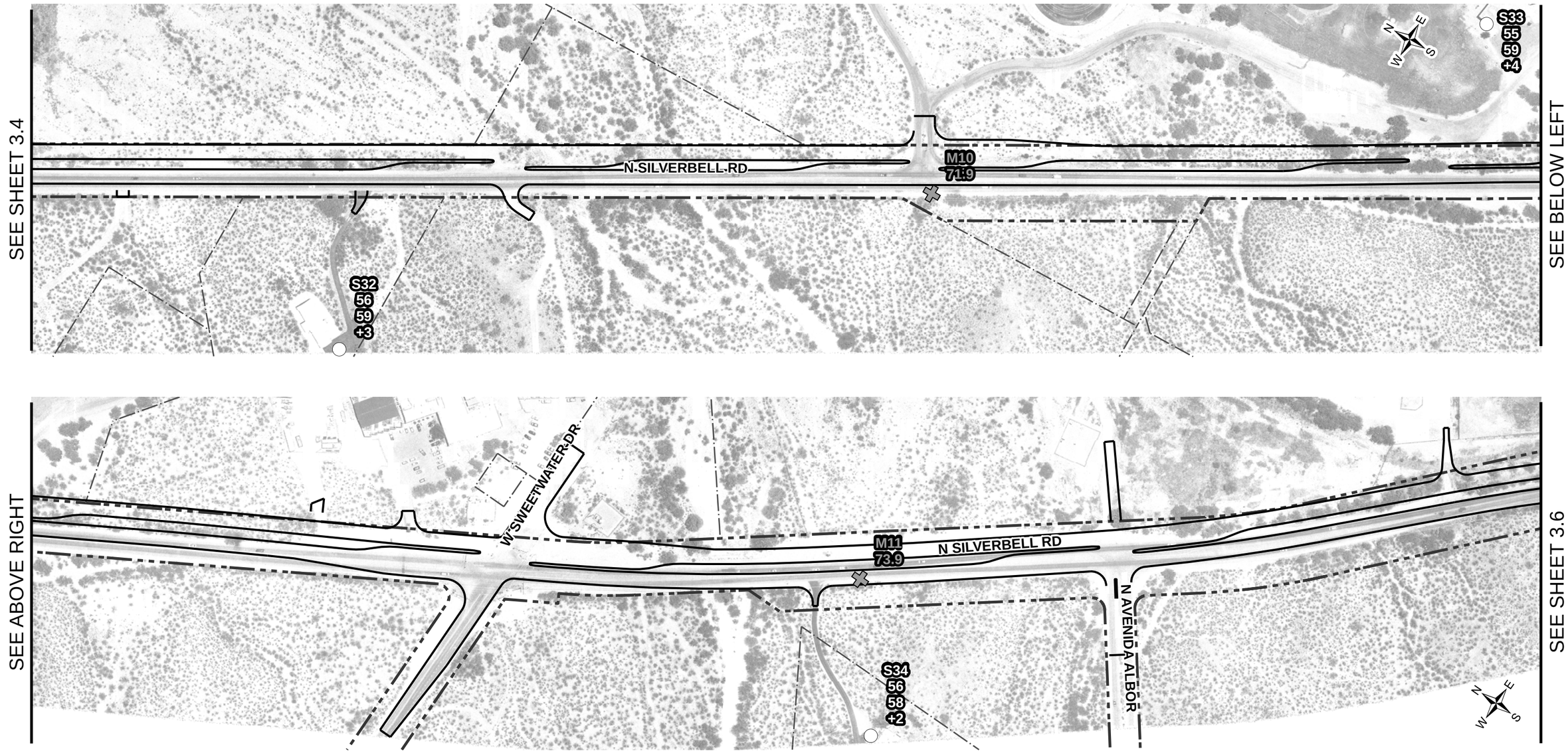

LEGEND

- NEW ROADWAY CURB LINE
- WALLS INCLUDED IN MODEL
- EXISTING ROW
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- ✖ - MEASURED SOUND LEVEL LOCATION
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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.5**

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LEGEND

- NEW ROADWAY CURB LINE
- WALLS INCLUDED IN MODEL
- EXISTING ROW
- EXISTING PROPERTY LINE

- ✖ - MEASURED SOUND LEVEL LOCATION
- M4 - MEASURED SOUND LEVEL RECEIVER NUMBER
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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.6**

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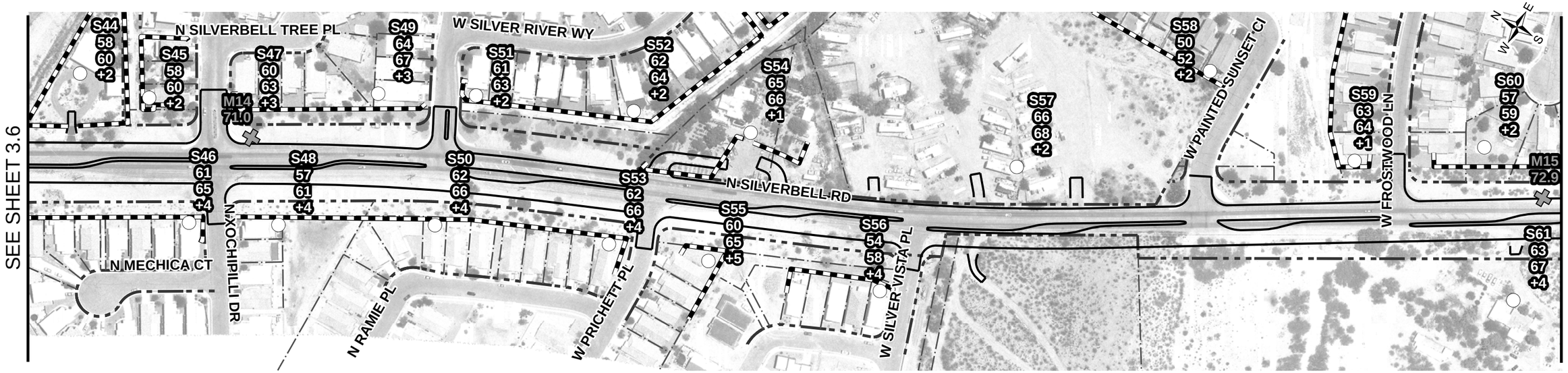

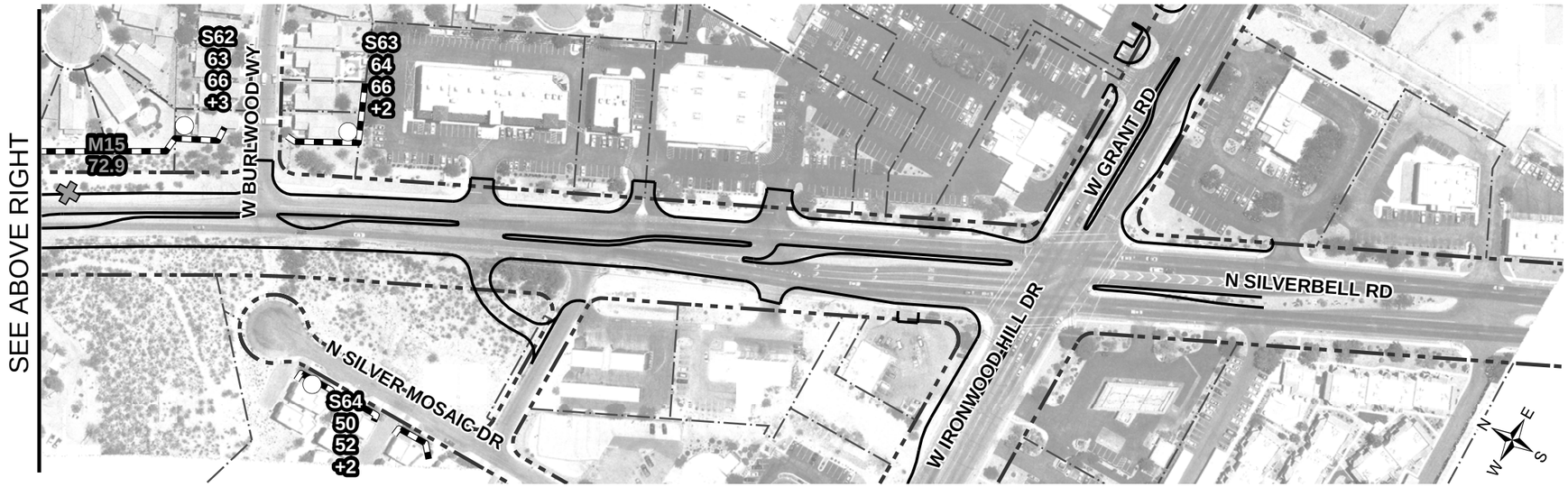

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- WALLS INCLUDED IN MODEL
- EXISTING ROW
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- - MEASURED SOUND LEVEL LOCATION
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NOISE STUDY RESULTS
TUCSON, ARIZONA

FIGURE **3.7**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

Table 5 Predicted Sound Levels

Rec.	Location	2010			2040			Sound Level Increase (dBA)
		Elevation Difference from Roadway Centerline (ft)	Distance from Roadway Centerline (ft)	Predicted Sound Level Existing Leq (dBA)	Elevation Difference from Roadway Centerline (ft)	Distance from Roadway Centerline (ft)	Predicted Sound Level Future Leq (dBA)	
S1	West of Silverbell Rd., South of Abington Rd.	26	298	53	29	293	58	5
S2	East of Silverbell Rd., North of Silver Ridge Ln.	-2	118	61	3	104	**68**	7
S3	West of Silverbell Rd., North of De Green Ln.	11	233	55	18	246	59	4
S4	East of Silverbell Rd., South of De Green Ln.	0	121	60	6	108	**68**	8
S5	West of Silverbell Rd., North of Belmont Ln.	25	177	55	32	192	59	4
S6	North of Silverbell Rd., East Belmont Ln.	4	142	57	6	128	**67**	10
S7	South of Silverbell Rd., East Belmont Ln.	10	239	54	15	265	59	5
S8	South of Silverbell Rd., West of Desert Foothill Dr.	8	184	51	11	224	55	4
S9	South of Silverbell Rd., East of Desert Foothill Dr.	15	197	54	15	234	59	5
S10	South of Silverbell Rd., West of Panorama Dr.	11	178	58	12	214	61	3
S11	South of Silverbell Rd., East of Panorama Dr.	40	228	50	37	280	55	5
S12	West of Silverbell Rd., North of Benjamin Rd.	28	230	48	26	283	52	4
S13	West of Silverbell Rd., South of Benjamin Rd.	22	163	53	23	273	55	2
S14	West of Silverbell Rd., North of Mallow Ln.	20	246	47	23	239	52	5
S15	West of Silverbell Rd., North of Mallow Ln.	12	297	45	14	310	49	4
S16	West of Silverbell Rd., South of Mallow Ln.	15	161	55	16	169	60	5
S17	West of Silverbell Rd., North of Sunset Dune Pl.	25	117	52	25	112	57	5
S18	West of Silverbell Rd., North of Sunset Dune Pl.	20	126	50	18	122	54	4
S19	West of Silverbell Rd., South of Sunset Dune Pl.	39	262	50	36	263	55	5

S20	West of Silverbell Rd., South of Sunset Rd	24	733	41	25	743	46	5
S21	West of Silverbell Rd., South of Sunset Rd	27	261	53	25	262	60	7
S22	West of Silverbell Rd., South of Sunset Rd	10	210	56	9	242	61	5
S23	West of Silverbell Rd., North of Kiley Ct.	43	155	59	39	191	**65**	6
S24*	West of Silverbell Rd., South of Kiley Ct.	8	105	57	3	145	60	3
S25*	West of Silverbell Rd., South of Gracious Ct.	12	91	59	8	129	**66**	7
S26	West of Silverbell Rd., South of Gracious Ct.	51	309	51	51	349	57	6
S27	West of Silverbell Rd., South of El Camino Del Cerro	5	81	**68**	11	127	**69**	1
S28	West of Silverbell Rd., North of Lost Horizon Dr.	7	100	**66**	11	140	**68**	2
S29	West of Silverbell Rd., North of Lost Horizon Dr.	8	145	64	12	182	65	1
S30	West of Silverbell Rd., North of Lost Horizon Dr.	27	315	59	29	352	60	1
S31	West of Silverbell Rd., South of Hill of Gold Dr.	9	81	**68**	10	116	**67**	-1
S32	West of Silverbell Rd., South of Hill of Gold Dr.	31	332	56	32	367	59	3
S33	East of Silverbell Rd., Christopher Columbus Park	3	316	55	5	276	59	4
S34	West of Silverbell Rd., North of Avenida Albor	21	328	56	25	340	58	2
S35	East of Silverbell Rd., Silverbell Golf Course	-2	238	58	2	229	60	2
S36*	East of Silverbell Rd., North of Neosha St.	-2	124	61	0	114	64	3
S37*	East of Silverbell Rd., North of Neosha St.	4	133	61	7	126	63	2
S38	West of Silverbell Rd., South of Neosha St.	21	357	50	23	360	52	2
S39*	East of Silverbell Rd., North of Placita Sombra Chula	4	185	59	5	186	61	2
S40*	East of Silverbell Rd., South of Placita Sombra Chula	2	157	62	6	162	64	2
S41*	East of Silverbell Rd., South of Goret Rd.	0	161	60	5	168	61	1
S42*	East of Silverbell Rd., South of Goret Rd.	0	393	51	3	404	52	1
S43	West of Silverbell Rd., South of Introspect Dr.	6	128	63	8	128	**66**	3

S44	East of Silverbell Rd., North of Silver Bell Tree Dr.	2	161	58	4	174	60	2
S45	East of Silverbell Rd., North of Silver Bell Tree Dr.	3	128	58	5	128	60	2
S46	West of Silverbell Rd., North of Silver Bell Tree Dr.	7	115	61	10	116	65	4
S47	East of Silverbell Rd., South of Silver Bell Tree Dr.	2	114	60	4	125	63	3
S48	West of Silverbell Rd., South of Silver Bell Tree Dr.	8	131	57	11	119	61	4
S49	East of Silverbell Rd., North of Silver Arrow Dr.	4	125	64	8	142	**67**	3
S50	West of Silverbell Rd., North of Prichett Pl.	7	131	62	9	107	**66**	4
S51	East of Silverbell Rd., South of Silver Arrow Dr.	3	128	61	5	152	63	2
S52	East of Silverbell Rd., South of Silver Arrow Dr.	0	149	62	3	158	64	2
S53	West of Silverbell Rd., North of Prichett Pl.	5	115	62	8	106	**66**	4
S54	East of Silverbell Rd., South of Prichett Pl.	1	123	65	5	144	**66**	1
S55	West of Silverbell Rd., South of Prichett Pl.	6	124	60	11	115	65	5
S56	West of Silverbell Rd., North of Silverbell Vista Pl.	7	141	54	11	135	58	4
S57	East of Silverbell Rd., North of Silverbell Vista Pl.	4	98	**66**	1	116	**68**	2
S58	East of Silverbell Rd., North of Painted Sunset Cl.	10	283	50	14	302	52	2
S59	East of Silverbell Rd., North of Splitwood Ave.	3	103	63	6	121	64	1
S60	East of Silverbell Rd., South of Splitwood Ave.	-1	129	57	2	142	59	2
S61	West of Silverbell Rd., South of Splitwood Ave.	6	159	63	10	159	**67**	4
S62	East of Silverbell Rd., North of Burlwood Way	2	130	63	7	137	**66**	3
S63	East of Silverbell Rd., South of Burlwood Way	2	129	64	7	133	**66**	2
S64	West of Silverbell Rd., North of Silver Sun Dr.	24	242	50	29	237	52	2

*Future 5-feet retaining walls were assumed on the property lines of proposed developments.

Rubberized pavement has the potential to reduce sound levels up to 5 decibels, versus conventional asphalt pavements. The City of Tucson and Pima County have adopted the use of rubberized asphalt to increase pavement life and as a sound mitigation measure. Based on the results of studies performed by ADOT and additional studies in Oro Valley, Scottsdale and Sacramento, Pima County has approved the use of rubberized pavement as a mitigation measure for noise abatement.

Rubberized asphalt pavement will be used on the Silverbell Road corridor. Per the Pima County procedure, a sound level reduction benefit of 3.0 dBA is applied to the predicted sound levels. Table 6 provides the receiver locations where the predicted sound level meets the 66 dBA threshold for consideration of noise mitigation. The rubberized asphalt benefit reduction drops all the sound levels below the 66 dBA threshold, except for receiver S27.

Table 6 Predicted Sound Levels with RAC Reduction Benefit

Loc.	Location	Predicted Sound Level without 3 dBA RAC Reduction Benefit	Predicted Sound Level with 3 dBA RAC Reduction Benefit
S2	East of Silverbell Rd., North of Silver Ridge Ln.	68	65
S4	East of Silverbell Rd., South of De Green Ln.	68	65
S6	North of Silverbell Rd., East Belmont Ln.	67	64
S23	West of Silverbell Rd., North of Wildlife Pl.	65	62
S25	West of Silverbell Rd., North of Wildlife Pl.	66	63
S27	West of Silverbell Rd., South of Camino Del Cerro	**69**	**66**
S28	West of Silverbell Rd., North of Lost Horizon Dr.	68	65
S31	West of Silverbell Rd., South of Hill of Gold Dr.	67	64
S43	West of Silverbell Rd., South of Introspect Dr.	66	63
S49	East of Silverbell Rd., North of Silver Arrow Dr.	67	64
S50	West of Silverbell Rd., North of Pritchett Pl.	66	63
S53	West of Silverbell Rd., North of Pritchett Pl.	66	63
S54	East of Silverbell Rd., South of Pritchett Pl.	66	63
S57	East of Silverbell Rd., North of Silverbell Vista Pl.	68	65
S61	West of Silverbell Rd., South of Splitwood Ave.	67	64
S62	East of Silverbell Rd., North of Burlwood Way	66	63
S63	East of Silverbell Rd., South of Burlwood Way	66	63

SOUND WALLS

Construction of sound walls is the most common mitigation method used in an attempt to reduce sound levels in urban levels. The City of Tucson and Town of Marana prefer not to implement sound walls for the following reasons.