



Tucson Parks and Recreation

Atturbury Wash Greenway Master Plan

Irvington Road to Pantano Wash
April 2009

Prepared by:

McGann & Associates
Landscape Architects and Planners

In association with:

GLHN - Architects and Engineers
RECON - Environmental Conservation Biologists
Structural Grace - Structural Engineers
Gordley Design Group - Public Participation Coordinators

Acknowledgments

City of Tucson - Mayor and Council

Robert Walkup Mayor
Regina Romero Council Member, Ward 1
Rodney Glassman Council Member, Ward 2
Karen Uhlich Council Member, Ward 3
Shirley Scott Council Member, Ward 4
Steve Leal Council Member, Ward 5
Nina Trasoff Vice Mayor / Council Member, Ward 6

City of Tucson - Ward 4 Council Office

Renée Sowards Council Administrative Assistant
Maximiliano "Max" Torres Council Administrative Assistant
Andy Squire Council Administrative Assistant
Lannie Bugarin Executive Assistant
Judith Gonzalez Office Assistant

City of Tucson - Parks and Recreation Department

Fred Gray Director
Jim Conroy East District Administrator
Midge Irwin East District Assistant Administrator
Howard Dutt Project Manager
Glena Emslie Manager, Lakeside Park
Marci Gregg Manager, Lincoln Regional Park
Michael Hayes Director of Golf
Frank Sousa Department of Transportation / Flood Control
Vince Catelano Department of Transportation / Transportation Planning

Pima Community College

William R. Ward Assistant Vice Chancellor - Facilities

Project Stakeholders

Michael Lyman President, Friends of Atturbury Wash
Kendall Groesen Audubon Society

Consultant Team

Don McGann, McGann & Associates Project Manager
Beth Darnell, McGann & Associates Assistant Project Manager
Scott Martinez, McGann & Associates Assistant Project Manager
Jan Gordley, Gordley Design Group Public Participation Coordinator
Sue Parcells, Gordley Design Group Public Participation Coordinator
Lori Woods, RECON Environmental Conservation Biologist
Carianne Funicelli, RECON Environmental Conservation Biologist
John McGann, GLHN Architects and Engineers Civil Engineer
Claudia Perchinelli, Structural Grace Structural Engineer

Table of Contents

- 1. Introduction:**
 - Introduction 1-1
 - The Greenway Concept 1-1
 - Existing Conditions within the Project Corridor 1-3
 - Purpose and Need 1-3
 - The Planning Process 1-4
 - Project Goals 1-4
 - Organization of Document 1-5
 - Proposed Project Phasing 1-5

- 2. Fred Enke Drive Segment**
 - Existing Conditions - General 2-1
 - Existing Conditions - Hydrology 2-3
 - Existing Conditions - Biological Resources 2-3
 - Existing Conditions - Visual Resources 2-3
 - Existing Conditions - Cultural Resources 2-3
 - Existing Conditions - Utilities 2-4
 - Other Existing Conditions (Proximity to Golf Course) 2-4
 - Segment Specific Opportunities 2-6
 - Proposed Alignment 2-6
 - Proposed Cross-Section(s) 2-6
 - Habitat Improvements 2-7
 - Irrigation Improvements 2-7
 - Structures and Other Special Features 2-7
 - Construction Quantities and Cost Estimate 2-8

- 3. Lincoln Park Segment**
 - Existing Conditions - General 3-1
 - Existing Conditions - Hydrology 3-4
 - Existing Conditions - Biological Resources 3-4
 - Existing Conditions - Visual Resources 3-4
 - Existing Conditions - Cultural Resources 3-5
 - Existing Conditions - Utilities 3-5
 - Other Existing Conditions (Planned Operations and Maintenance Facility) 3-5
 - Other Existing Conditions (Proximity to Park and School Facilities) 3-6
 - Other Existing Conditions (Lack of Internal Connections between Upper and Lower Lincoln Park) .. 3-6
 - Other Existing Conditions (The Atturbury - Lyman Bird and Animal Sanctuary) 3-6
 - Segment Specific Opportunities 3-7
 - Proposed Alignment 3-7
 - Proposed Cross-Section 3-8
 - Habitat Improvements 3-10
 - Irrigation Improvements 3-10
 - Structures and Other Special Features 3-10
 - Other Design Issues (Easement or IGA for Routing Greenway through PCC East Campus) 3-11
 - Construction Quantities and Cost Estimate 3-11

Table of Contents

4. Escalante Road to Stella Road Segment	
Existing Conditions - General	4-1
Existing Conditions - Hydrology	4-4
Existing Conditions - Biological Resources	4-5
Existing Conditions - Visual Resources	4-5
Existing Conditions - Cultural Resources	4-6
Existing Conditions - Utilities	4-6
Other Existing Conditions (Tributary Channel and Use of West Bank for Trash Collection)	4-6
Segment Specific Opportunities	4-7
Proposed Alignment	4-7
Proposed Cross-Section(s)	4-8
Habitat Improvements	4-10
Irrigation Improvements	4-10
Structures and Other Special Features	4-10
Other Design Issues (Utility Coordination)	4-11
Construction Quantities and Cost Estimate	4-11
5. Lakeside Park Segment	
Existing Conditions - General	5-1
Existing Conditions - Hydrology	5-4
Existing Conditions - Biological Resources	5-4
Existing Conditions - Visual Resources	5-4
Existing Conditions - Cultural Resources	5-5
Existing Conditions - Utilities	5-5
Other Existing Conditions (Access Drive to Boat Ramp)	5-5
Other Existing Conditions (Steep Grades along Sarnoff Drive)	5-5
Segment Specific Opportunities	5-6
Proposed Alignment	5-6
Proposed Cross-Section(s)	5-7
Habitat Improvements	5-8
Irrigation Improvements	5-9
Structures and Other Special Features	5-9
Construction Quantities and Cost Estimate	5-9
6. Golf Links Road to Pantano Wash Segment	
Existing Conditions - General	6-1
Existing Conditions - Hydrology	6-4
Existing Conditions - Biological Resources / Habitat	6-4
Existing Conditions - Visual Resources	6-4
Existing Conditions - Cultural Resources	6-4
Existing Conditions - Utilities	6-5
Other Existing Conditions (Planned Development of Pantano River Park)	6-5
Segment Specific Opportunities	6-5

Table of Contents

Proposed Alignment	6-6
Proposed Cross-Section	6-6
Habitat Improvements	6-6
Irrigation Improvements	6-7
Structures and Other Special Features	6-7
Construction Quantities and Cost Estimate	6-8

7. Greenway / Roadway Intersections

Introduction	7-1
Irvington Road (Existing Conditions)	7-1
Irvington Road (Proposed Improvements)	7-1
Escalante Road (Existing Conditions)	7-2
Escalante Road (Proposed Improvements)	7-2
Stella Road (Existing Conditions)	7-3
Stella Road (Proposed Improvements)	7-4
Golf Links Road (Existing Conditions)	7-4
Golf Links Road (Proposed Improvements)	7-6

Appendices:

- Appendix A - Construction Cost Estimates
- Appendix B - Bridge Structures Report
- Appendix C - Recommended Plant List
- Appendix D - Invasive Species Management Guidelines
- Appendix E - Rezoning Ordinance

1. Introduction:	
Figure 1-A: Location Map	1-2
2. Fred Enke Drive Segment	
Figure 2-A: Location Map	2-2
Figure 2-B: Golf Course Hazzard Zone	2-5
Figure 2-C: Typical Greenway Cross-Section - Fred Enke Drive Segment	2-7
Figure 2-D: Fred Enke Drive Segment - Key Map	2-9
Figure 2-E: Fred Enke Drive Segment - Areas A and B	2-10
Figure 2-F: Fred Enke Drive Segment - Areas C and D	2-11
3. Lincoln Park Segment	
Figure 3-A: Location Map	3-3
Figure 3-B: Typical Greenway Cross-Section Areas of Lincoln Park with Restricted Corridor Width	3-8
Figure 3-C: Typical Greenway Cross-Section Areas of Lincoln Park with Adequate Spaces for Divided Path and Trail	3-9
Figure 3-D: Typical Greenway Cross-Section Areas of Lincoln Park where Path and Trail Follow Separate Dirt Tracks	3-9
Figure 3-E: Lincoln Park Segment - Key Map	3-12
Figure 3-F: Lincoln Park Segment - Areas A and B	3-13
Figure 3-G: Lincoln Park Segment - Areas C and D	3-14
Figure 3-H: Lincoln Park Segment - Areas E and F	3-15
Figure 3-I: Lincoln Park Segment - Area G	3-16
Figure 3-J: Lincoln Park Segment - Area H	3-17
Figure 3-K: Lincoln Park Segment - Area I	3-18
4. Escalante Road to Stella Road Segment	
Figure 4-A: Location Map	4-3
Figure 4-B: Existing Channel Bank Condition East Bank - Between Escalante Road and Stella Road	4-4
Figure 4-C: Typical Greenway Cross-Section Crossing of Atturbury Wash at Escalante Road	4-8
Figure 4-D: Typical Greenway Cross-Section Escalante Road - North Approximately 600 Feet	4-9
Figure 4-E: Typical Greenway Cross-Section Between Escalante Road and Stella Road	4-9
Figure 4-F: Typical Greenway Cross-Section Stella Road - South Approximately 1,000 Feet	4-9
Figure 4-G: Escalante Road to Stella Road Segement - Key Map	4-12
Figure 4-H: Escalante Road to Stella Road Segment - Area A	4-13
Figure 4-I: Escalante Road to Stella Road Segment - Area B	4-14
Figure 4-J: Escalante Road to Stella Road Segment - Areas C and D	4-15
Figure 4-K: Escalante Road to Stella Road Segment - Areas E and F	4-16
Figure 4-L: Escalante Road to Stella Road Segement - Area G	4-17

5. Lakeside Park Segment
Figure 5-A: Location Map 5-3
Figure 5-B: Typical Greenway Cross-Section - Adjacent to Lakeside Park 5-7
Figure 5-C: Typical Greenway Cross-Section - Adjacent to Boat Launch Parking Lot 5-8
Figure 5-D: Typical Greenway Cross-Section - Lakeside Park to Golf Links Road 5-8
Figure 5-E: Lakeside Park Segment - Key Map 5-10
Figure 5-F: Lakeside Park Segment - Areas A and B 5-11
Figure 5-G: Lakeside Park Segment - Areas C and D 5-12
Figure 5-H: Lakeside Park Segment - Area E 5-13
Figure 5-I: Lakeside Park Area - Multi-Use Path Profile 5-14

6. Golf Links Road to Pantano Wash Segment
Figure 6-A: Location Map 6-3
Figure 6-B: Typical Greenway Cross-Section - Golf Links Road to Pantano Wash 6-6
Figure 6-C: Golf Links Road to Pantano Wash Segment - Key Map 6-9
Figure 6-D: Golf Links Road to Pantano Wash Segment - Areas A and B 6-10
Figure 6-E: Golf Links Road to Pantano Wash Segment - Area C 6-11

7. Greenway / Roadway Intersections
Figure 7-A: Irvington Road - Greenway Intersection 7-7
Figure 7-B: Escalante Road - Greenway Intersection 7-8
Figure 7-C: Stella Road - Greenway Intersection 7-9
Figure 7-D: Golf Links Road - Greenway Intersection 7-10

Introduction:

The Atturbury Wash is a natural drainageway located within the City of Tucson, Arizona. It headwaters in Section 31 (T15S-R16E) and flows northwest to its confluence with the Pantano Wash in Section 21 (T14S-R15E). (See Figure 1-A).

This Atturbury Wash Greenway Master Plan addresses a portion of the overall wash corridor. The project limits extend from Irvington Road, which is also the northern boundary of Davis-Monthan Air Force Base, to the Pantano Wash, a distance of approximately 2-1/2 miles.

The concept of a multi-use linear park or greenway along the subject reach of the Atturbury Wash had its origins in the 1988 Pima County Regional Trails Master Plan. It is was subsequently identified in the City of Tucson Parks and Recreation Department's 2006 Strategic Plan. Both of these documents called for the development of a non-motorized, multi-use public trail along the Atturbury Wash.

The Greenway Concept:

Within the City of Tucson and adjacent jurisdictions, a system of river parks is being planned and constructed. These river parks, or linear parks, are being developed along the metropolitan area's major watercourses, the Santa Cruz River, the Rillito River, the Pantano Wash, and the Canada del Oro Wash. Improvements within these River Park corridors include paved multi-use paths, soft-surface trails, public parking areas, small plazas, restroom buildings, public art, landscape improvements, habitat plantings, and supporting irrigation systems. The river parks are intended to serve as the spine of the metropolitan area's overall linear park and trail system.

While the river parks are an important and valuable recreation resource, they are also expensive and require a wide corridor of land to construct. Due to the cost of the improvements, their construction is typically limited to areas where the watercourse banks have been stabilized to prevent damage to the constructed facilities during storm events. This combination of features is only found along the major watercourses noted above.

There are, however, numerous small watercourses, such as the Atturbury Wash, that can serve as corridors with paths, trails, and related improvements. Along these corridors the City of Tucson plans to develop a system of greenways.

Greenways, as elements of the City of Tucson's linear park and trail system, typically:

- Follow natural drainageways and riparian corridors but can also extend through natural upland areas and/or developed sites.
- Are constructed within public rights-of-way of variable width.

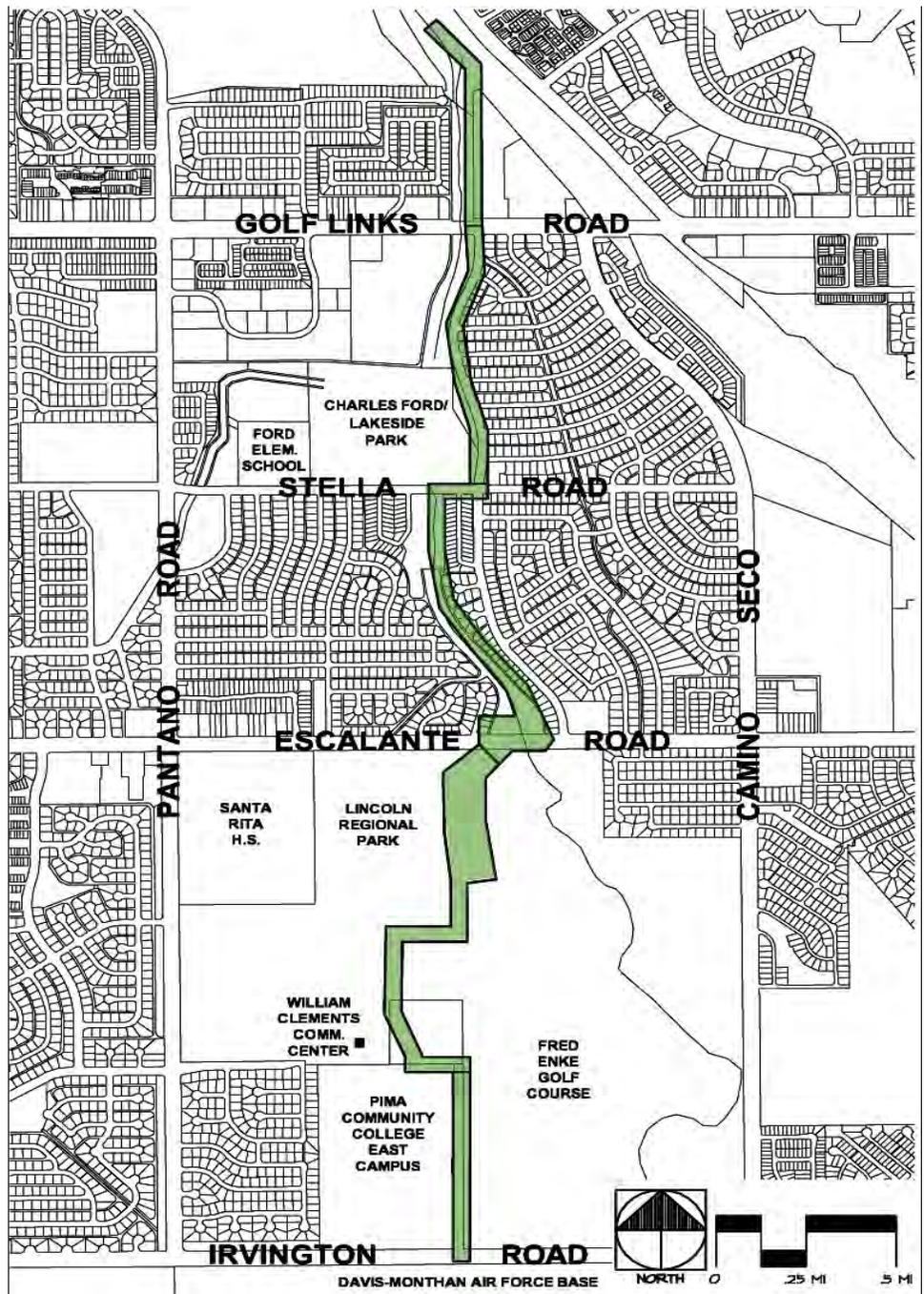


Figure 1-A: Location Map

The Greenway Concept (Continued):

- Have an accessible paved multi-use path for non-motorized recreational and alternate-modes commuter use.
- Include a soft-surface trail adjacent or parallel to the paved pathway. (Trails may be on one or both sides of the subject wash or drainageway).
- Connect public parks, schools, and other community facilities.
- Have preserved native vegetation and/or constructed landscape elements.
- Include multiple entrances that allow local residents to conveniently access the greenway.
- Include small rest stops with benches and other site furniture.

Various portions of the Atturbury Wash Greenway will include the features noted above.

In contrast to river parks, greenways typically do not:

- Include large on-site motor vehicle parking areas but rather utilize parking facilities at adjacent/nearby parks, schools, or other public facilities.
- Include restroom buildings.
- Include entry lighting except as may be deemed important for public safety.

Existing Conditions within the Project Corridor:

Portions of the Atturbury Wash corridor within the project limits are in a natural condition with native xero-riparian vegetation. Other portions of the wash have been modified through channelization and other disturbances. Stormwater flows in the Atturbury Wash are intermittent, but can be significant. Based on Tucson Stormwater Management System (TSMS) data the flows associated with the 100-year storm event range from 2,572 cubic feet per second (cfs) at the Escalante Road crossing to 4,382 cfs at the Atturbury's confluence with the Pantano Wash.

In addition to the potential for the Atturbury Wash Greenway to serve as a stand-alone recreational resource, it also has the potential to provide connections between several community facilities, including: Fantasy Island Trails Park, Pima Community College East Campus, Lincoln Park, Clements Community Center, Lincoln Park Festival and Special Events Area, Atturbury - Lyman Bird and Animal Sanctuary, Lakeside Park, and the Pantano Wash Linear Park. Other community facilities near the project corridor include: Santa Rita High School, Carson Middle School, and Ford Elementary School.

Purpose and Need:

This Master Plan was developed to:

- Identify the most appropriate alignment for the proposed Greenway.
- Describe the scope, character, and features of the proposed Greenway
- Prepare an estimate of the cost to design and construct the Greenway.
- Provide recommendations for project phasing.

The Planning Process: This Master Plan represents the vision of citizens of the Tucson community who identified the potential for a Greenway along the Atturbury Wash, who supported the funding of the planning work, and who participated in the planning process.

During the course of this project, several public forums were conducted to solicit input related to the draft plan. The first of these was conducted at the Clements Community Center on May 29, 2008. Prior to the meeting, area residents living within one mile of the site were notified via direct mail. At the meeting, attendees were given an opportunity to review and make recommendations related to the alignment and features of the proposed Greenway. The comments received were utilized to refine and update the draft plan.

A second public session was conducted on August 5, 2008 in conjunction with a general neighborhood meeting held at the Clements Center. At this session, attendees were briefed on the status of the project and on changes that had been made to the original draft of the plan.

A third and final public meeting was conducted on March 18, 2009 at the Clements Center. Area residents were notified about the meeting by direct mail. At this meeting, attendees were provided an opportunity to comment on the revised draft plan and on the proposed phasing of construction.

In addition to public input, meetings were also conducted with various project stakeholders including representatives of the Atturbury - Lyman Bird and Animal Sanctuary and the Tucson Audubon Society.

The Master Plan presented herein also reflects the input of various City Departments. In addition to the Parks and Recreation Department, input was received from the City Council Ward 4 Office, the Department of Transportation, and the Floodplain Management Office. Pima Community College staff also participated in the planning process.

Project Goals: Utilizing input provided by stakeholders, area residents, and the public at large, the following goals were established for the Atturbury Wash Greenway.

- To create a continuous Greenway along or near the Atturbury Wash from Irvington Road to the Pantano River Park.
- To provide a continuous ADA accessible paved multi-use path along the entire length of the Greenway.
- To provide a recreational facility for walkers, joggers, runners, bicyclists, in-line skaters, and other (non-motorized) pathway and trail users.
- To provide a safe route for individuals to use when walking or bicycling from their residence to work or to other community destinations.

Project Goals (Continued):

- To preserve existing riparian and upland vegetation along the Greenway corridor.
- To restore native plant communities and enhance wildlife habitat in areas along the corridor previously degraded by urban development.
- To provide for public safety along the Greenway corridor by utilizing the principles of Crime Prevention through Environmental Design (CPTED).
- To provide for user safety at locations where the Greenway crosses public streets.
- To respect the rights and interests of adjacent property owners and area residents.

Organization of Document:

Along the Atturbury Wash Greenway corridor there are several segments, each with a distinct set of existing site conditions and each with a need for a unique set of design solutions. In acknowledgment of these conditions, the Master Plan report has been organized by corridor segments. These are:

- The Fred Enke Drive Segment
- The Lincoln Park Segment
- The Escalante Road to Stella Road Segment
- The Lakeside Park Segment
- The Golf Links Road to Pantano Wash Segment
- The Greenway / Roadway Intersections

The Master Plan addresses each segment by describing the existing conditions and by providing preliminary plans for the development of the Greenway in that portion of the overall project. Cost estimates for each segment are also provided as an Appendix to this report.

Proposed Project Phasing:

The funds currently available for the construction of the Greenway are insufficient for the construction of the entire project. As a consequence, the construction will be phased.

It is recommended that the first phase consist of the construction of paths, trails, and related improvements within Lincoln Park. These improvements will connect Upper Lincoln and Lower Lincoln Park and will facilitate community access to the Pima Community College East Campus, the Clements Community Center, the new Festival / Special Events area, existing park facilities and fields, and planned park facilities and fields. Additionally, the utility services needed to construct this segment are in place and need only to be extended to serve the Greenway.

**Proposed Project
Phasing (Continued):**

It is recommended that the second phase of development be the Fred Enke Drive segment. The cost to construct this segment is relatively low and its completion will complete the Greenway's connection to Irvington Road.

Further, it is recommended that subsequent phases be developed starting at Escalante Road and proceeding north. The Escalante Road to Lakeside Park Segment will connect Lincoln Park and Lakeside Park. The Lakeside Park segment will extend the Greenway north to Golf Links Road. The Golf Links Road to Pantano Wash Segment will complete the connection of the Greenway to the Pantano River Park.

Fred Enke Drive Segment

Existing Conditions: **General:**

The Fred Enke Drive Segment of the Atturbury Wash Greenway extends from Irvington Road on the south to the entrance of the Fred Enke Golf Course parking lot on the north, a distance of approximately 0.35 miles. (See Figure 2-A).

This segment is located approximately 1/3 of a mile west of the Atturbury Wash. This departure from the wash corridor is necessary as the wash extends through the center of the golf course. The routing of a multi-use path through the golf course would create unsafe conditions for greenway users. In addition to eliminating conflicts, the proposed alignment of the Fred Enke Drive Segment also provides valuable opportunities for connections to Lincoln Park, the Clements Community Center, and the Pima Community College East Campus.

The proposed alignment of this segment parallels the eastern edge of the Fred Enke Drive right-of-way and the western edge of the 18th hole of the golf course.



Fred Enke Drive, Looking South (Golf Course to Left)

Fred Enke Drive Segment

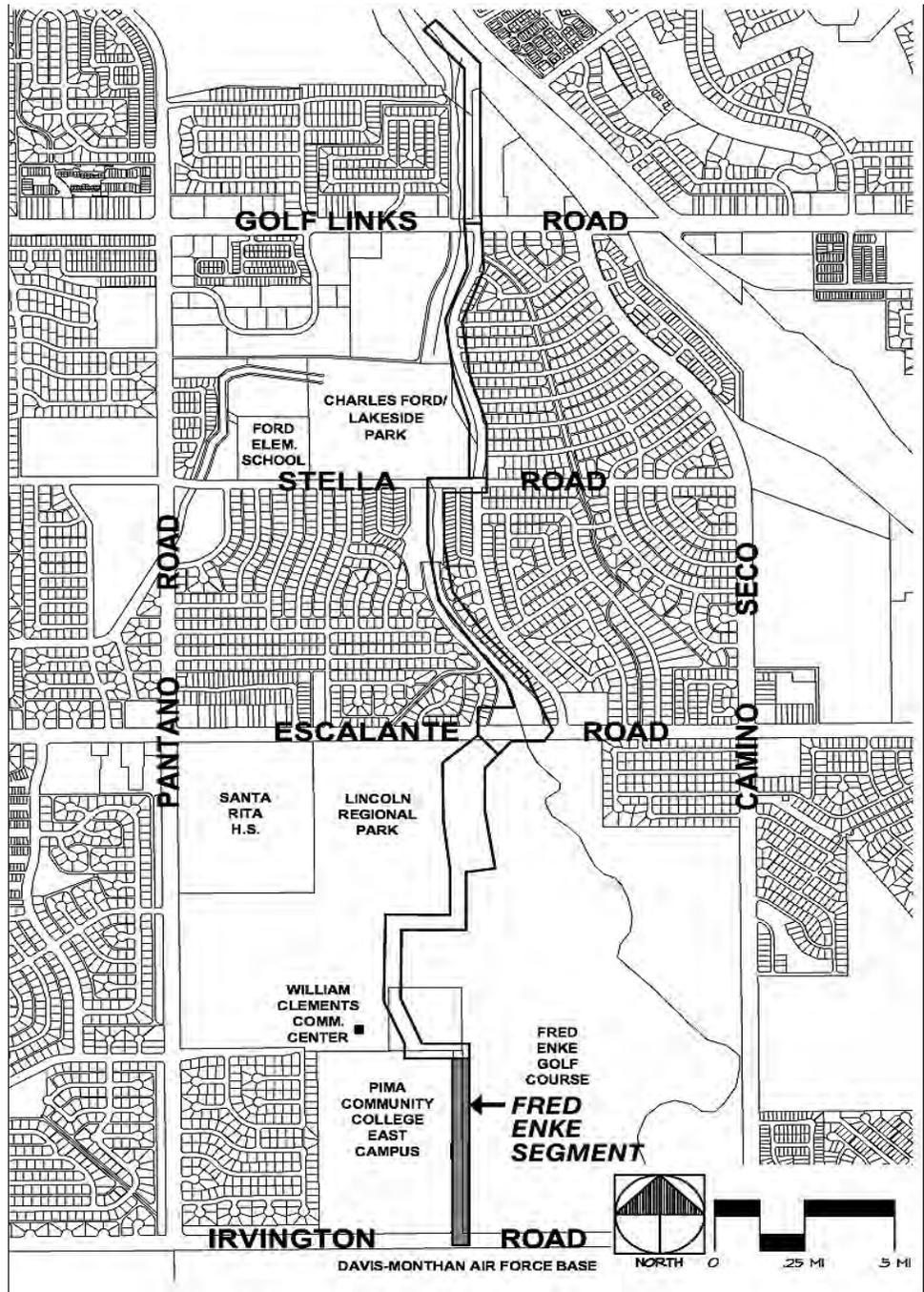


Figure 2-A: Location Map

Existing Conditions (Continued):

Hydrology:

Since the proposed alignment of this segment is some distance from the Atturbury Wash channel, the proposed corridor is outside of the designated 100-year floodplain. There are no other washes or channels crossing this segment and drainage will be addressed by grading the multi-use path to drain to landscaped areas.

Biological Resources:

The construction of the road, various underground utilities, and the golf course, resulted in the removal of most of the native vegetation along this segment, although there are a few large specimen trees at the edge of the golf course. The eastern edge of the Fred Enke Drive right-of-way has been replanted with native and other drought-tolerant species, including Velvet Mesquite (*Prosopis velutina*), Blue Palo Verde (*Parkinsonia florida*), Foothills Palo Verde (*Parkinsonia microphylla*), Texas Ebony (*Pithecellobium flexicaule*), Desert Spoon (*Dasyliirion wheeleri*), Four-Wing Saltbush (*Atriplex canescens*), and Fairy Duster (*Calliandra californica*).

This existing vegetation within this segment has moderate value as wildlife habitat. The habitat has not, however, been identified as important to special status species nor is it a part of an important riparian habitat corridor.

Also present within this segment are some invasive, non-native plants, including Buffelgrass (*Pennisetum ciliare*). The Buffelgrass appears to have spread to the site from dense patches along the adjacent Irvington Road right-of-way.

Visual Resources:

Urban developments (roads, campus buildings, and the golf course) are the most prominent visual features associated with this segment. Long range views of mountain ranges to the north, south, and east are also present.

Cultural Resources:

The lands within this segment were previously modified in conjunction with the construction of roadway, underground utilities, and a golf course. There are no known cultural resource sites within this segment and it is unlikely that sites will be identified. A formal review of the segment site for cultural resources will be conducted prior to construction in accordance with City of Tucson Parks and Recreation Department standards.

Existing Conditions (Continued):

Utilities:

There are several underground utility lines present in the Fred Enke Drive right-of-way, east of the roadway pavement. Also present are numerous above-ground utility cabinets. The proposed construction of the multi-use path and related greenway improvements east of this utility corridor will eliminate conflicts during construction and when utility lines need to be exposed for maintenance and repair.



Existing Utilities East of Fred Enke Drive

Other Existing Conditions (Proximity to Golf Course):

A unique feature of this segment is its proximity to the 18th hole of the Fred Enke Golf Course. The proximity of a greenway, with multi-use paths and trails, to a golf course required additional investigation to ensure that public safety would not be compromised.

Ken Kavanaugh, a golf course architect based in Tucson, Arizona was consulted to identify limits of the hazard zone associated with the 18th hole. Mr. Kavanaugh provided a drawing that showed the tee area, the landing area for tee shots, the landing area for approach shots to the green, and fairway landing areas in between. (See Figure 2-B). The geometry and dimensions associated with the golf course hazard area are based on adopted standards for golf course design and the use of contemporary, high-performance golf equipment.

As illustrated in Figure 2-B, there is a corridor between 30 feet and 150 feet in width, between the existing Fred Enke Drive roadway curb and the limits of the golf course hazard zone. It is proposed that the greenway be constructed along the western edge of this corridor with additional fencing and planting provided to further enhance public safety.



Figure 2-B
 Atturbury Wash Greenway Master Plan
 Fred Enke Drive Segment

18TH HOLE - GOLF BALL HAZZARD ZONE

Fred Enke Drive Segment

Segment Specific Opportunities:

The Fred Enke Drive Segment's location and the existing site conditions create several opportunities for successful greenway development. These include:

- An enhanced bicycle and pedestrian connection between Irvington Road and Lincoln Park to be used for recreation and/or commuting.
- A partial connection between Lincoln Park and the Fantasy Island Trails Park. The Fantasy Island Trails Park is a 346 acre park with trails for mountain bicycling. It is located south of Irvington Road, approximately 1.75 miles east of the Irvington Rd. / Fred Enke Drive intersection. A future project will be needed to complete the connection along the Irvington Road corridor.
- Enhanced habitat value along the corridor consistent with the overall goals for the greenway.

Proposed Alignment:

The Fred Enke Drive Segment of the Atturbury Wash Greenway will parallel the alignment of the roadway and will be located in a corridor of land east of the existing right-of-way fence. It will begin at the northeast corner of the Irvington Road / Fred Enke Drive intersection and will end at the entry drive to the Golf Course parking lot.

The proposed alignment and the specific features of this segment of the greenway are shown in Figures 2-D through 2-E.

Proposed Greenway Cross- Section:

It is proposed that new greenway improvements be constructed east of the existing right-of-way fence. This will eliminate the need to remove the landscape plantings along the roadway and will avoid conflicts with existing underground and surface utilities.

Within this segment, the paved multi-use path will have decomposed granite shoulders rather than a separate soft-surface trail. This will allow the improvements to be constructed within the narrow corridor between the existing right-of-way and the golf-course hazard zone. This configuration is illustrated on the following page. (See Figure 2-C).

Proposed Greenway Cross Section (Continued):

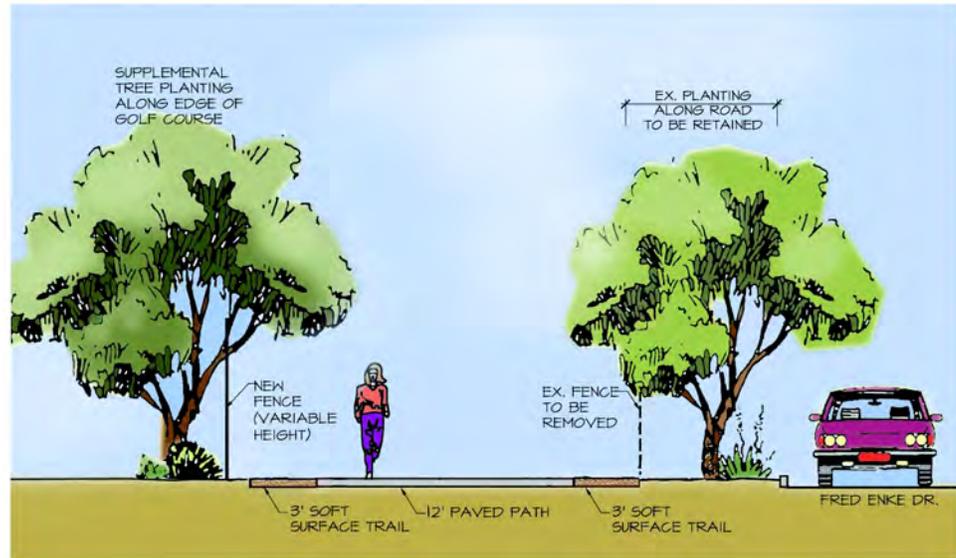


Figure 2-C: Typical Greenway Cross Section - Fred Enke Drive Segment

Habitat Improvements:

Additional tree and shrub planting is proposed for this segment of the greenway. This new planting will occur primarily on the east side of the new fence, along the edge of the 18th fairway. Large native trees that will provide a physical and visual screen between the golf course and the greenway will be emphasized. Plant species to be utilized will be as outlined in Appendix C.

Irrigation Improvements:

An automatic drip irrigation system will be provided to ensure the establishment and initial development of the trees and shrubs installed as part of this project. Reclaimed water from existing sources within Lincoln Park or the Fred Enke Golf Course will be utilized and all irrigation controllers will be connected to the central control system(s) associated with the park or golf course. Water harvesting will also be utilized where appropriate.

Structures and Other Special Features:

Relocated and New (Higher) Chain-Link Fence:

The existing 5' high chain link fence along the east side of the Fred Enke Drive right-of-way will be removed and portions of it will be relocated approximately 25 feet to the east. Other portions of the existing fence will be replaced with a new 10' high chain link fence. The 10' high fence will be installed adjacent to the tee-shot landing zone. The length of the 10' high fence segment will be approximately three hundred feet (300').

**Structures and Other
Special Features
(Continued):**

Low Retaining Walls to Protect Existing Utilities:

It is likely that low retaining walls will be required to construct the multi-use path in the immediate vicinity of the Irvington Road intersection. The photographs below illustrate this area where rip-rapped slopes may need to be replaced with retaining walls.



Existing Slope Conditions at NE Corner of Irvington Road / Fred Enke Drive Intersection

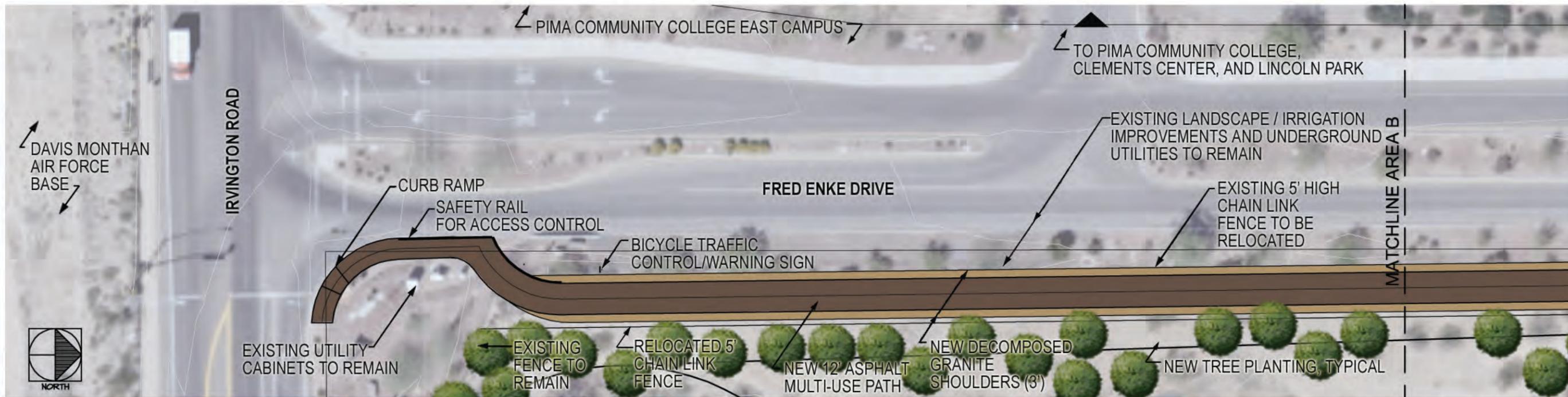
**Construction
Quantities and Cost
Estimate:**

The estimated cost to construct the Fred Enke Drive Segment of the Atturbury Wash Greenway is \$238,000. This estimate is based on the conceptual design presented herein and should be considered an order-of-magnitude estimate only. The estimate is based on 2009 costs without escalation. Additional detail related to the estimated construction cost is provided in Appendix A.

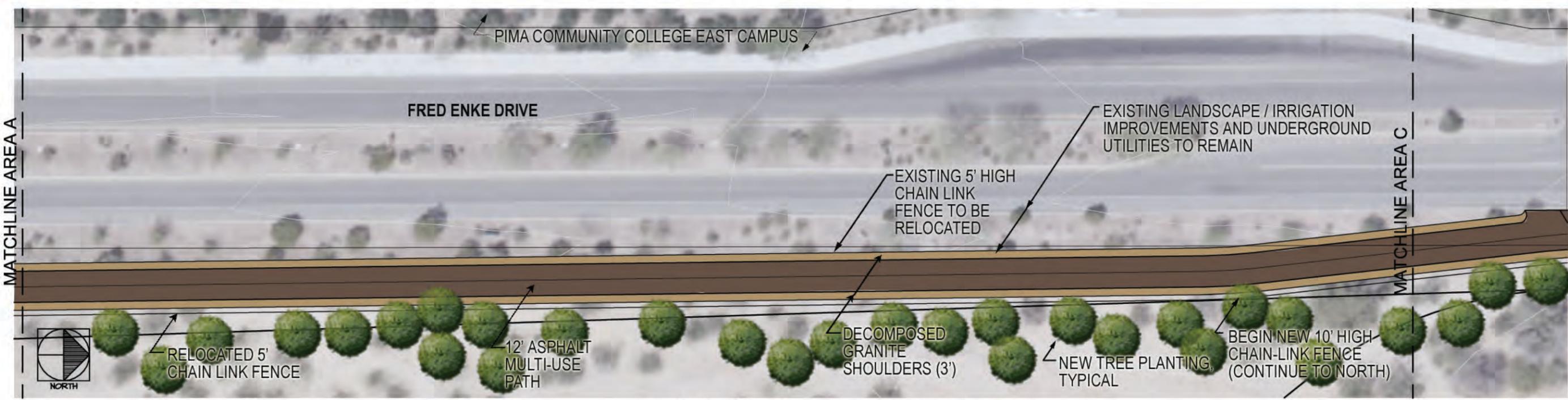
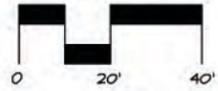


FRED ENKE DRIVE SEGMENT - KEY MAP

Figure 2-D
 Atturbury Wash Greenway Master Plan
 Fred Enke Segment Key Map



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA A



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA B

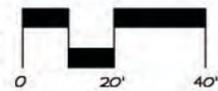
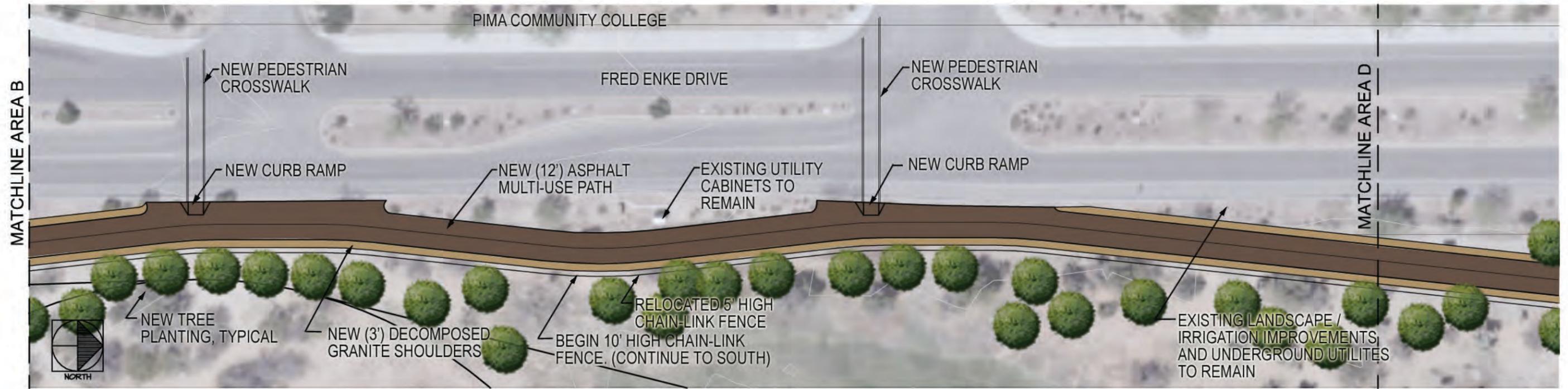
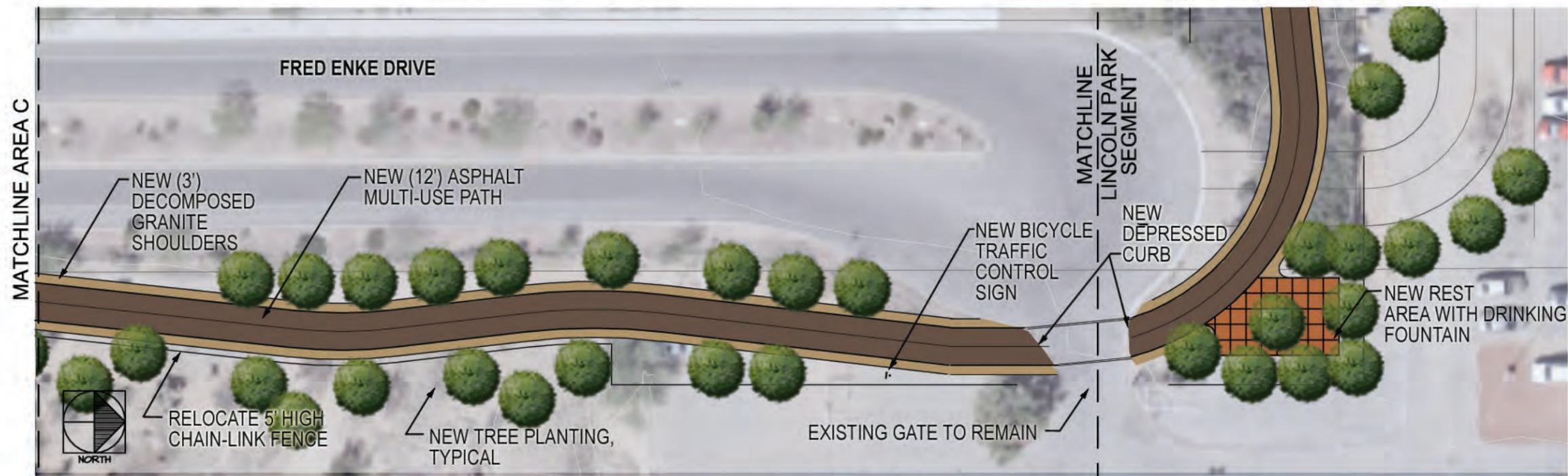
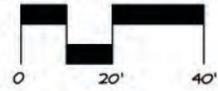


Figure 2-E
Atturbury Wash Greenway Master Plan
Fred Enke Drive Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA C



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA D



Figure 2-F
Atturbury Wash Greenway Master Plan
Fred Enke Drive Segment

Existing Conditions:

General:

The Lincoln Park Segment of the Atturbury Wash Greenway extends from the northern terminus of Fred Enke Drive to the northern edge of Lincoln Regional Park. The length of the proposed greenway corridor, which follows a varied alignment through the site, is approximately 0.95 miles. (See Figure 3-A).

This segment is located away from the Atturbury Wash riparian corridor. At the north end of the segment, the proposed multi-use path is approximately 300' west of the wash centerline. At the south end of the segment, it is nearly ½ mile west of the wash.

The proposed alignment was selected to avoid conflicts with the golf course, the driving range, and the Atturbury - Lyman Bird and Animal Sanctuary. The selected alignment also facilitates public access from the greenway to the facilities at Lincoln Park, the William M. Clements Community Center, and the Pima Community College East Campus.



Proposed Site for New Operations and Maintenance Building
Pima Community College East Campus is to right of Fence / Hedgerow

**Existing Conditions
(Continued):**



Existing Dirt Track / Road on Ridge South of Driving Range



Existing Dirt Track / Road near Lower Lincoln Park

Lincoln Park Segment

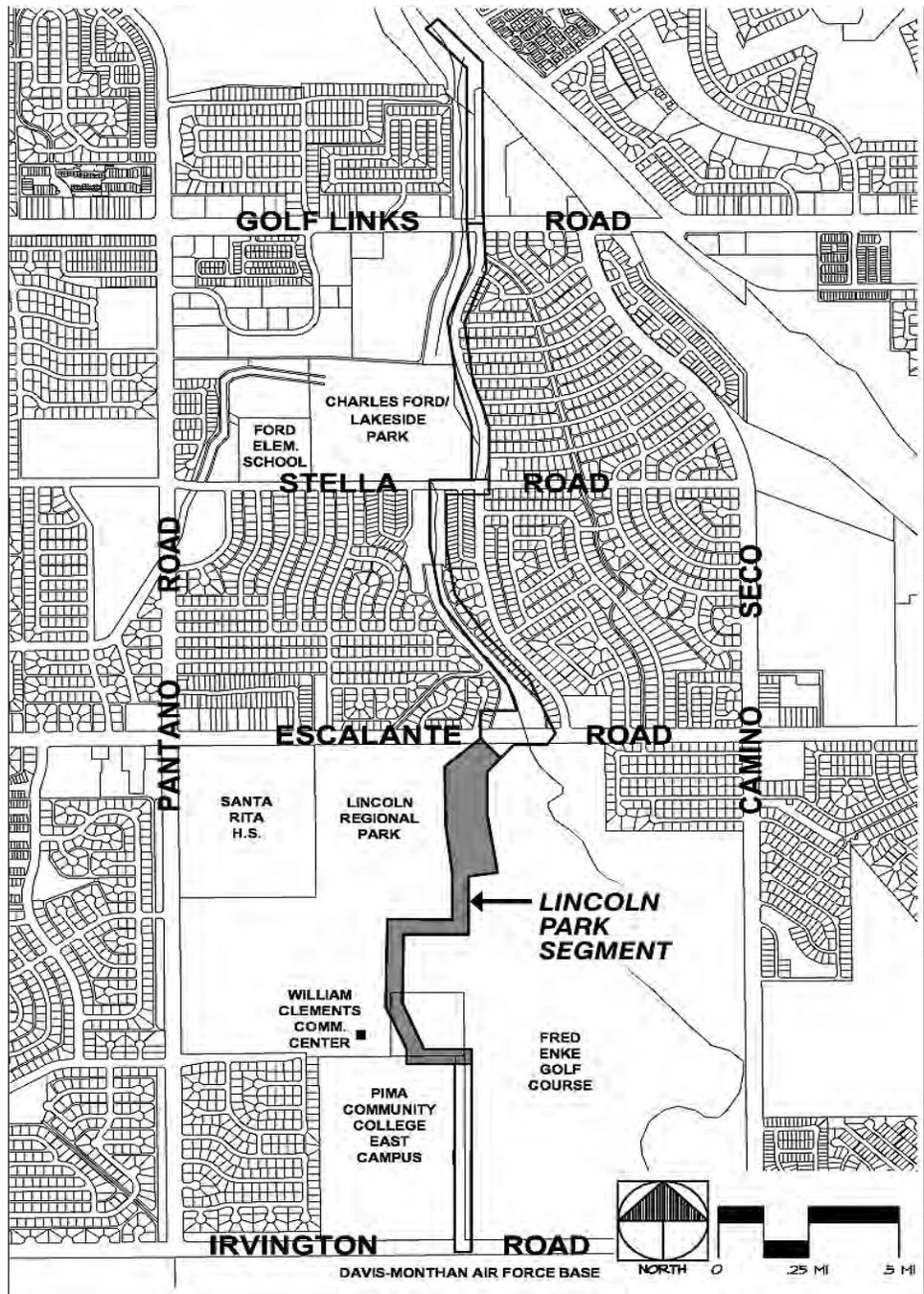


Figure 3-A: Location Map

Existing Conditions (Continued):

Hydrology:

The proposed alignment of the Greenway through Lincoln Park is offset from the Atturbury Wash and as such is not within the designated 100-year floodplain. The alignment crosses upland areas and follows a ridgetop where cross drainages are infrequent. There are, however, a few minor washes that cross the proposed multi-use path alignment. Stormwater runoff in these channels will need to be conveyed below the multi-use path in a pipe or scupper.

Biological Resources:

The Lincoln Park Segment of the Atturbury Wash Greenway corridor is characterized by Sonoran Desert upland vegetation with Blue Palo Verde (*Parkinsonia florida*), Foothills Palo Verde (*Parkinsonia microphylla*), Velvet Mesquite (*Prosopis velutina*), Acacia (*Acacia* spp.), Brittlebush (*Encelia farinosa*), Bursage (*Ambrosia* spp.), Creosote (*Larrea tridentata*), Cholla / Prickly Pear (*Opuntia* spp.), and various other cacti being characteristic plant species. The native plant community supports diverse populations of small mammals, birds, and reptiles.

Although most of the vegetation is upland in character, there is a small riparian corridor between the driving range and the Clements Center. This riparian area is associated with a wash that is a tributary to the Kinnison Wash.

The existing vegetative resources along the proposed greenway corridor have been degraded by the prior construction of various facilities and numerous dirt roads or tracks through the site. These disturbances have removed vegetation, accelerated soil erosion in localized areas, and created conditions favorable to the establishment of non-native and invasive plant species.

Visual Resources:

From vantage points along the greenway corridor within Lincoln Park, there are spectacular vistas of the surrounding mountain ranges, including the Santa Catalina Mountains, the Rincon Mountains, and the more distant Santa Rita Mountains. Mid-range vistas include views of the Atturbury Wash riparian corridor and the Atturbury - Lyman Bird and Animal Sanctuary. Visual resources within and adjacent to the proposed corridor include close-up views of Sonoran Desert trees, shrubs, and cacti.

Urban development, including residential and other structures, are visible from some vantage points along the proposed corridor, but are generally not prominent.

Existing Conditions (Continued):

Cultural Resources:

The proposed Atturbury Wash Greenway corridor through Lincoln Park was not surveyed for cultural resources in conjunction with this master plan project. Given the scope of prior disturbances along the corridor (driving range, underground pipelines, etc.) it is unlikely that cultural resources sites will be found. However, a formal review of the segment site for cultural resources will be conducted prior to the construction of Greenway improvements in accordance with City of Tucson Parks and Recreation Department standards.

Utilities:

There are existing underground utilities present within and near the proposed corridor. Utilities present include: sanitary sewer, reclaimed water, potable water, irrigation, electric, and telephone. The proposed multi-use path and other Greenway improvements will be designed to avoid conflicts with the underground utilities and at-grade utility structures.

The 12" reclaimed water main that crosses the site will require special coordination. A portion of the proposed multi-use path north of the driving range, approximately 650' in length, will be constructed above or immediately adjacent to the pipeline. As such, the final design will be subject to Tucson Water's review and approval.

Other Existing Conditions - Planned Operations and Maintenance Facility:

Prior to the start of the Atturbury Wash Greenway planning project, the City of Tucson Parks and Recreation Department completed the preparation of construction documents for a new operations and maintenance facility. This facility will serve both Lincoln Park and the Fred Enke Golf Course. It will be built as soon as funding is made available.

Various sites were evaluated for this facility. The selected site is located immediately south of the driving range adjacent to the Pima Community College (PCC) East Campus. The siting of this facility created an impediment to the connection of the greenway along Fred Enke Drive to the greenway through Lincoln Park. After discussions with Pima Community College a solution was developed that locates a small segment of the greenway on college property, a solution that allows for a continuous greenway while also providing better access to the PCC East Campus.

Existing Conditions (Continued):

Other Existing Conditions - Proximity to Park and School Facilities:

It is important to note that the Lincoln Park Segment of the Atturbury Wash Greenway has the potential to provide enhanced bicycle and pedestrian access to several existing and planned community facilities. These include: the existing sports fields and other facilities at Lincoln Park, the proposed softball complex at Lincoln Park, the William Clements Community Center, the Special Events and Festival Area, the Pima Community College East Campus, and the Santa Rita High School campus.

Other Existing Conditions - Lack of Appropriate Internal Connections between Upper and Lower Lincoln Park:

At the present time, the developed facilities at “upper” Lincoln Park (the Clements Center, the ballfields, and associated parking areas) are internally connected to the facilities at “lower” Lincoln Park by a network of dirt tracks. The connection by public or paved roadway consists of a one mile drive along Pantano Road and Escalante Road.

The existing dirt tracks do not provide an accessible route between these two areas. Their continued use by maintenance vehicles, mountain bicyclists, and pedestrians is resulting in localized soil erosion and the need for native plant restoration.

Other Existing Conditions - The Atturbury - Lyman Bird and Animal Sanctuary:

The Atturbury - Lyman Bird and Animal Sanctuary is located along the Atturbury Wash Corridor between the Fred Enke Golf Course and Escalante Road. This section of the wash has not been modified by channelization and exhibits dense native riparian vegetation. Through the efforts of numerous dedicated volunteers, the sanctuary currently features interpretive walking paths, demonstration gardens, and several on-going habitat restoration and enhancement projects. The protection of these facilities and projects requires controlled access to the sanctuary site.

**Existing Conditions
(Continued):**

The greenway could potentially rejoin the Atturbury Wash corridor north of the Fred Enke Golf Course, but in so doing it would route the Greenway through the sanctuary. To avoid this, an alternative route away from the sanctuary is proposed. This will enable the Greenway to achieve its goal of accommodating a wide range of recreational users and alternate mode commuters while concurrently allowing the sanctuary to achieve its goal of protecting and enhancing valuable riparian habitat.

**Segment Specific
Opportunities:**

The location and existing conditions along the Lincoln Park Segment of the Atturbury Wash Greenway create several opportunities for successful Greenway development. These include:

- Enhanced opportunities for bicycle and pedestrian access from surrounding neighborhoods to the existing facilities at Lincoln Park, the Clements Community Center, the Festival and Special Events facility, and the proposed softball field complex.
- Enhanced opportunities for bicycle and pedestrian access to the Pima Community College East Campus and the Santa Rita High School Campus.
- An opportunity to provide a safe, handicapped accessible route between upper and lower Lincoln Park for public use and for use by Parks and Recreation Department personnel.
- A 0.86 mile long multi-use path and trail for recreational use and for use by commuters using alternate modes of transportation.
- An opportunity to route a portion of the Greenway away from the Atturbury Wash and along a ridgetop that features views and long-range vistas of several mountain ranges.
- An opportunity to restore native vegetation on some of the dirt tracks and roads that cross the Lincoln Park site.

Proposed Alignment:

The southernmost portion of the Lincoln Park segment will start at the northern terminus of Fred Enke Drive and extend east approximately 350 feet along the northern edge of the Pima Community College east campus. (See Figure 3-F).

The alignment will then turn north and follow a route that is between the golf course driving range and the Clements Center and Festival / Special Events area. This 0.25 mile long portion of the greenway will be within a previously disturbed corridor that is east of the unnamed tributary to the Kinnison Wash. (See Figures 3-F and 3-G).

**Proposed Alignment
(Continued):**

The alignment will then intersect with the reclaimed water pipeline scar and follow it east a distance of approximately 0.15 miles. Through this area the greenway will follow the alignment of the pipeline. (See Figure 3-H).

The greenway will then turn north and follow existing dirt roads along a ridgetop north to Escalante Road and the entrance to Lower Lincoln Park. (See Figures 3-H, 3-I, 3-J, and 3-K).

**Proposed Greenway
Cross-Sections:**

The Lincoln Park segment of the greenway will feature several different cross-sections that respond to localized site conditions.

The southern portion, where space is constrained, will feature a multi-use path with decomposed granite shoulders. Planting will occur on one or both sides of the new path. (See Figure 3-B).

The middle portion, where additional space is available, will feature a paved, multi-use path with a separated but parallel decomposed granite trail. Planting will occur between the path and trail and on the edges of the greenway corridor. (See Figure 3-C).

The northernmost section will take advantage of existing site conditions where there are several dirt tracks. The paved multi-use path will follow one of these tracks while the decomposed granite path will follow another. (See Figure 3-D).



Figure 3-B: Proposed Cross-Section - Areas of Lincoln Park Segment with Restricted Corridor Width

Proposed Greenway Cross-Sections (Continued):



Figure 3-C: Proposed Cross-Section - Areas of Lincoln Park Segment with Adequate Space for Divided Path / Trail Configuration



Figure 3-D: Proposed Cross-Section - Areas of Lincoln Park Segment where Path and Trail follow Separate Dirt Tracks

**Habitat
Improvements:**

Two habitat improvement efforts are proposed for this section of greenway. The first of these will occur along the unnamed tributary to Kinnison Wash, east of the golf course driving range. In this location, new plantings will be installed to enhance and restore the existing riparian vegetation.

Throughout the balance of the site, plantings consisting of native upland species will be installed to restore previously disturbed areas and to enhance the visual characteristics of the Greenway.

In localized areas, where rest stops are proposed, native trees will be planted in dense pockets to provide shade for Greenway users.

**Irrigation
Improvements:**

Throughout most of the Lincoln Park Segment of the greenway, an automatic drip irrigation system will be installed to ensure the establishment and survival of new plantings. To the greatest extent possible, reclaimed water from existing mains on the site will be used as the source of irrigation water.

Water harvesting techniques and dry-land restoration techniques will also be used in conjunction with the proposed drip irrigation system. The controllers for the new greenway irrigation system will be integrated with the existing central control systems within upper and lower Lincoln Park.

**Structures and Other
Special Features:**

Rest Stop at Fred Enke Drive:

A small rest stop is proposed where this section of greenway terminates at the cul-de-sac at the north end of Fred Enke Drive. This rest stop will feature a small paved plaza, benches, and a drinking fountain. Given its prominent location, it will also have a sign or monument that identifies the Atturbury Wash Greenway. (See Figure 3-F).

Rest Stop South of Festival / Special Events Area:

A rest stop is proposed for the area approximately 0.1 miles south of the Festival / Special Events area. This site was selected because the area was previously disturbed, the long-range views of the site are of exceptional quality, it is close to the proposed softball complex, and it is at the terminus of a potential route that would connect the Greenway with the Santa Rita High School Campus.

Improvements proposed at this location include a paved plaza, benches, and a drinking fountain. A small shade structure and/or trees for shade will also be provided. (See Figure 3-G).

Entry Plaza at Lower Lincoln Park:

A Greenway entry plaza is proposed for the location where the Greenway intersects with the entry drive to lower Lincoln Park. This area will feature a small paved plaza, benches, and appropriate identification and regulatory signs.

The plaza will be developed at the base of the slope where the Greenway descends from the ridgetop to the elevation of lower Lincoln Park. To make this area function safely, it will be necessary to create some space between the bottom of the slope and the park entry drive. This will be accomplished by realigning and reconstructing a small portion of the entry drive. This realignment is possible in that the entry drive forms a “T” intersection with Escalante Road and does not need to align with an existing or proposed street north of the intersection. (See Figure 3-K).

Other Design Issues:

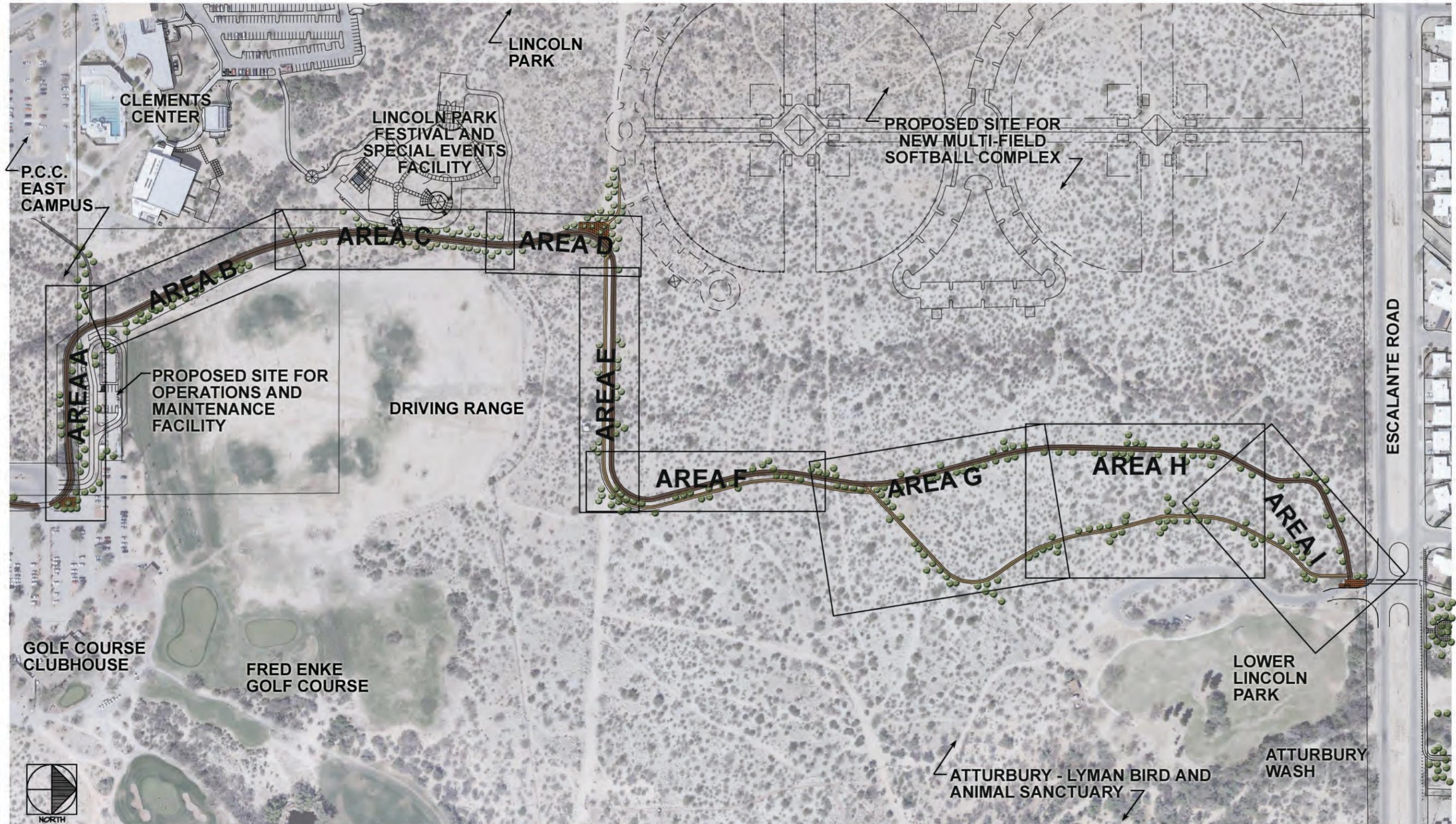
Easement or Inter-Governmental Agreement for Routing of Greenway along Northern Edge of Pima Community College East Campus:

To construct the Lincoln Park segment of the Atturbury Wash Greenway as proposed herein will require that an easement be acquired or that an Inter-Governmental Agreement (IGA) be executed between the City of Tucson Parks and Recreation Department and Pima Community College. Such an agreement would allow a portion of the Greenway to be constructed on a 50' x 350' strip of land at the northeast corner of the PCC east campus. This agreement would also obligate the City to maintain the subject portion of Greenway.

A benefit that will accrue to the College as a result of constructing this section of Greenway includes better bicycle and pedestrian access to the campus. Benefits that will accrue to the City and the public include a continuous Greenway, elimination of the need to re-design and move the proposed operations and maintenance facility, and elimination of the need to reconstruct portions of the golf course driving range.

Construction Quantities and Cost Estimate:

The estimated cost to construct the Fred Enke Drive Segment of the Atturbury Wash Greenway is \$567,000. This estimate is based in the conceptual design presented herein and should be considered an order-of-magnitude estimate only. The estimate is based on 2009 costs without escalation. Additional detail related to the estimated construction cost is included in Appendix A.



LINCOLN PARK SEGMENT - KEY MAP

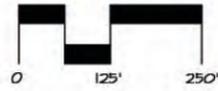
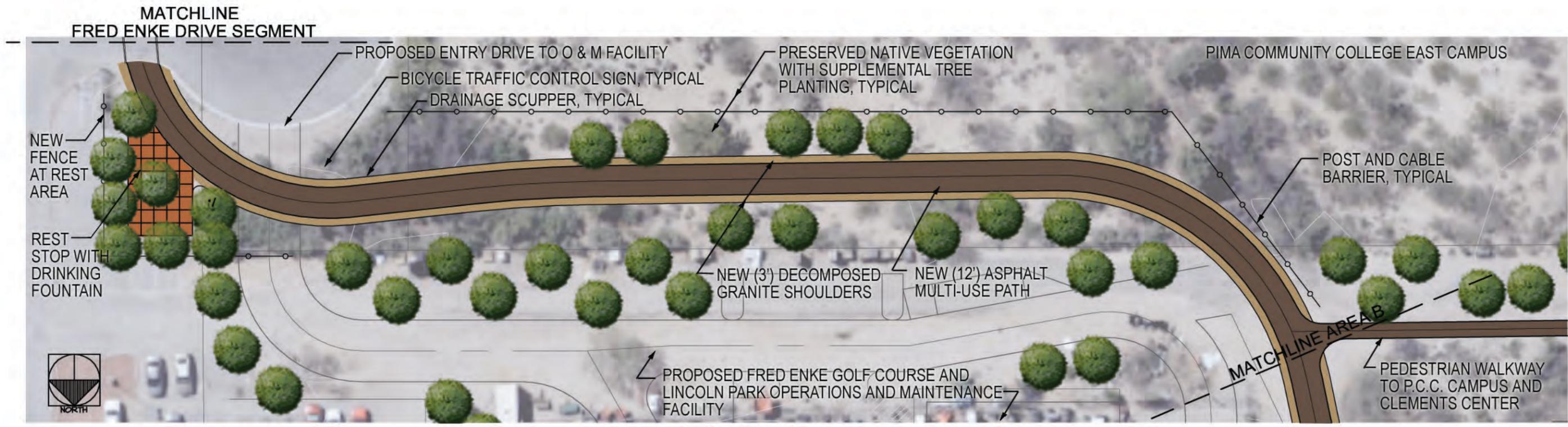
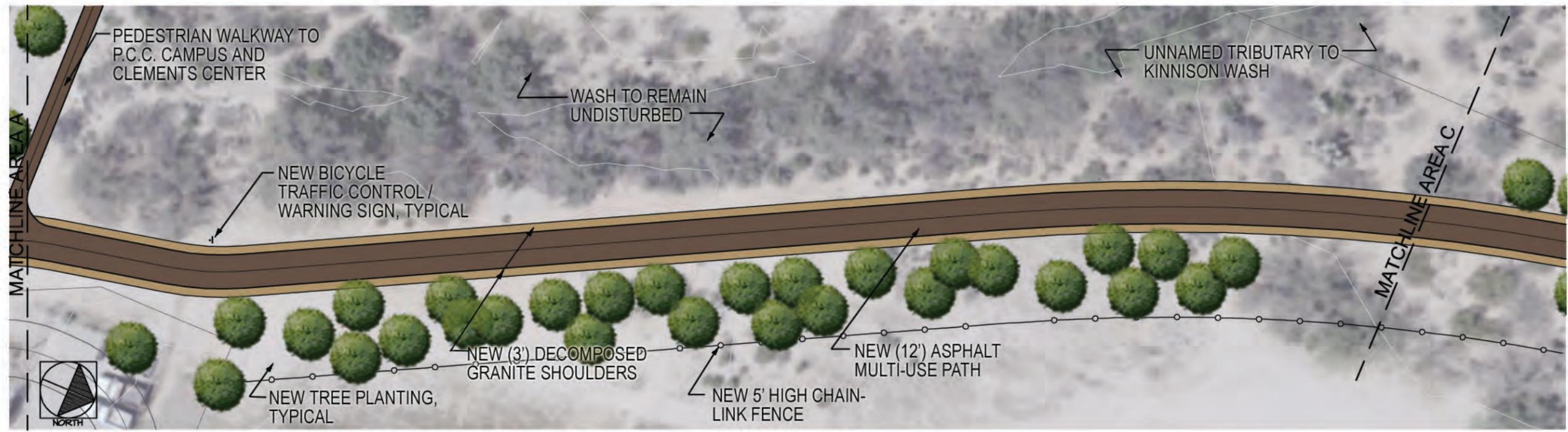
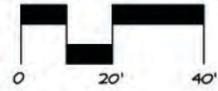


Figure 3-E
Atturbury Wash Greenway Master Plan
Lincoln Park Segment KeyMap



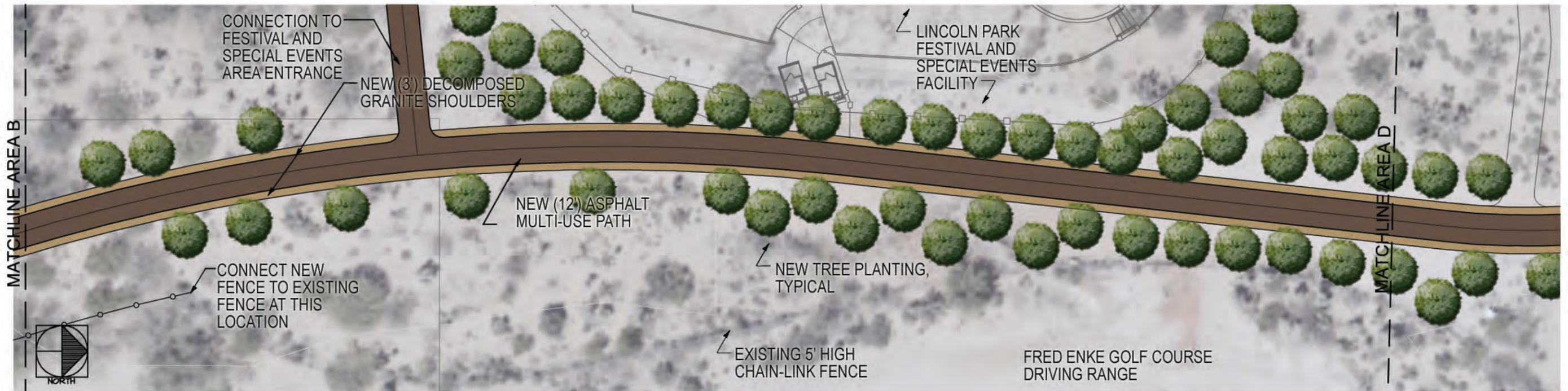
CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA A



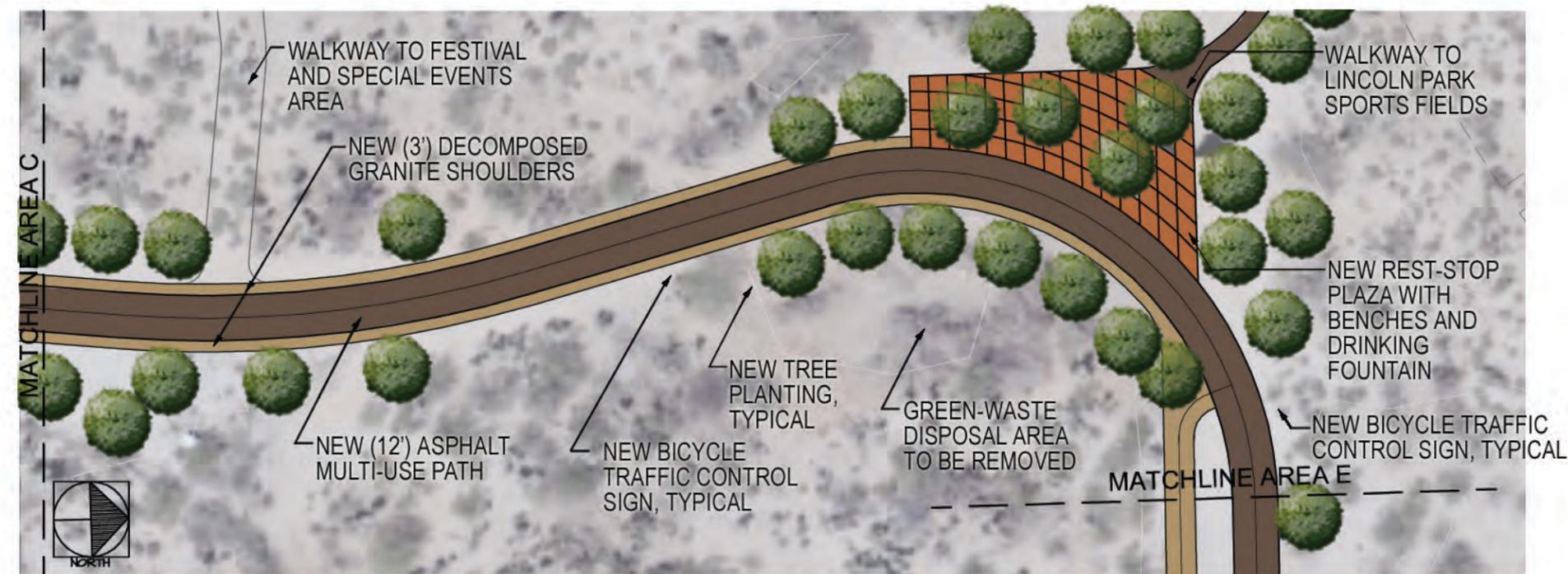
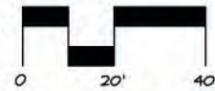
CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA B



Figure 3-F
Atturbury Wash Greenway Master Plan
Lincoln Park Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA C



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA D

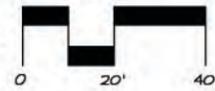
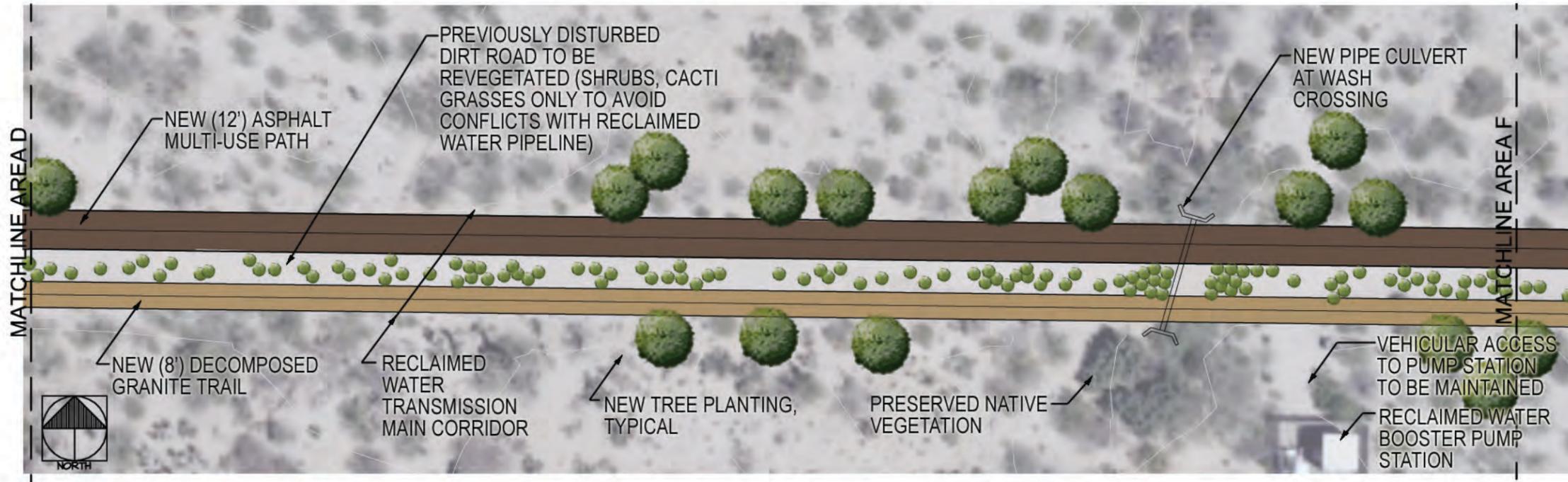
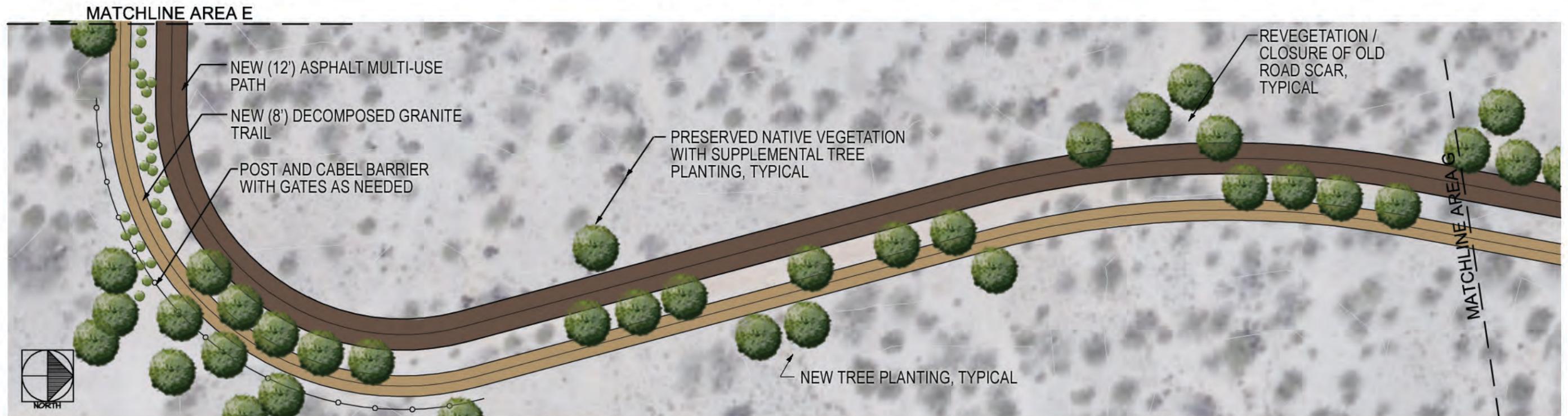
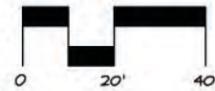


Figure 3-G
Atturbury Wash Greenway Master Plan
Lincoln Park Segment



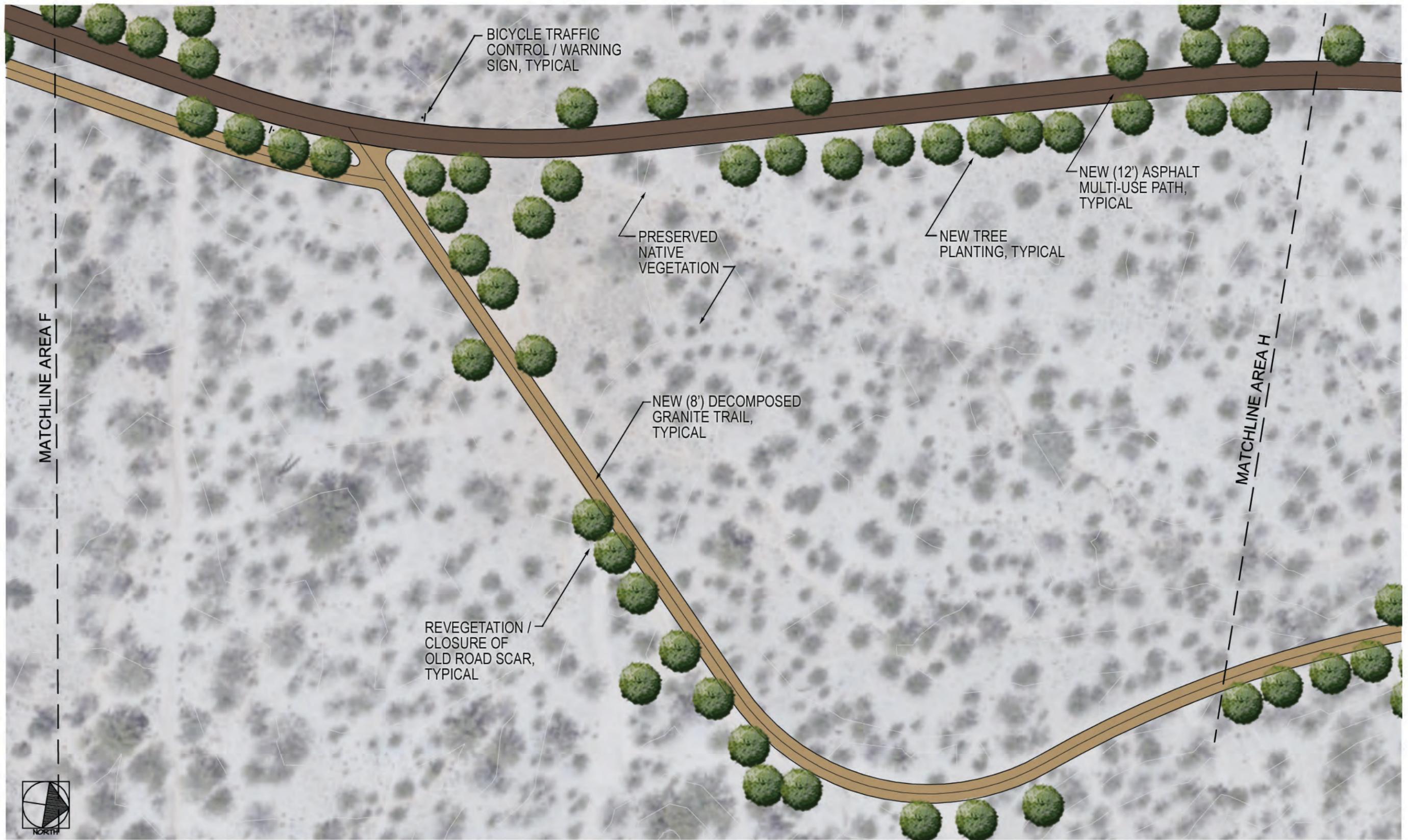
CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA E



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA F

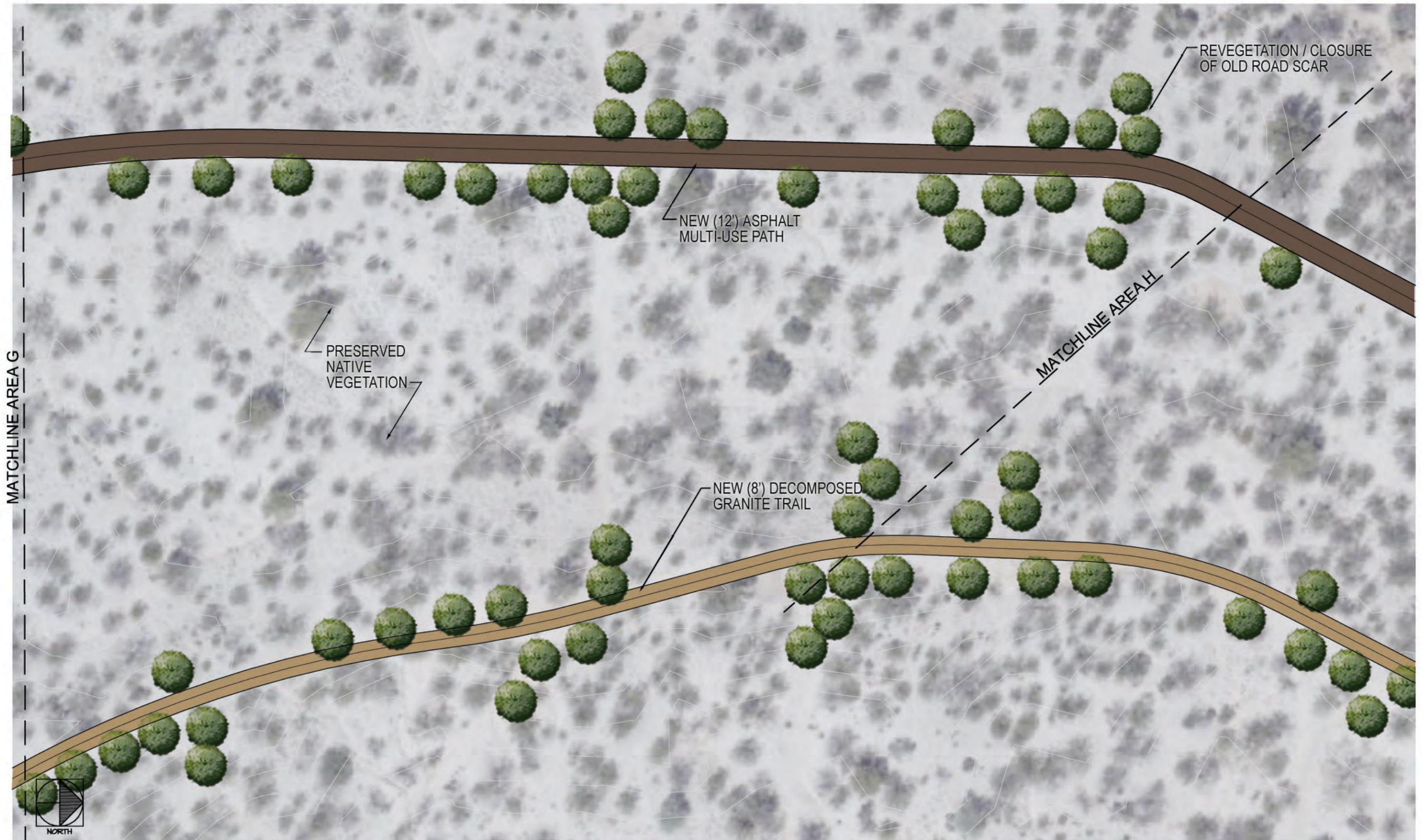


Figure 3-H
Atturbury Wash Greenway Master Plan
Lincoln Park Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA G

Figure 3-1
Atturbury Wash Greenway Master Plan
Lincoln Park Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA H



Figure 3-J
Atturbury Wash Greenway Master Plan
Lincoln Park Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA I

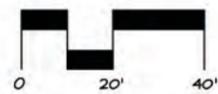


Figure 3-K
Atturbury Wash Greenway Master Plan
Lincoln Park Segment

Escalante Road to Stella Road Segment

Existing Conditions:

General:

The Escalante Road to Stella Road Segment of the Atturbury Wash Greenway extends from the northern boundary of Lincoln Park at Escalante Road to the southern boundary of Lakeside Park at Stella Road, a distance of approximately 0.5 miles. (See Figure 3-A).

Along the northern edge of the Escalante Road right-of-way, the Greenway will cross the Atturbury Wash from west to east and then extend north along the east bank of the channel. Along the east bank there is an existing alley with a narrow dirt road and several underground utility lines. Weedy, non-native plants have volunteered along the corridor. Trash has also been dumped in some locations within and adjacent to the wash channel.

At the north end of this segment, there is an eight hundred foot (800') long section of multi-use path. As a condition of development approval(s), the City of Tucson required the developer of the adjacent Lakeside Ridge subdivision to construct and dedicate this path and corridor to the City of Tucson.



East Bank of Atturbury Wash - North of Escalante Road

Escalante Road to Stella Road Segment

Existing Conditions (Continued):



East Bank of Atturbury Wash - Between Escalante Road and Stella Road



Existing Paved Path - East Bank of Atturbury Wash - South of Stella Road
adjacent to Lakeside Ridge Subdivision

Escalante Road to Stella Road Segment

Existing Conditions
(Continued):

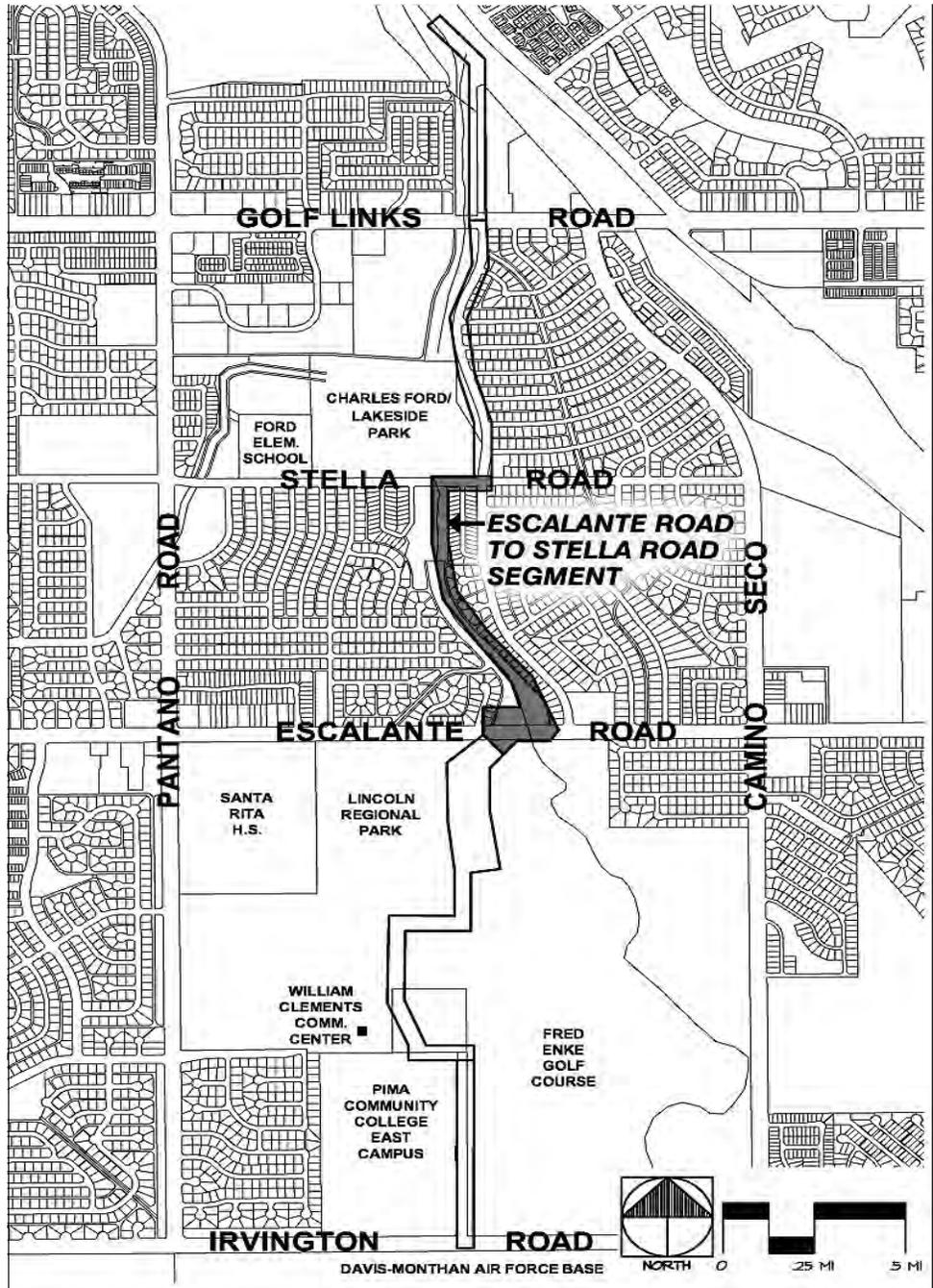


Figure 4-A: Location Map

Escalante Road to Stella Road Segment

Existing Conditions (Continued):

Hydrology:

The Atturbury Wash crosses Escalante Road at a dip crossing at the south end of this segment. Per Tucson Stormwater Management System (TSMS) data, the $Q=100$ flow at this location is 2,572 cfs. There are no current plans to eliminate the dip crossing at Escalante Road with pipes, a box culvert, or a bridge.

North of Escalante Road, the storm flows associated with the Atturbury Wash are contained within a constructed / improved channel. There is one constructed tributary channel that flows into the Atturbury from the west but no tributary channels that interrupt the east bank. The flows associated with the 100 year storm event are contained within the channel.

Approximately 1,600 L.F. of the east bank within this segment and portions of the west bank of the Atturbury Wash channel have been stabilized with concrete slope paving. This paving extends from the invert of the channel to the approximate mid-point of the channel bank as shown in Figure 4-B. Above the concrete is a native soil slope. The concrete channel stabilization on the east bank ends approximately 800 feet south of Stella Road. North of the stabilized bank, the channel widens from approximately 120' to 200'. In this location there is a distinct low-flow channel with adjacent intermediate bank areas.

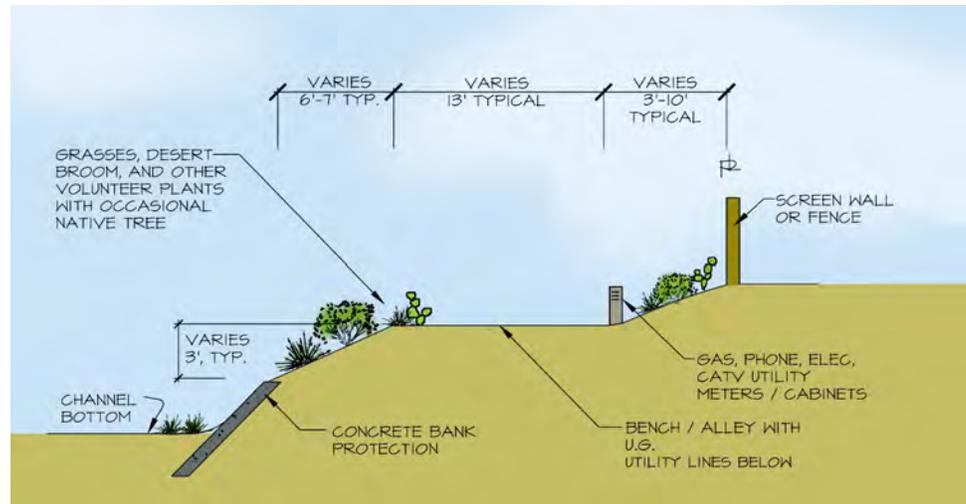


Figure 4-B: Existing Channel Bank Condition - East Bank
between Escalante Road and Stella Road

At the north end of this segment, the Atturbury flows through a box culvert below Stella Road. Per TSMS data, the $Q=100$ flow at the outlet of the box culvert is 2,512 cfs. The box culvert empties into a large, steep concrete structure at the inlet to the Lakeside Park lake.

Escalante Road to Stella Road Segment

Existing Conditions (Continued):

Biological Resources:

Modifications to the Atturbury Wash channel and the construction of adjacent subdivisions and utility systems has resulted in the removal of most of the natural riparian vegetation within this segment. There are a few remnant patches of native vegetation east and west of the main channel, just north of Escalante Road. There are also some clusters of riparian shrubs at various locations within the channel. The remaining vegetation consists of volunteer plants of both native and non-native species. There are a few specimen trees that should be preserved in place as the Greenway is developed.

The patches of native vegetation north of Escalante Road include Mesquite (*Prosopis velutina*), Foothill Palo Verde (*Parkinsonia microphylla*), and a variety of native shrubs. Although somewhat degraded, the existing vegetation within these patches has the potential to be the starting point for habitat restoration along the corridor.

The clusters of shrubs present within this segment include large clumps of Hackberry (*Celtis pallida* and *Celtis reticulata*). These clumps help stabilize and reduce soil erosion within the channel and also provide habitat and cover for song birds and small mammals.

The non-native plants present in this area include several noxious and invasive plant species. These include Buffelgrass (*Pennisetum ciliare*), Bermuda grass (*Cynodon dactylon*), Johnson grass (*Sorghum halapense*), Giant reed (*Arundo donax*), Salt cedar (*Tamarix spp.*), African sumac (*Rhus lancea*), Mexican Palo Verde (*Parkinsonia aculeata*), and Russian thistle (*Salsola spp.*). These species can be found throughout this reach of the Atturbury but are most prevalent within the wide channel bottom just south of Stella Road. Removal of these invasive species as needed to reestablish native riparian habitat will be a challenge and will require a significant initial effort and an on-going maintenance program.

Visual Resources:

The visual character of this segment is dominated by the rear-yard patio walls and fences associated with adjacent residential lots. These features range from very well maintained to deteriorated and unsightly. The construction of the Greenway, however, may be an incentive for adjacent property owners to improve the walls and fences that form the visual edges of the corridor.

The engineered elements of the channel, such as the concrete bank protection, are also visually prominent. A general clean-up of the area combined with new plantings along the Greenway will help to mitigate the visual impacts of these features.

Escalante Road to Stella Road Segment

Existing Conditions (Continued):

Within the middle portions of this segment of Greenway, there is a sense of enclosure that is created by the adjacent patio walls and the few specimen trees that line the Wash. This intimate character is in stark contrast to the wide-open vistas that are present in Lincoln Park to the south and in Lakeside Park to the north. This variation adds to the visual quality and character of the overall Atturbury Wash Greenway.

Cultural Resources:

The Escalante Road to Stella Road segment of the Atturbury Wash Greenway was not surveyed for cultural resources in conjunction with this master plan project. Given the extent of prior disturbance to the area as a result of channel improvements, underground utility installations, and residential subdivision construction, it is highly unlikely that cultural resources are present. However, a formal review of the segment site for cultural resources will be conducted prior to the construction of Greenway improvements in accordance with City of Tucson Parks and Recreation Department standards.

Utilities:

There are several underground utility systems present along the east bank of the Atturbury through this segment. Included are underground gas pipelines, buried electrical cable, and buried telephone cable. Associated with these underground utilities are transformers, switchgear, access boxes, regulators, and meters that have been installed at or above grade.

Coordination with applicable utility companies and the maintenance and protection of these utilities will be a necessary part of greenway development. When completed, the greenway multi-use path will facilitate access to the utility systems along the corridor. Although infrequent, it may be necessary from time-to-time to remove portions of the multi-use path to repair and maintain the underground utility systems.

Other Existing Conditions - Tributary Channel, Use of West Bank for Trash Collection, and Existing Multi-Use Path Development:

During the development of this plan, two alternatives were considered for the alignment of the Greenway between Escalante Road and Stella Road. The selected alternative is to follow the east bank. The other alternative considered was to follow the west bank.

Escalante Road to Stella Road Segment

Existing Conditions (Continued):

One of the factors supporting the proposed plan is the presence of a constructed tributary drainage channel that flows into the wash from the west. To cross this tributary a bicycle / pedestrian bridge would be required or the banks of the tributary channel would need to be modified to provide an accessible route through a dip crossing. The east bank does not have these conditions allowing for lower cost multi-use path development.

The alley along the west bank of the Atturbury is currently used for trash collection, but the alley along the east bank is not used for this purpose. Potential conflicts between large trucks and bicyclists / pedestrians made the west bank alternative less desirable.

Additionally, a portion of the multi-use path adjacent to the Lakeside Ridge Subdivision was already constructed. Using this existing path as part of the Greenway development will result in substantial cost savings.

Segment Specific Opportunities:

The location and existing conditions along the Escalante Road to Stella Road Segment of the Atturbury Wash Greenway create several opportunities for Greenway development. These include:

- Provision of a safe bicycle and pedestrian connection between Lincoln Park and Lakeside Park.
- A 0.5 mile long multi-use path and trail for use by area residents and commuters using alternate modes of transportation.
- Enhanced public safety in the area achieved by increasing the number of local residents who use the area and who can observe and report illegal or inappropriate behavior.
- Enhanced habitat value achieved through general clean-up of the site, removal of noxious and invasive plant species, and the planting of appropriate riparian and upland vegetation.
- Increased property values for adjacent and nearby residents resulting from convenient access to a City maintained public recreational facility.

Proposed Alignment:

The proposed alignment of the Greenway will cross the Atturbury Wash on the north side of Escalante Road and then follow the east bank of the wash for approximately 0.5 miles to Stella Road. The Greenway will then follow the south side of Stella Road for three hundred feet (300') to the Stella Road / Sarnoff Drive intersection. The proposed alignment is shown in Figures 4-G, 4-H, 4-I, 4-J, 4-K, and 4-L.

Escalante Road to Stella Road Segment

Proposed Greenway Cross-Sections:

The Escalante Road to Stella Road Segment of the Atturbury Wash Greenway will feature four different cross-sections.

The section that crosses the Atturbury Wash at Escalante Road will include a concrete multi-use path with a toe-down to minimize damage during storm events. This section will consist of a paved path and access control bollards only. (See Figure 4-C).

The section of the Greenway that extends north of Escalante Road (approximately 600') will include a paved multi-use path with decomposed granite shoulders. In this area there is adequate room for landscape plantings and habitat restoration along the path. (See Figure 4-D).

Moving north, the width of the alley where the Greenway path will be constructed becomes very narrow. Various utility structures and cabinets are also present along the alley's eastern edge. To the west, a sloped bank extends down into the Atturbury Wash channel. To create a level area wide enough for Greenway path development, it will be necessary to protect the upper portions of the bank with a rock filled gabion or similar retaining wall. The resulting cross-section is illustrated in Figure 4-E.

The fourth cross-section occurs in the area that is approximately 1,000 feet south of Stella Road. In this location, the channel widens and there is no stabilization of the channel bank. The proposed cross-section in this location is shown in Figure 4-F.

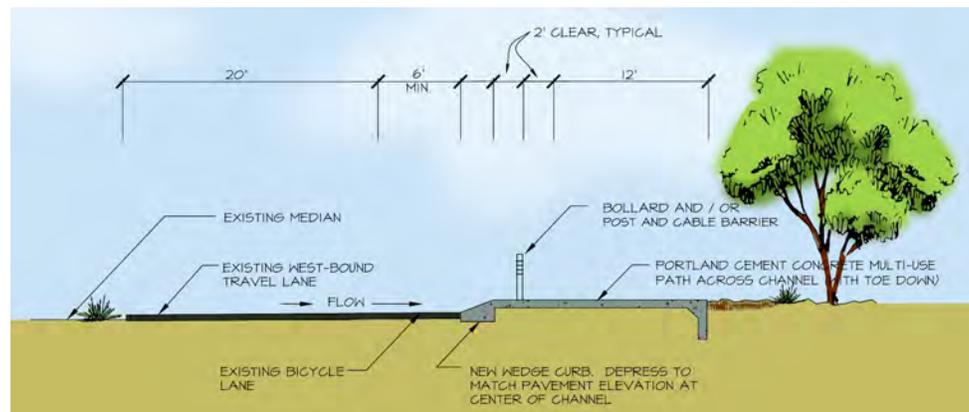


Figure 4-C: Typical Greenway Cross-Section Crossing of Atturbury Wash at Escalante Road

Escalante Road to Stella Road Segment

Proposed Greenway Cross-Sections (Continued):



Figure 4-D: Typical Greenway Cross-Section Escalante Road - North Approximately 600 Feet

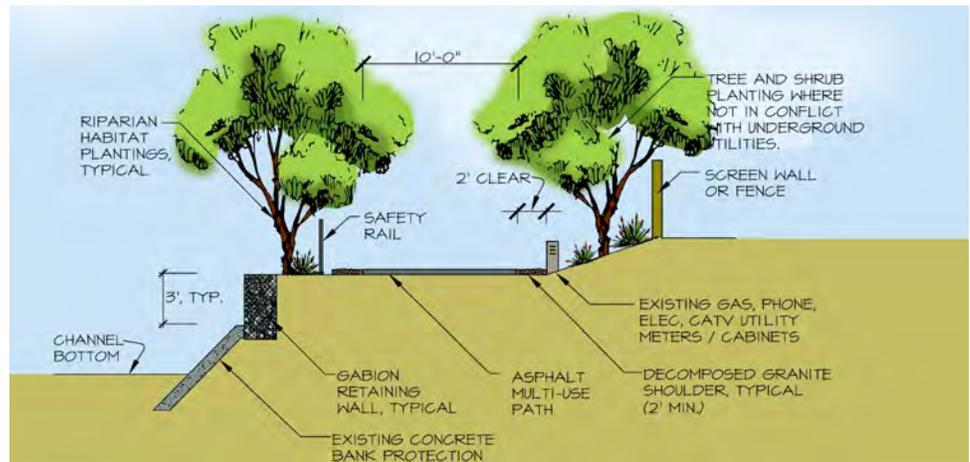


Figure 4-E: Typical Greenway Cross-Section Between Escalante Road and Stella Road

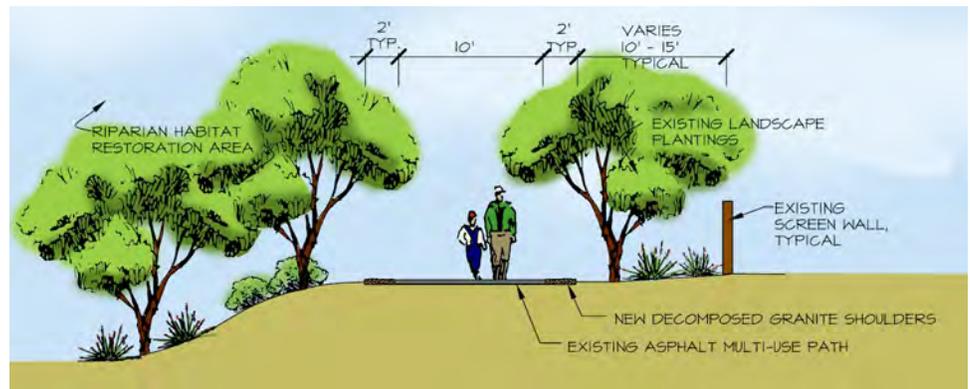


Figure 4-F: Typical Cross-Section Stella Road - South Approximately 1,000 Feet

Escalante Road to Stella Road Segment

Habitat Improvements:

At the southernmost portion of this segment, immediately north of the Atturbury - Lyman Bird and Animal Sanctuary, there are remnant patches of native vegetation. It is proposed that these areas be cleaned-up, that non-native plants be removed, and that supplemental planting be installed to enhance the value of the habitat in these locations. New plantings in this area will emphasize trees, such as Velvet Mesquite (*Prosopis velutina*) and other riparian species.

In the center of this segment, where the channel narrows, habitat improvements will be limited to new plantings on the channel bank, along the Greenway path, and at the eastern edge of the channel bottom. Extensive plantings within the channel could potentially impact the channel's stormwater conveyance capacity and the associated flood plain. Riparian and upland trees species such as Velvet Mesquite (*Prosopis velutina*) and Blue Palo Verde (*Parkinsonia florida*) will be emphasized.

In the northernmost portion of this segment, where there is a wider wash channel and a terrace above a low-flow channel, there is greater opportunity for habitat restoration. The initial phase of this restoration will be the eradication of non-native species. While complete eradication will be impossible, there is an opportunity to restore a more native plant community with enhanced habitat value. Emphasis will be given to creating clusters of dense planting with Velvet Mesquite (*Prosopis velutina*), Desert Hackberry (*Celtis pallida*), and Canyon Hackberry (*Celtis reticulata*). Additional information regarding plant species to be used for habitat restoration is included in Appendix C.

Irrigation Improvements:

A temporary drip irrigation system will be installed to ensure the establishment of trees and shrubs planted within this segment of the Greenway. If possible, reclaimed water will be used as the source of irrigation water. Dryland planting techniques and water harvesting will also be used to complement the temporary irrigation system.

Structures and Other Special Features:

Rest Areas North of Escalante Road:

Two small rest areas are proposed along the Greenway north of Escalante Road. These small plazas will serve Greenway users and area residents. Improvements to be constructed at these sites include benches, shade trees, informational signs, and signs posting Greenway use regulations.

Escalante Road to Stella Road Segment

Structures and other Special Features (Continued):

East Bank Gabion Retaining Wall:

As noted above, it will be necessary to construct a low (2' - 3' high) retaining wall along portions of the east bank. This wall will protect the bank while creating a sufficiently wide corridor adjacent to the channel for the construction of the proposed multi-use path. The use of rock filled Gabion will facilitate stormwater infiltration and allow the roots of native plants to grow through the Gabion and into the soil below. It will also provide a more natural visual appearance than a masonry or cast-in-place concrete retaining wall would provide.

Walkway Improvements along Stella Road:

To safely route bicycle and pedestrian traffic across Stella Road, it is proposed that the Greenway extend along the south side of Stella Road from the Atturbury Wash to the Stella Road / Sarnoff Drive intersection. To accomplish this, the existing sidewalk will need to be widened to accommodate two-way bicycle and pedestrian traffic. Additionally, it is proposed that a safety rail be installed between the roadway and the sidewalk / path to discourage unsafe mid-block crossings.

Near the intersection, there is a power pole that could be an impediment to safe bicycle and pedestrian movement. This power pole is a terminal pole with an overhead line extending back to the west only. It is proposed that this short section of overhead line be removed and relocated underground so that the subject pole can be removed.

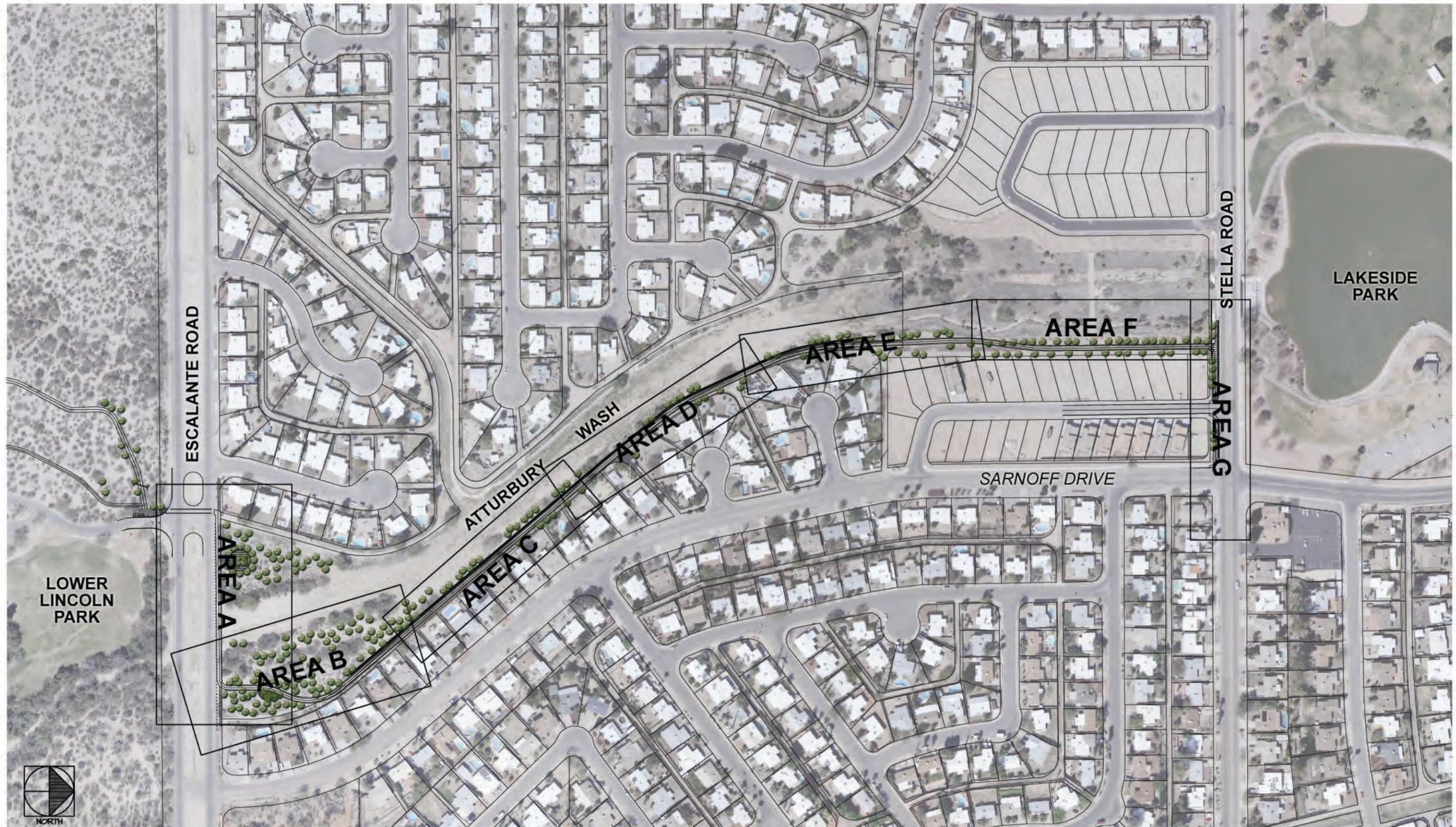
Other Design Issues:

Utility Coordination:

The presence of existing underground utilities within this segment of the Greenway will necessitate close coordination with the various utility companies. To the extent possible, the Greenway will be designed to avoid existing installations, but some minor relocations may be necessary. The Greenway may also need to be designed to accommodate the maintenance and service access requirements of the respective utility companies.

Construction Quantities and Cost Estimate:

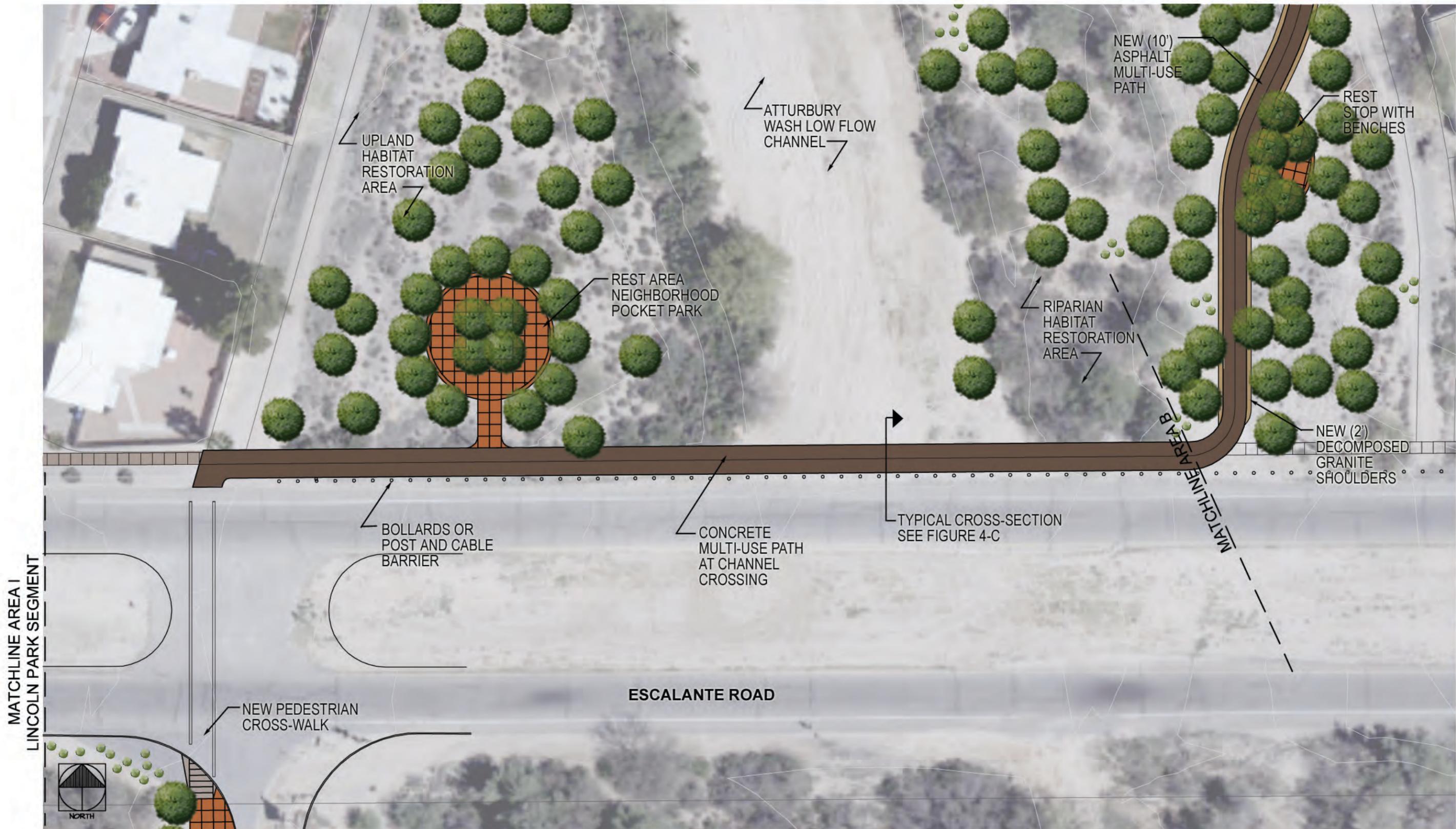
The estimated cost to construct the Escalante Road to Stella Road segment of the Atturbury Wash Greenway is \$509,000. This estimate is based on the conceptual design presented herein and should be considered an order-of-magnitude estimate only. The estimate is based on 2009 costs without escalation. Additional detail related to the estimated construction cost is included in Appendix A.



ESCALANTE ROAD TO STELLA ROAD SEGMENT - KEY MAP



Figure 4-G
Atturbury Wash Greenway Master Plan
Escalante Road to Stella Road Segment Key Map



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA A



Figure 4-H
Atturbury Wash Greenway Master Plan
Escalante Road to Stella Road Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA B

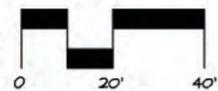
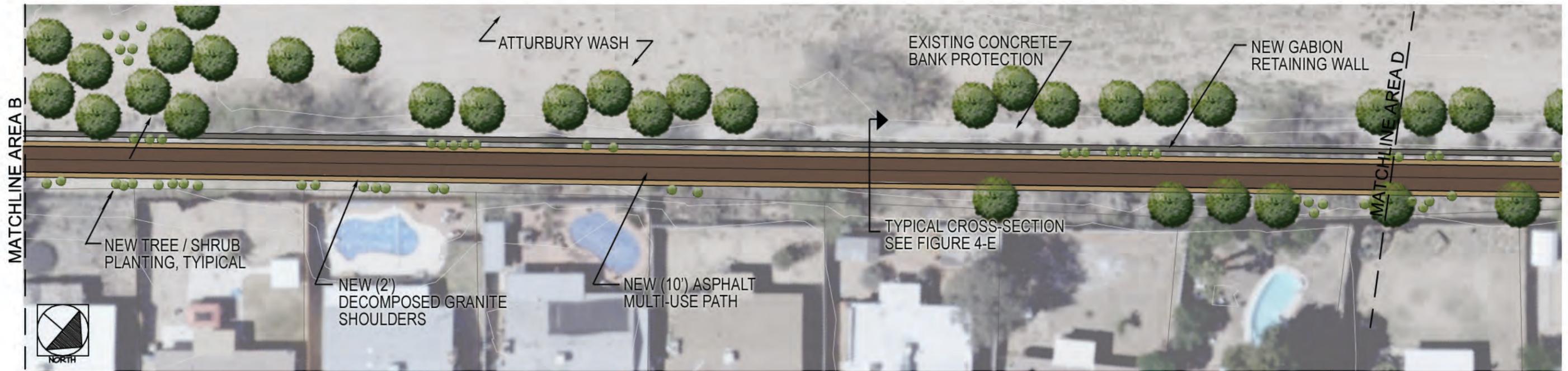


Figure 4-1
Atturbury Wash Greenway Master Plan
Escalante Road to Stella Road Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA C

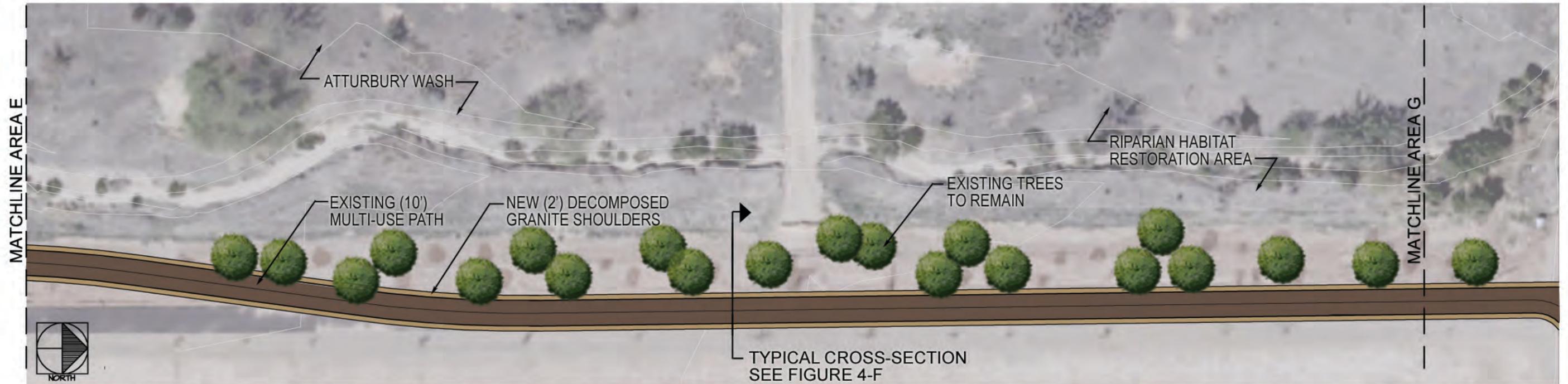
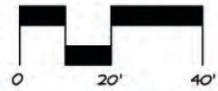


CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA D

Figure 4-J
Atturbury Wash Greenway Master Plan
Escalante Road to Stella Road Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA E



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA F

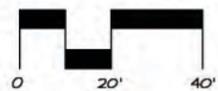


Figure 4-K
Atturbury Wash Greenway Master Plan
Escalante Road to Stella Road Segment

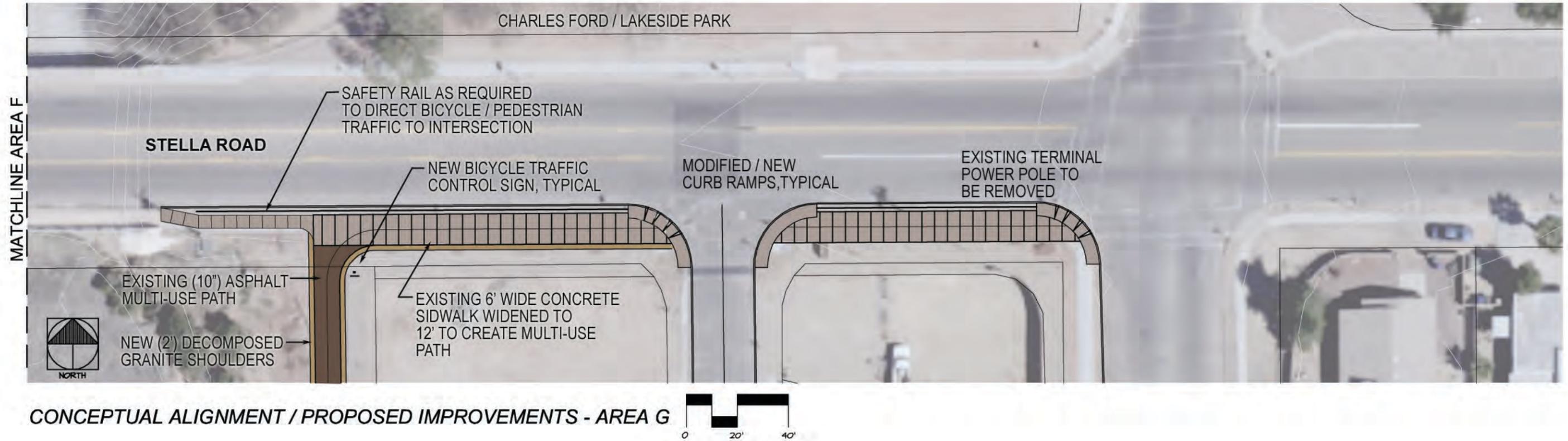


Figure 4-L
 Atturbury Wash Greenway Master Plan
 Escalante Road to Stella Road Segment

Existing Conditions:

General:

The Lakeside Park Segment of the Atturbury Wash Greenway extends from Stella Road north along the eastern boundary of Charles Ford Lakeside Park. North of the park, it follows the eastern bank of the Atturbury Wash, between the channel and Sarnoff Drive. The northern terminus of this segment is Golf Links Road. The length of this Greenway segment is approximately 0.5 miles. (See Figure 5-A).

The urban fishing lake at Lakeside Park is an impoundment of the Atturbury Wash. Soil excavated to create the lake was stockpiled at the perimeter of the site creating rather steep hills. These hilly perimeter areas were planted with turf grass and trees. Parking lots and ramadas have also been constructed along the eastern edge of the park.

North of Lakeside Park, the Atturbury Wash consists of a constructed channel with residential and other urban development to the west. An 80' wide terrace above the channel bank and Sarnoff Drive are to the east. In this location, there is an existing, 10' wide, asphalt multi-use path. The multi-use path crosses a tributary drainage channel in a dip-crossing approximately 200' south of Golf



Links Road.

Eastern Edge of Charles Ford Lakeside Park - Looking North

**Existing Conditions
(Continued):**



Eastern Edge of Lakeside Park at East Boat Ramp / Park Entry - Looking South



Existing Path on East Bank of Atturbury Wash - South of Golf Links Rd. - Looking North

Lakeside Park Segment

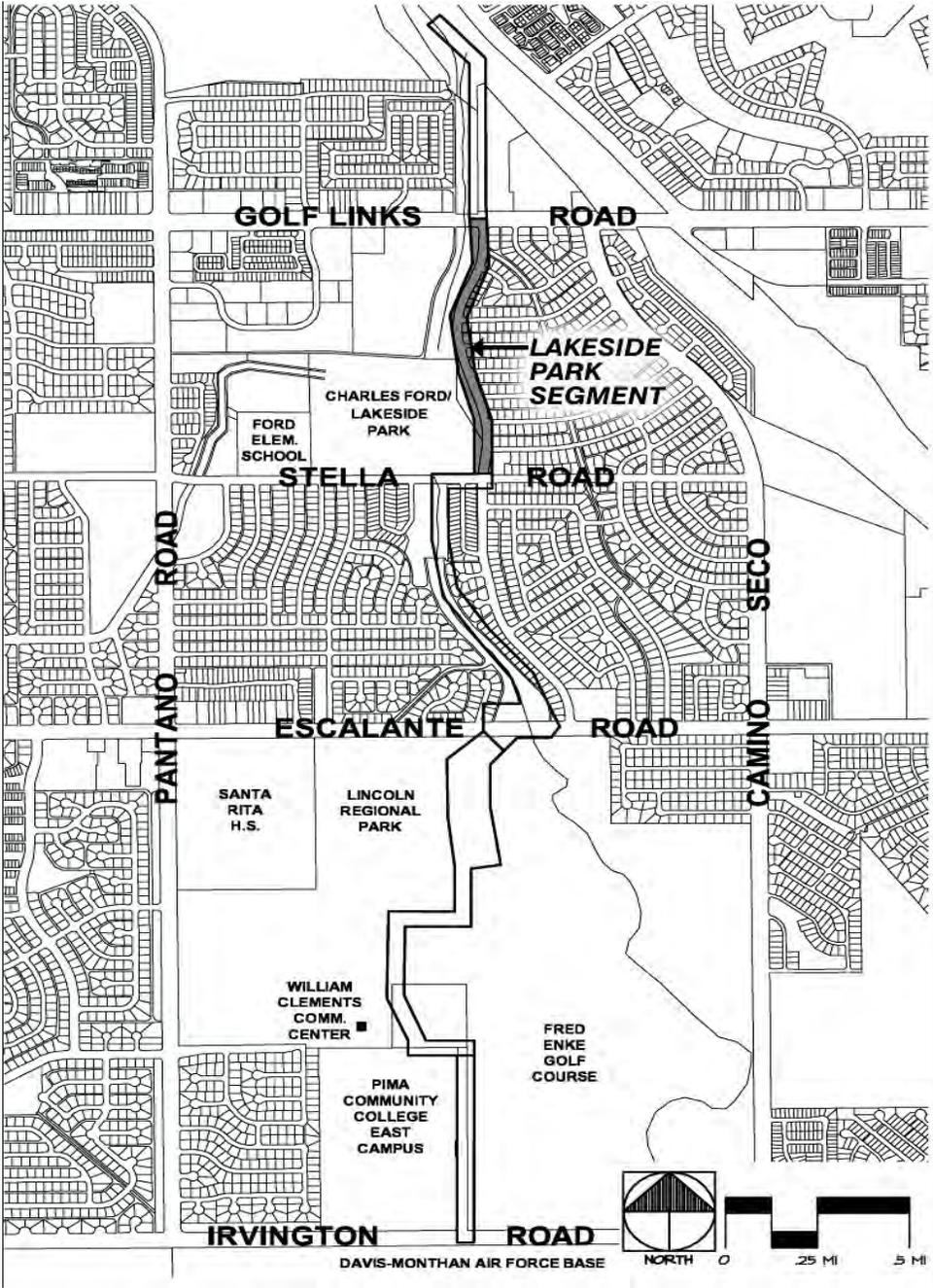


Figure 5-A: Location Map

Existing Conditions (Continued):

Hydrology:

The southern portion of this Greenway segment is above the elevation of the lake and the associated 100 year floodplain. There are small sloped areas within the park that will drain across the Greenway. These local flows will be conveyed in scuppers or pipes below the proposed multi-use path as-appropriate.

North of the park, the Lake drains into the Atturbury Wash channel. Based on Tucson Stormwater Management System (TSMS) data, the flow at this location during the 100-year storm event is 4,344 cfs. The floodplain is contained within the wash channel.

Similarly, the floodplain between the Lake and Golf Links Road is contained within the Atturbury Wash channel and will not impact the development of the Greenway path and trail system. At Golf Links Road, stormwater is conveyed below the roadway through a box culvert. The 100-year storm event flow at this location is 4,382 cfs.

Biological Resources:

The riparian habitat that was historically associated with Atturbury Wash within this segment of the Greenway was removed with the construction of the lake, the park, the improved channel, and adjacent roads and utility systems. Existing vegetation along the corridor consists of scattered trees some of which are native species and some of which are invasive non-native species. The understory consists of weedy species such as Burrobush (*Hymenoclea monogyra*), Desert Broom (*Baccharis sarathroides*), Bermuda Grass (*Cynodon dactylon*), Johnson Grass (*Sorghum halapense*), and Giant Reed (*Arundo donax*).

Visual Resources:

The visual resources associated with this segment of the Greenway are characterized by views of urban development and constructed parkland. In the vicinity of Lakeside Park, there are attractive views of the lake and the surrounding grassy park. Longer range vistas of the Santa Catalina Mountains and other mountain ranges are also present.

North of the park, views are more constrained by urban development including single-family homes and apartments. Sarnoff Drive and Golf Links Road are also prominent visual features.

The proximity of this section of Greenway to Sarnoff Drive has the potential to make the Greenway highly visible to the Tucson community.

Existing Conditions (Continued):

Cultural Resources:

The Lakeside Park segment of the Atturbury Wash Greenway was not surveyed for cultural resources as part of this project. It is unlikely, however, that cultural resources are present. This is due to the extensive earthwork and other ground modifications associated with previous park, lake, drainage channel, utility, and roadway construction. However, a formal review of the segment site for cultural resources will be conducted prior to the start of Greenway construction in accordance with City of Tucson Parks, and Recreation Department standards.

Utilities:

In-as-much as this segment of the Greenway parallels Sarnoff Drive there are numerous underground utilities in the vicinity of the corridor. Most of them, however, are within the Sarnoff Drive right-of-way and should not be an impediment to Greenway construction.

Branch utilities serving Lakeside Park and crossing the Greenway corridor are likely to be present. These private (Parks Department) utility lines will need to be located and protected during Greenway development.

Other Existing Conditions - Access Drive to Boat Ramp:

At the northeast corner of Lakeside Park there is a boat ramp and associated parking lot with two vehicular access drives from Sarnoff Drive. There is also a large paved area, outside the park's perimeter fence and along the roadway, that is infrequently used for over-flow parking.

The proposed alignment of the Greenway will cross this paved area and intersect with the entry drives. To minimize potential bicycle / pedestrian conflicts with motor vehicles at these entry locations, a consolidation of the entry drives is proposed.

Other Existing Conditions - Steep Grades along Sarnoff Drive:

There is a portion of Sarnoff Drive, east of Lakeside Park, where the grade of the roadway is greater than five percent (5%). The grade of the adjacent park site is similarly steep (See photograph next page). Following the existing grade with the new multi-use path would result in a slope along the centerline of the path that exceeds federal and local guidelines for accessibility. A modified, flatter grade will be required to meet these standards.

Existing Conditions (Continued):



Steep Grades along Sarnoff Drive and the East Boundary of Lakeside Park

Segment Specific Opportunities:

The location and existing conditions along the Lakeside Park Segment of the Atturbury Wash Greenway create several opportunities for successful Greenway development. These include:

- An opportunity to construct an accessible pedestrian route along the eastern edge of Lakeside Park connecting the public use facilities near the east boat ramp with the public use facilities accessed from Stella Road.
- Enhanced opportunities for residents living in the vicinity of Lakeside Park to safely walk or bike to Lincoln Park, the Clements Center, the Pima Community College East, and other destinations located to the south along the Greenway.
- An opportunity to create a 0.5 mile long multi-use path and trail for recreational use and for use by commuters using alternate modes of transportation.
- An opportunity to enhance the visual characteristics and habitat value associated with the Greenway corridor.

Proposed Alignment:

The southernmost portion of Lakeside Park segment will parallel Sarnoff Drive along the eastern boundary of the Park. A portion of the multi-use path in this area will be constructed on an elevated grade behind a small retaining wall. The elevated grade will enable the multi-use path to meet applicable standards for accessibility. (See Figures 5-B and 5-F).

Proposed Alignment (Continued):

At the northeast corner of Lakeside Park, in the vicinity of the boat launch parking lot, the alignment will parallel the Sarnoff Drive right-of-way. It will be close to the existing roadway so as to minimize impacts to the existing parking lot. (See Figures 5-F and 5-G).

North of the park the multi-use path and trail will follow the east bank of the Atturbury Wash and will meander between the wash channel and the Sarnoff Drive right-of-way. The dip crossing of the tributary channel will be replaced with a short-span bicycle and pedestrian bridge. (See Figure 5-H).

Proposed Greenway Cross-Sections:

The Lakeside Park Segment of the Atturbury Wash Greenway will feature three different cross-sections as needed to respond to existing site conditions.

Adjacent to Lakeside Park, the cross-section will feature low retaining walls as needed to raise the grade of the multi-use path and make it accessible. This cross-section will also feature a safety rail at the top of the retaining wall and some supplemental planting. (See Figure 5-B).

In the vicinity of the boat launch parking area, where available space is constrained, the cross-section will feature a paved multi-use path with decomposed granite shoulders. Plantings will also be included where there is sufficient space. (See Figure 5-C).

Between Lakeside Park and Golf Links Road, where there is ample room for Greenway development, the cross-section will feature a paved multi-use path, a separate decomposed granite trail, and plantings on both sides of the path and trail. (See Figure 5-D).

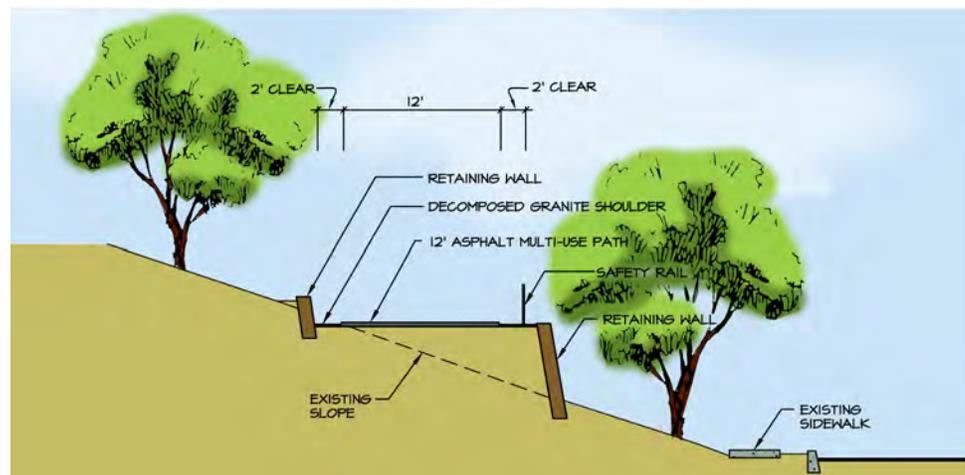


Figure 5-B: Proposed Cross-Section adjacent to Lakeside Park

**Proposed Greenway
Cross-Sections
(Continued):**



Figure 5-C: Proposed Cross-Section Adjacent to Boat Launch Parking Lot



Figure 5-D: Proposed Cross-Section between Lakeside Park and Golf Links Road

**Habitat
Improvements:**

The urban character of the corridor adjacent to Lakeside Park and the absence of a wash channel with periodic storm flows makes the re-establishment of riparian habitat in this area inappropriate. What is appropriate and what is proposed is the planting of additional trees along this section of Greenway. The trees will complement the existing park vegetation, provide enhanced habitat for birds, and shade the Greenway path to make it more comfortable for users.

**Habitat Improvements
(Continued):**

Between the Park and Golf Links Road there is greater opportunity for habitat restoration. The planting of native trees, shrubs, cacti, and grasses is proposed in this area. Plantings will include species such as Velvet Mesquite (*Prosopis velutina*), Blue Palo Verde (*Parkinsonia florida*), and Desert Willow (*Chilopsis linearis*). These species have high habitat value, are drought tolerant, and will also create an attractive urban landscape.

**Irrigation
Improvements:**

An automatic drip irrigation system will be installed in conjunction with the development of the Lakeside Park segment of the Greenway. The source of irrigation water will be an existing reclaimed water main within Lakeside Park. The new irrigation control system will be integrated with the existing irrigation control system within the park.

Water harvesting will also be used to provide supplemental water to the habitat restoration and landscape plantings along the Greenway.

**Structures and Other
Special Features:**

Retaining Walls and Elevated Multi-Use Path at Lakeside Park:

As noted above, the development of an accessible multi-use path adjacent to Lakeside Park will require elevated grades supported by low retaining walls. There are various options for retaining wall construction, but the most cost effective will likely be a pre-cast masonry segmental wall. The requirements for this retaining wall are illustrated in plan and profile in Figure 5-I.

Bicycle Pedestrian Bridge at Tributary Channel:

There is an existing tributary channel that drains into the Atturbury Wash from the east approximately 200 feet south of Golf Links Road. This channel floods with each rain storm and can flow several feet deep during large storm events. To provide all-weather access along the Greenway, it is proposed that this tributary channel be bridged with a bicycle / pedestrian bridge structure.

A composite plate girder bridge with a 50' span is proposed for this location. The structure type will allow it to be designed with railing and other features that are unique to this bridge and to the Atturbury Wash Greenway. It will also be a cost effective structure to construct. Additional information related to this structure is included in Appendix E.

**Construction
Quantities and Cost
Estimate:**

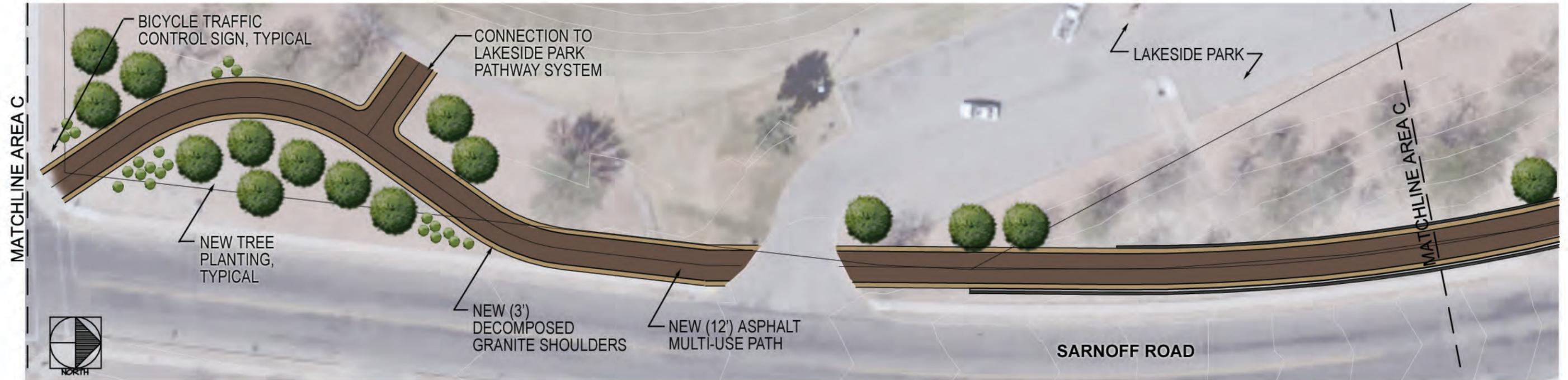
The estimated cost to construct the Lakeside Park Segment of the Atturbury Wash Greenway is \$636,000. This estimate is based on the conceptual design presented herein and should be considered an order-of-magnitude estimate only. The estimate is based on 2009 cost without escalation. Additional detail related to the estimated construction cost is included in Appendix A.



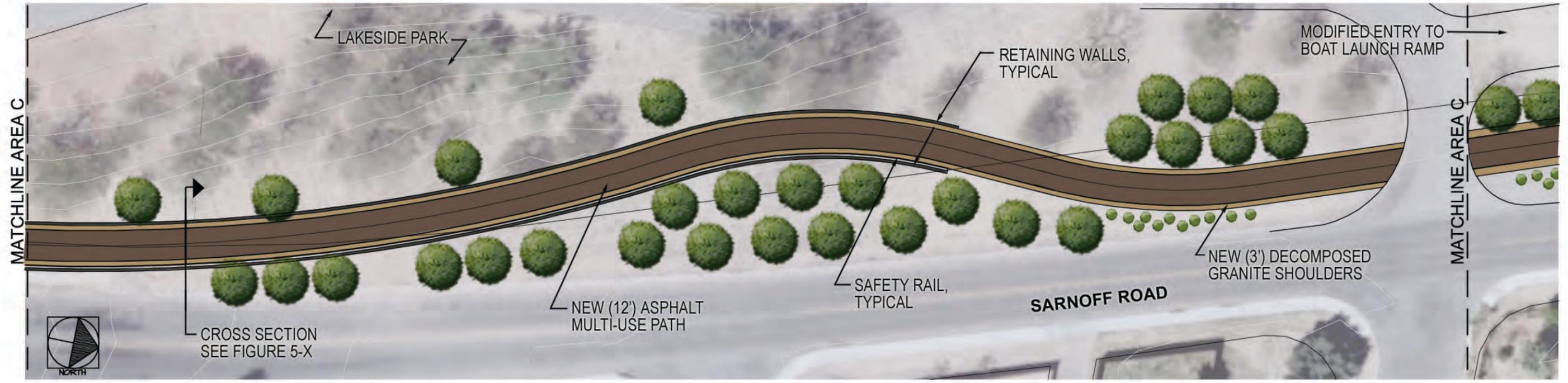
LAKESIDE PARK SEGMENT - KEY MAP



Figure 5-E
Atturbury Wash Greenway Master Plan
Lakeside Park Segment Key Map



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA A

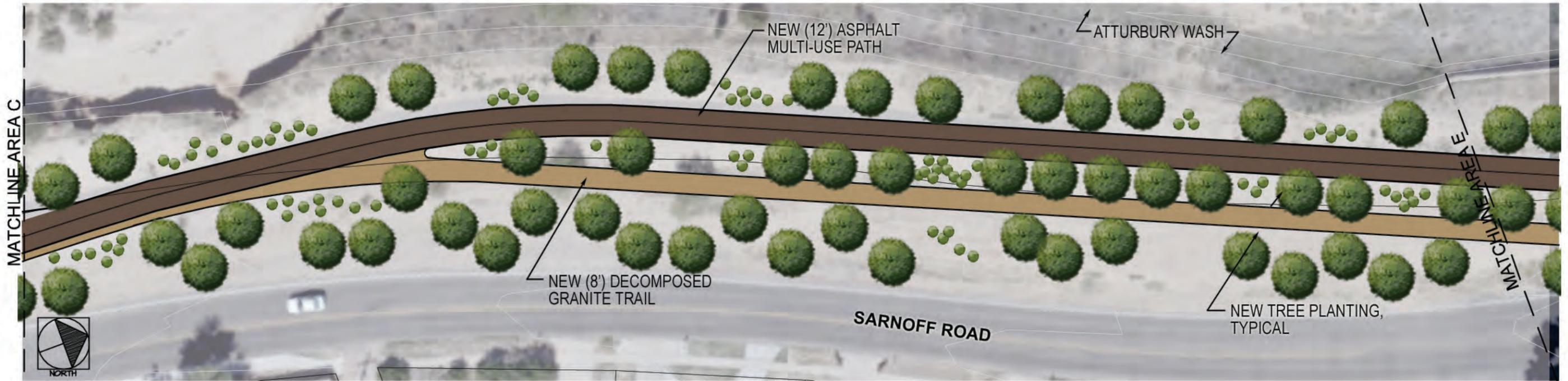
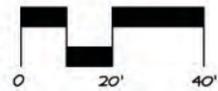


CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA B

Figure 5-F
Atturbury Wash Greenway Master Plan
Lakeside Park Segment



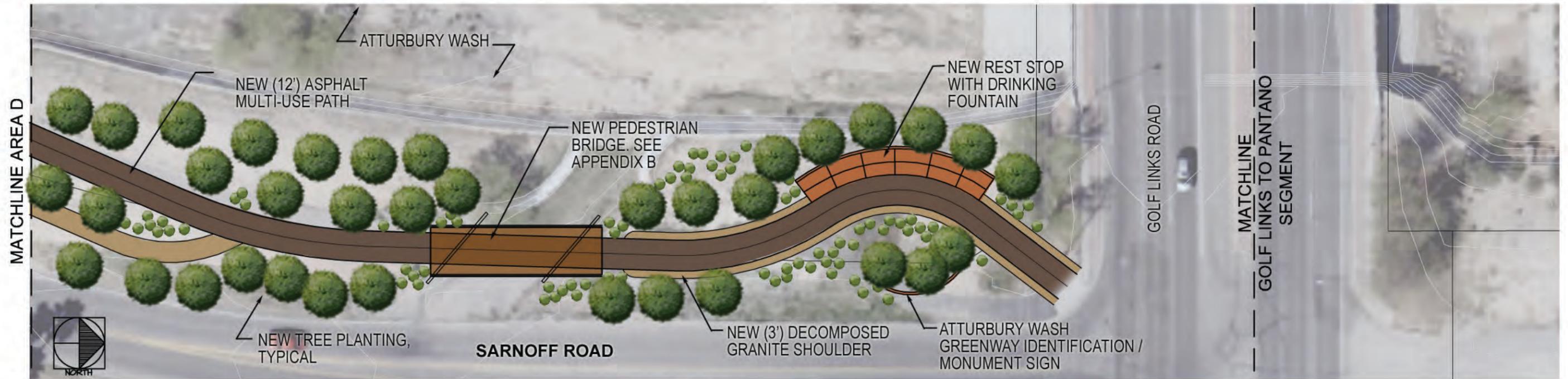
CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA C



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA D



Figure 5-G
Atturbury Wash Greenway Master Plan
Lakeside Park Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA E

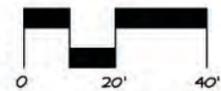
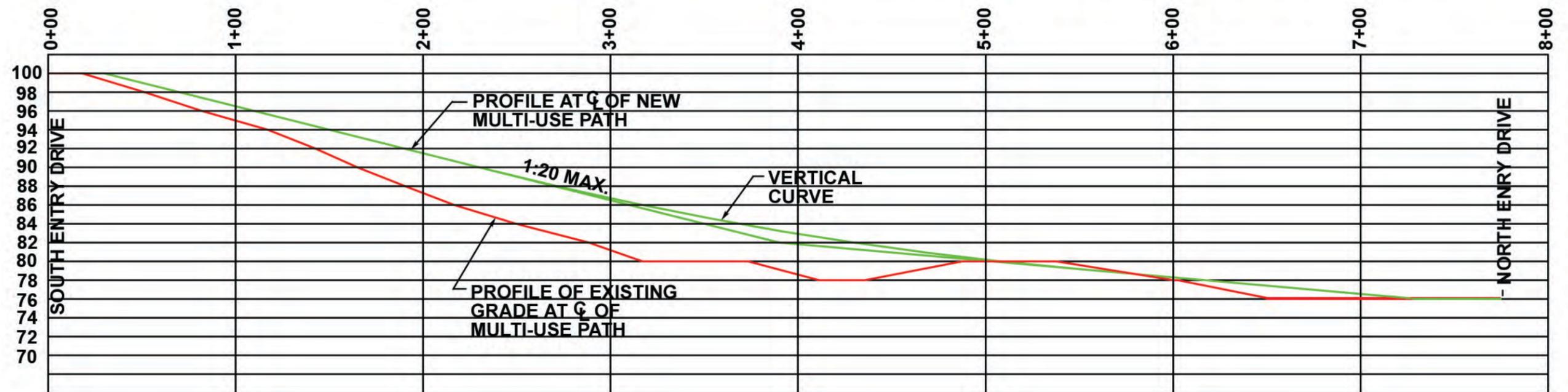


Figure 5-H
 Atturbury Wash Greenway Master Plan
 Lakeside Park Segment



LAKESIDE PARK AREA TRAIL PROFILE

Figure 5-1
Atturbury Wash Greenway Master Plan

Golf Links Road to Pantano Wash Segment

Existing Conditions:

General:

The Golf Links Road to Pantano Wash Segment of the Greenway will follow the eastern bank of the Atturbury Wash from the Golf Links Road right-of-way to the confluence of the Atturbury and Pantano. The length of this segment is approximately 0.3 miles. (See Figure 6-A).

The Atturbury Wash within this segment consists of channel that is approximately 150' wide by 20' deep. The lower portions of the channel banks are stabilized with soil cement. The upper portions of the banks consist of native soil. In this area, the Atturbury has the characteristics of an engineered conveyance channel rather than those of a natural wash.

On the eastern bank of the Wash there is a 30' wide level corridor that will be used for pathway and trail development. This corridor was dedicated to the City of Tucson in conjunction with the rezoning of the adjacent property. (City of Tucson Ordinance Number 9676, dated March 4, 2002. A copy of this Ordinance is attached as Appendix F).



East Bank of Atturbury Wash Channel North of Golf Links Road - Looking North

Golf Links Road to Pantano Wash Segment

Existing Conditions (Continued):

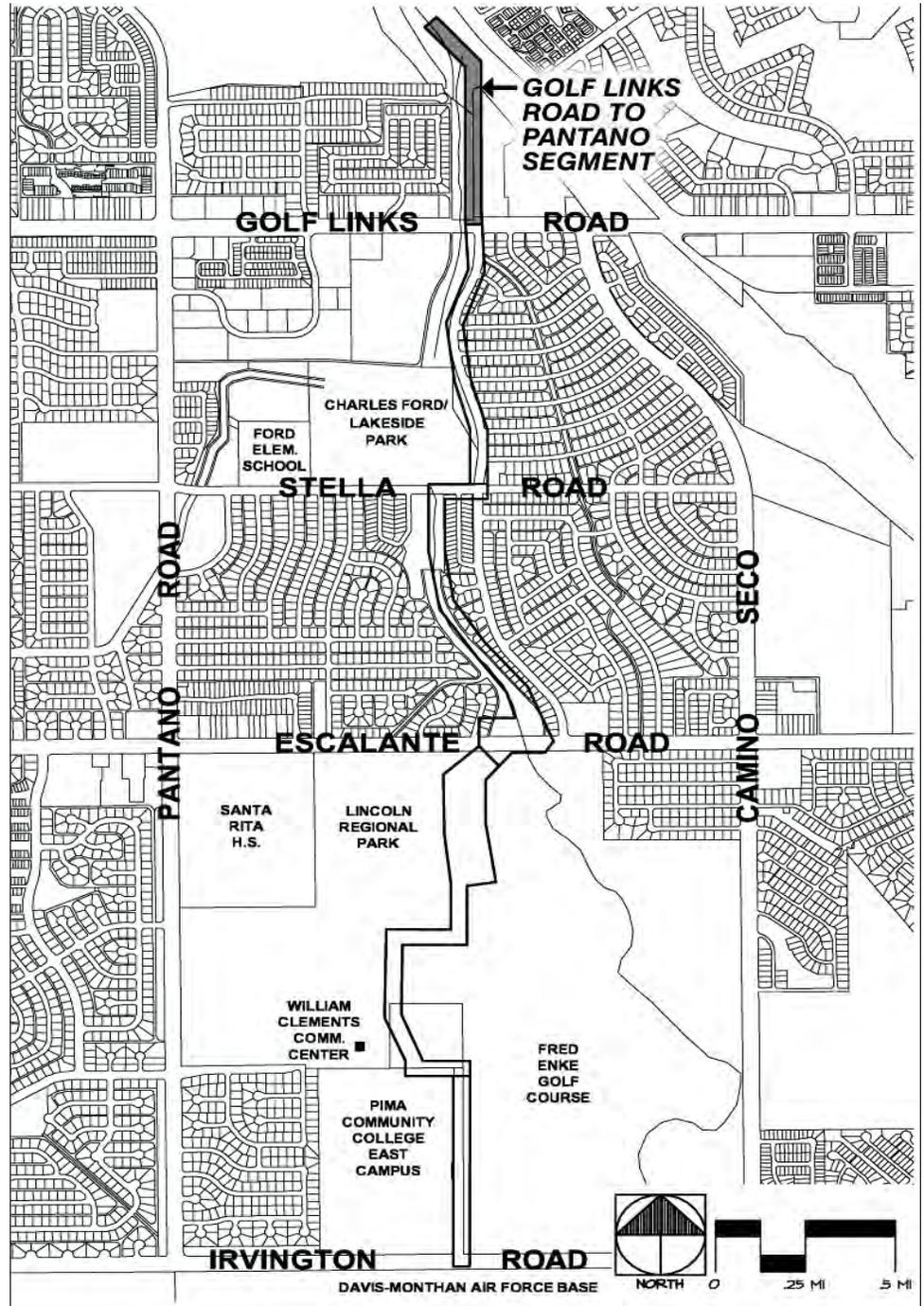


Non-Native / Weedy Vegetation in Atturbury Wash Channel - North of Golf Links Road



Existing Conditions Southeast of Atturbury Wash / Pantano Wash Confluence

Golf Links Road to Pantano Wash Segment



Figures 6-A: Location Map

Golf Links Road to Pantano Wash Segment

Existing Conditions (Continued):

Hydrology:

Based on Tucson Stormwater Management System (TSMS) data, the storm flows associated with the 100-year storm event are 4,382 cfs at the south end and 4,408 cfs at the north end of this segment. The flood plain associated with these flows is contained within the constructed channel. The proposed improvements on the channel bank will be outside the floodplain limits.

There are no tributary channels that drain into the Atturbury Wash from the east between Golf Links Road and the Pantano Wash. Local drainage across the proposed Greenway corridor will need to be accommodated with scuppers and/or pipe below the paved multi-use path.

Biological Resources:

The biological resources associated with the subject portion of the Atturbury Wash are highly degraded. Previous channel construction and development on and near the channel banks has resulted in all of the native riparian vegetation being removed. The existing vegetation is characterized by weedy and non-native species such as Dogweed (*Dyssodia pentachaeta*), Burrowweed (*Isocoma tenuisecta*), Desert Broom (*Baccharis sarothroides*), Eucalyptus (*Eucalyptus* spp.), and Oleander (*Nerium oleander*).

Visual Resources:

This segment of the Greenway does feature long-range views of the Santa Catalina Mountains to the north. These vistas become more prominent and unobstructed near the confluence with the Pantano Wash.

The visual resources elsewhere along the segment are degraded. They are characterized by eroded slopes, non-native plants, stored construction materials on the site to the east, and urban development to the west and to the south, along Golf Links Road.

Cultural Resources:

The Golf Links Road to Pantano Wash segment of the Atturbury Wash Greenway was not surveyed for cultural resources as part of this project. It is unlikely, however, that cultural resources are present. This is due to the extensive earthwork and other ground modifications associated with previous drainage channel, bank protection, and roadway construction. However, a formal review of the segment site for cultural resources will be conducted prior to the start of Greenway construction in accordance with City of Tucson Parks, and Recreation Department standards.

Golf Links Road to Pantano Wash Segment

Existing Conditions (Continued):

Utilities:

There are several underground and overhead utility lines that cross the southern end of this segment of the Greenway. These utility lines are within the Golf Links Road right-of-way. The Greenway will need to be designed to avoid conflicts with these existing utilities.

The corridor along the east bank of the Atturbury Wash, where the proposed multi-use path and trail will be developed, was recently acquired by the City of Tucson. In-as-much as this corridor was historically undeveloped private property and not a public right-of-way there are no known utility lines in this location and there should be no impediments to Greenway development.

Other Existing Conditions - Planned Development of Pantano River Park:

The Pima County Regional Flood Control District, as part of its overall river park development program, has completed the design and engineering of a multi-use path and other linear park features along the Pantano Wash, from Michael Perry Park to 22nd Street. These improvements will be constructed on the north bank of the Pantano Wash.

Although there are no current plans for river park development along the south bank of the Pantano, the long-range goal of Pima County, the City of Tucson, and other local jurisdictions is to have paths and trails along both sides of the major water courses in the region, including the Pantano. In the interim, however, there will be a gap between the northern terminus of the Atturbury Wash Greenway and the Pantano River Park's north bank improvements.

The development of strategies for connecting the Atturbury Wash Greenway to the Pantano River Park prior to the build-out of the regional river park and greenway system will be important.

Segment Specific Opportunities:

The location and existing conditions along the Golf Links Road to Pantano Wash Segment of the Atturbury Wash Greenway create several opportunities for Greenway development. These include:

- An opportunity to connect the Atturbury Wash Greenway with the Pantano River Park expanding and improving the ability of City residents living near the Atturbury Wash to connect with the regional river park system and use it for recreation and commuting via alternate modes of transportation.
- An opportunity to enhance the visual character of the Atturbury Wash Greenway corridor as viewed from the heavily traveled Golf Links Road.

Golf Links Road to Pantano Wash Segment

Segment Specific Opportunities (Continued):

- An opportunity to enhance the habitat value of a section of the Atturbury Wash corridor that is currently degraded and in poor condition.
- An opportunity to replant and stabilize slopes adjacent to the Wash and to reduce on-going maintenance requirements.

Proposed Alignment:

The Golf Links Road to Pantano Wash Segment of the Atturbury Wash Greenway will follow the east bank of the channel. It will meander slightly within the 30' level corridor that was acquired for Greenway development.

At the confluence of Atturbury and Pantano, the Greenway will connect to the south bank portion of the planned Pantano River Park. A bicycle and pedestrian bridge will be constructed to allow users to cross over the Atturbury Wash channel. (See Figures 6-C, 6-D, and 6-E).

Proposed Greenway Cross-Section:

The cross-section associated with the Golf Links Road to Pantano Wash Segment of the Greenway will feature a paved multi-use path with decomposed granite shoulders. A new chain-link fence or post-and-cable barrier will be installed along the eastern edge of the corridor. The existing safety rail along the channel edge will be repaired or replaced, as-needed. The existing bare soil slopes extending down into the channel will be repaired and planted to prevent future erosion.

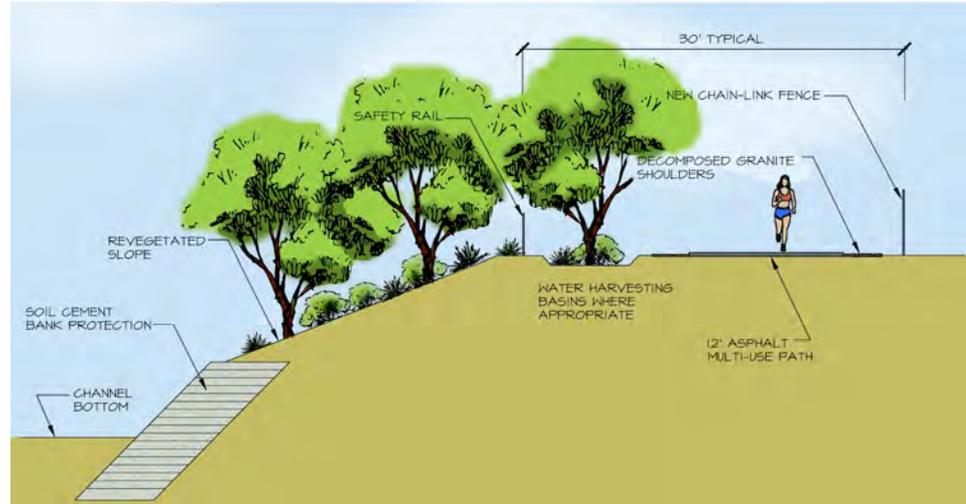


Figure 5-B: Proposed Cross-Section between Golf Links Road and Pantano Wash

Habitat Improvements:

As an initial step in the improvement of the habitat along this segment of the Greenway, invasive, noxious, and non-native plant species will be removed to the greatest extent feasible. Slopes within the channel above the soil cement and level areas outside the channel bank will then be replanted with native vegetation.

Golf Links Road to Pantano Wash Segment

Habitat Improvements (Continued):

The subject area, although along the wash, is not subject to periodic flooding and as such will not support many native riparian plant species. Accordingly, a mix of upland plant species will be utilized. The plant palette proposed for this area includes species such as Velvet Mesquite (*Prosopis velutina*), Blue Palo Verde (*Parkinsonia florida*), Desert Willow (*Chilopsis linearis*), Triangle Leaf Bursage (*Ambrosia deltoidea*), and Brittlebush (*Encelia farinosa*). Additional information related to proposed habitat improvement plantings is included in Appendix C.

Irrigation Improvements:

An automatic drip irrigation system will be installed in conjunction with the development of the Golf Links Road to Pantano Wash segment of the Atturbury Wash Greenway. Reclaimed water will be used as the source of irrigation water if it is feasible to make a connection to an existing reclaimed water main when this segment is constructed.

Water harvesting will also be used to provide supplemental water to the habitat restoration plantings along the Greenway.

Structures and other Special Features:

Bicycle / Pedestrian Bridge Across the Atturbury Wash Channel:

To enable uninterrupted bicycle and pedestrian traffic along the south bank of the Pantano Wash, it is proposed that a bridge be constructed across the Atturbury Wash channel. This bridge should be constructed concurrently with pathway and trail development on the south bank.

A composite plate girder bridge with two 90' spans and a center pier (180' total bridge length) is proposed for this location. The structure type will allow it to be designed with railings and other features that are unique to this bridge and to the Atturbury Wash Greenway. This type of bridge will also be a cost effective structure to construct in the context of the project site.

The proposed bridge will cross the channel at an angle that reduces the overall bridge length. There is public right-of-way at both ends of the proposed bridge alignment to allow for safe bicycle turning movements. Additional information related to the proposed bridge structure is included in Appendix E.

Rest Area North of Golf Links Road:

A small rest area is proposed for the Greenway north of Golf Links Road. This area will feature benches, a drinking fountain, trees for shade, informational signs, and signs posting Greenway use regulations.

Golf Links Road to Pantano Wash Segment

**Structures and Other
Special Features
(Continued):**

Temporary Connections between Greenway and the Pantano River Park:

As of the date of this master plan, schedules for the construction of the Pantano River Park and for the construction of the northern end of the Atturbury Wash Greenway had not been established. Ideally, these improvements would be constructed at the same time and all appropriate connections made. More realistically, they will be constructed independently over a period of several years. There will likely be a need to make temporary connections between the two facilities.

There are two potential ways to connect these two facilities on an interim basis. They are:

- Improvements to the sidewalks along the south side of Golf Links Road, between the Atturbury Wash and the Pantano Wash.
- Construction of facilities along the south bank of the Pantano between the Atturbury Wash and Golf Links Road.

Improvements to the sidewalks on the south side of Golf Links Road as needed to connect the two project will be difficult. This is due to the need to cross several roadway intersections and to work around existing utility features and landscape improvements. Though less than ideal, the subject corridor could be used as a connection on a temporary basis.

The construction of improvements on the south bank of the Pantano would also create a connection. A paved multi-use path and associated improvements on the south bank between the confluence and Golf Links Road will be required to make this connection functional.

Both of these approaches will require improvements to the bicycle and pedestrian ramps under Golf Links Road at the Pantano Wash. There are existing ramps at this location, but they are substandard in terms of width and grade. They will need to be reconstructed to current standards before they can be effectively and safely used by bicyclists and pedestrians.

**Construction
Quantities and Cost
Estimate:**

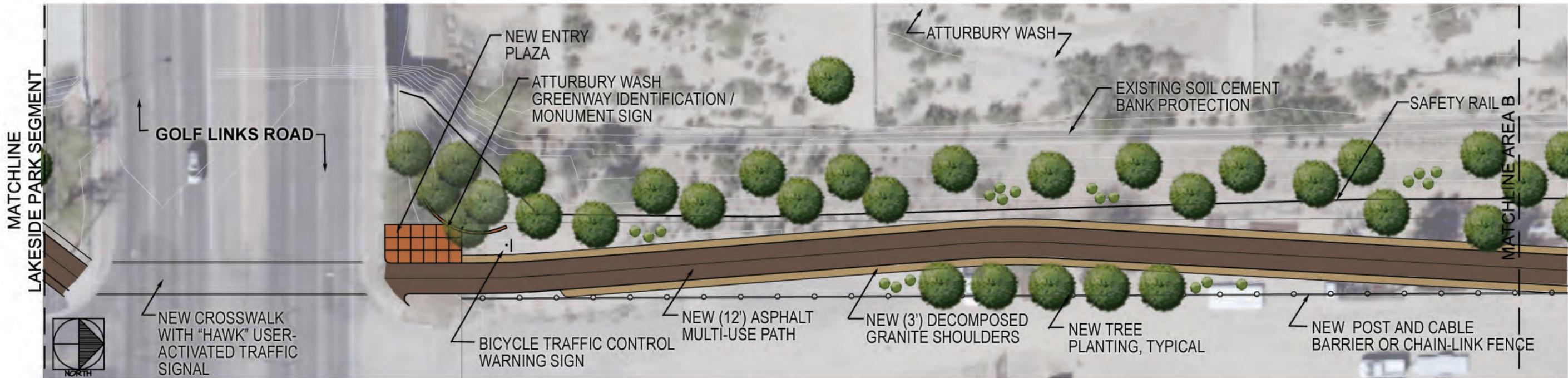
The estimated cost to construct the Golf Links Road to Pantano Wash Segment of the Atturbury Wash Greenway is \$1,218,000. This estimate is based on the conceptual design presented herein and should be considered an order-of-magnitude cost estimate only. The estimate is based on 2009 costs without escalation. Additional detail related the estimated construction cost is included in Appendix A.



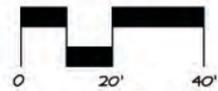
GOLF LINKS ROAD TO PANTANO WASH SEGMENT - KEY MAP



Figure 6-C
Atturbury Wash Greenway Master Plan
Golf Links Road to Pantano Wash Segment Key Map



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA A



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA B

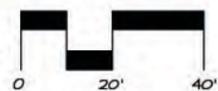
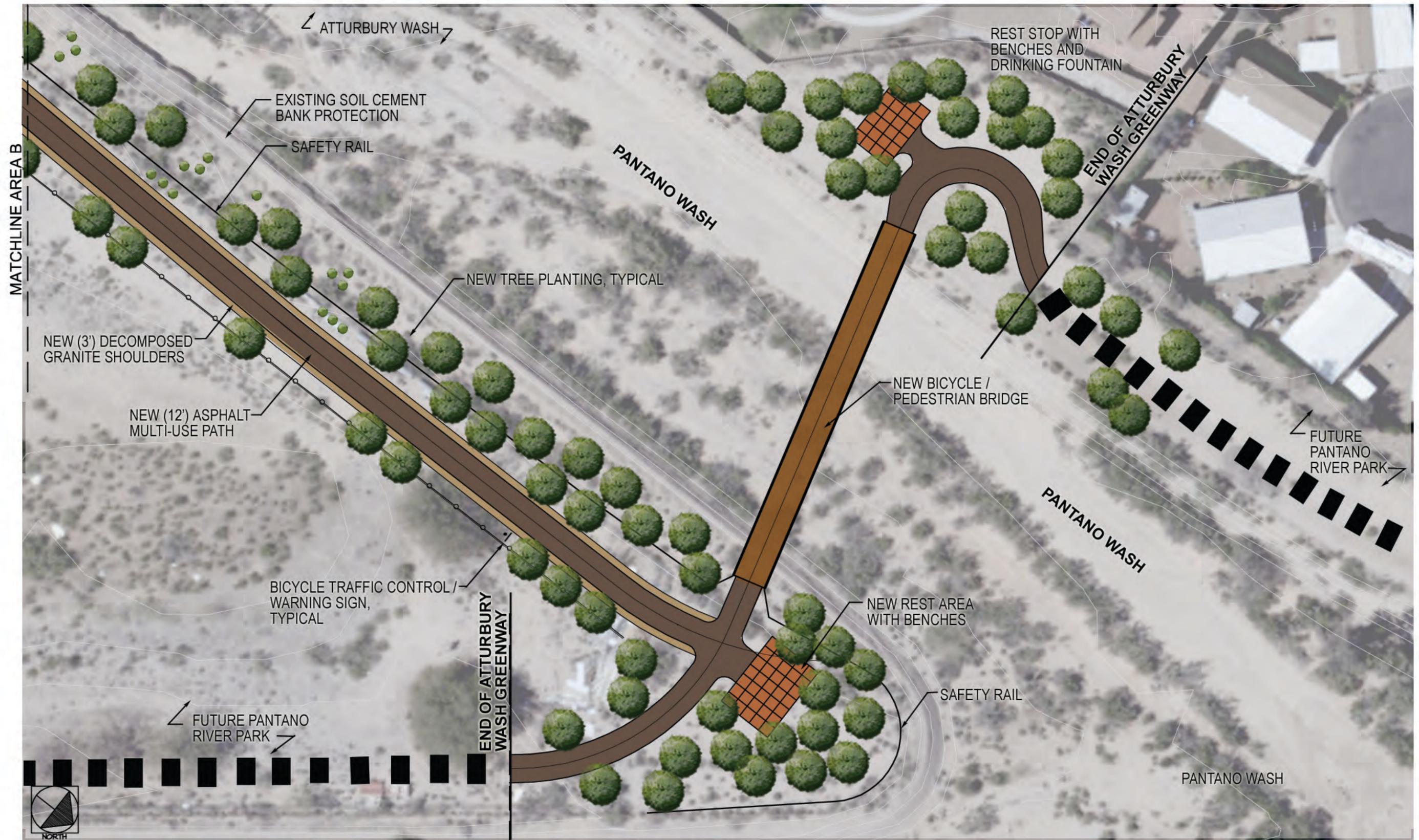


Figure 6-D
Atturbury Wash Greenway Master Plan
Golf Links Road to Pantano Wash Segment



CONCEPTUAL ALIGNMENT / PROPOSED IMPROVEMENTS - AREA C

Figure 6-E
Atturbury Wash Greenway Master Plan
Golf Links Road to Pantano Wash Segment

Introduction:

A goal for the development of the Atturbury Wash Greenway is to provide paved paths and trails that are fully interconnected with the regional pathway and linear park system. To meet this goal, the Greenway plan must address the Greenway's intersection with four east-west streets: Irvington, Escalante, Stella, and Golf Links Roads.

Ideally, the Greenway's multi-use path would cross under these roadways using a bridge or culvert to create grade-separated crossings. Unfortunately, existing conditions do not allow for this type of grade separation, so alternative approaches were necessary.

Provided below are descriptions of the existing conditions at each of the subject roadway crossings and recommendations for making these crossings functional and safe for bicyclist, pedestrians, and other Greenway users.

Irvington Road:

Existing Conditions:

Irvington Road is a designated collector street with an average daily traffic volume (ADT) of 13,000 vehicles per day. There is one east-bound and one west-bound lane and there are bicycle lanes on both sides of the roadway. There are left-turn lanes associated with each leg of the intersection.

Fred Enke Drive is a local street that provides access to the Pima Community College's East Campus and to the Fred Enke Golf Course. It is configured with one lane in each direction, a left-turn lane at the intersection, and bicycle lanes on both sides of the roadway.

The Irvington Road - Fred Enke Drive intersection is a signalized, "T" intersection with striped pedestrian cross-walks across Fred Enke Drive and across Irvington Road, west of the intersection.

Proposed Improvements:

The Atturbury Wash Greenway will enter the Irvington Road / Fred Enke Drive intersection at the northeast quadrant of the intersection and will cross these two roads at-grade. The existing traffic signal will remain to make this crossing safe for bicyclists and pedestrians.

Proposed improvements at this intersection include:

- New pavement / crosswalk striping
- Warning and traffic control signage for bicyclists along the Greenway approaching the intersection.

Greenway / Roadway Intersections

Irvington Road (Continued):

- Warning signage along Irvington Rd. and Fred Enke Dr. as recommended by the Manual of Uniform Traffic Control Devices (MUTCD).
- The installation / construction of improvements as required for compliance with ADA and City of Tucson standards including, but not limited to truncated domes at curb access ramps.

Escalante Road:

Existing Conditions:

Escalante Road is a designated collector street with an average daily traffic volume (ADT) of 5000 vehicles per day. There is one east-bound lane and one west-bound lane. These are divided by a 50' wide unplanted median. There are bicycle lanes on both sides of the roadway.

The entry drive to Lower Lincoln Park intersects with Escalante Road forming a "T" intersection. Traffic exiting the park is controlled with a stop sign. There are currently no restrictions on east or west-bound traffic on Escalante Road at this location.

The Lower Lincoln Park entry drive intersection is approximately one-half mile east of the Escalante Road / Pantano Road signalized intersection and one-half mile west of the Escalante Road - Camino Seco Road intersection which is controlled by stop signs on Escalante Road.

The Atturbury Wash crosses Escalante Road in an at-grade, dip crossing. There are no current plans to construct a bridge or culvert to eliminate this dip crossing.

Proposed Improvements:

The Atturbury Wash Greenway will cross Escalante Road at-grade, east of the entry drive to Lower Lincoln Park. Stop signs are proposed to make this crossing safe for bicyclists and pedestrians. At some time in the future, the installation of a High Intensity Activated Cross-Walk (HAWK) may be considered if traffic volumes and other conditions meet the warrants presented in the MUTCD and are consistent with applicable City of Tucson Standards.

Proposed improvements at this intersection include:

- The realignment of the Lower Lincoln Park entry drive as required to provide a level area for safe access to the Greenway.
- New pavement / crosswalk striping.
- Warning and traffic control signage for bicyclists along the Greenway approaching the intersection.

Greenway / Roadway Intersections

Escalante Road (Continued):

- Warning signage for motorists along Escalante Road as recommended by the Manual of Uniform Traffic Control Devices (MUTCD).
- Stop signs for east-bound and west-bound traffic on Escalante Road at the Lower Lincoln Park entry drive.
- The installation / construction of improvements as required for compliance with ADA and City of Tucson standards including, but not limited to, truncated domes at curb access ramps.

Stella Road:

Existing Conditions:

Stella Road is a designated collector street with an average daily traffic volume (ADT) of 4,000 vehicles per day. There is one east-bound, one west-bound, and a center turn lane. There are no designated bicycle lanes on this section of Stella Road. The Stella Road / Sarnoff Drive intersection is approximately 400' east of the Atturbury Wash. This intersection is controlled by 4-way stop signs. There are painted cross-walks on all four legs of this intersection.

The Atturbury Wash crosses under Stella Road in a box culvert. The ceiling of this culvert is approximately six feet high. The culvert discharges into a large, steep, concrete energy dissipating structure at the inlet to the Lakeside Park reservoir. Due to the low clearance within the box culvert and the nature of the structure's outlet, the box culvert cannot be used as a grade-separated route for the Greenway multi-use path.

Box Culvert at Atturbury Wash Crossing of Stella Road - Looking North



Stella Road (Continued):

It is also the case that the Greenway intersects Stella Road at a location that is approximately 300 feet west of the Stella Road / Sarnoff Drive intersection. This distance provides insufficient separation between the existing intersection and a potential mid-block crossing.

Proposed Improvements:

As a consequence of the above, it is proposed that the Greenway be routed east along the south side of Stella Road to the intersection where the crossing will be made at the existing cross-walk with bicycle and pedestrian safety being accommodated with the existing 4-way stop sign. At some time in the future, the installation of a High Intensity Activated Cross-Walk (HAWK) may be considered if traffic volumes and other conditions meet the warrants presented in the MUTCD and are consistent with applicable City of Tucson Standards.

Proposed improvements at this intersection include:

- The construction of a wider (10' min.) sidewalk / multi-use path along the south side of Stella Road between the Atturbury Wash and Sarnoff Drive as needed to accommodate two-way bicycle and pedestrian traffic.
- The installation of a pipe rail fence or similar barricade between the multi-use path noted above and Stella Road to discourage mid-block crossings by bicyclists and pedestrians.
- Removal of a power pole and the undergrounding of a short section of overhead power line in the vicinity of the multi-use path along Stella Road.
- Warning and traffic control signage for bicyclists along the Greenway approaching the intersection area.
- Warning signage for motorists along Stella Road as recommended by the Manual of Uniform Traffic Control Devices (MUTCD).
- The installation / construction of improvements as required for compliance with ADA and City of Tucson standards including, but not limited to, truncated domes at curb access ramps.

Golf Links Road:

Existing Conditions:

Golf Links Road is a designated Arterial Street with an average daily traffic volume (ADT) of 29,000 vehicles per day. There are three east-bound, three west bound, and a left turn lane at the planned Greenway crossing of this street. There are also designated bicycle lanes on both sides of the roadway.

Greenway / Roadway Intersections

Golf Links Road (Continued):

The Golf Links Road / Sarnoff Drive intersection is approximately 100' east of the Atturbury Wash. This is currently a "T" intersection but curb returns have been constructed on the north leg of the intersection to provide for access to future development(s) to the northeast. There are signalized intersections at Golf Links Road and Pantano Road, approximately 2,800 feet to the west, and at Golf Links and Camino Seco approximately 900 feet to the east.

Northbound Sarnoff Drive traffic is controlled by a stop sign. There are no traffic controls for east and west-bound Golf Links Road traffic at this intersection.

The Atturbury Wash crosses under Golf Links Road in a box culvert. The ceiling of this culvert is approximately eight feet high. The culvert discharges into a drop structure with concrete wing-walls. Due to the relatively low clearance within the culvert and the configuration of the outlet, the box culvert cannot be used as a grade-separated route for the Greenway multi-use path.



Inlet to Atturbury Wash Box Culvert Under Golf Links Road - Looking North

Golf Links Road (Continued):



Grade Control and Drop Structures at Atturbury Wash Box Culvert under Golf Links Road. From inside Culvert looking North

Proposed Improvements:

The Atturbury Wash Greenway will cross Golf Links Road at-grade at the existing Golf Links Road / Sarnoff Drive intersection. Due to the existing roadway configuration, the high volume of traffic, and the speed of traffic at this location it will be necessary to install a High Intensity Activated Cross-Walk (HAWK) at this crossing.

Proposed improvements at this intersection include:

- The installation of a High Intensity Activated Cross-Walk (HAWK).
- New pavement / crosswalk striping.
- Warning and traffic control signage for bicyclists along the Greenway approaching the intersection.
- Warning signage along Golf Links Road as recommended by the Manual of Uniform Traffic Control Devices (MUTCD).
- The installation / construction of improvements as required for compliance with ADA and City of Tucson standards including, but not limited to truncated domes at curb access ramps.

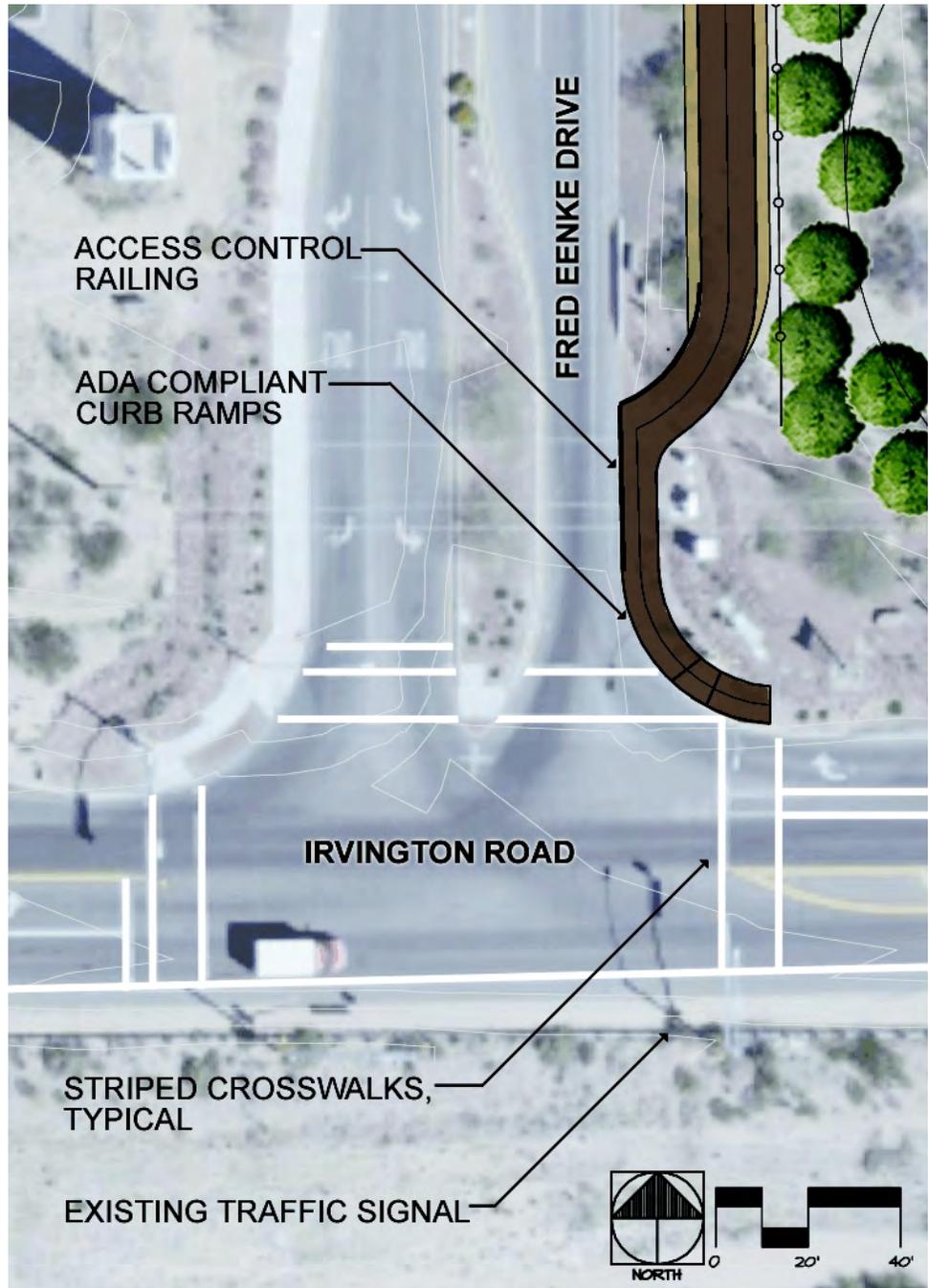


Figure 7-A: Irvington Road - Greenway Intersection

Greenway / Roadway Intersections

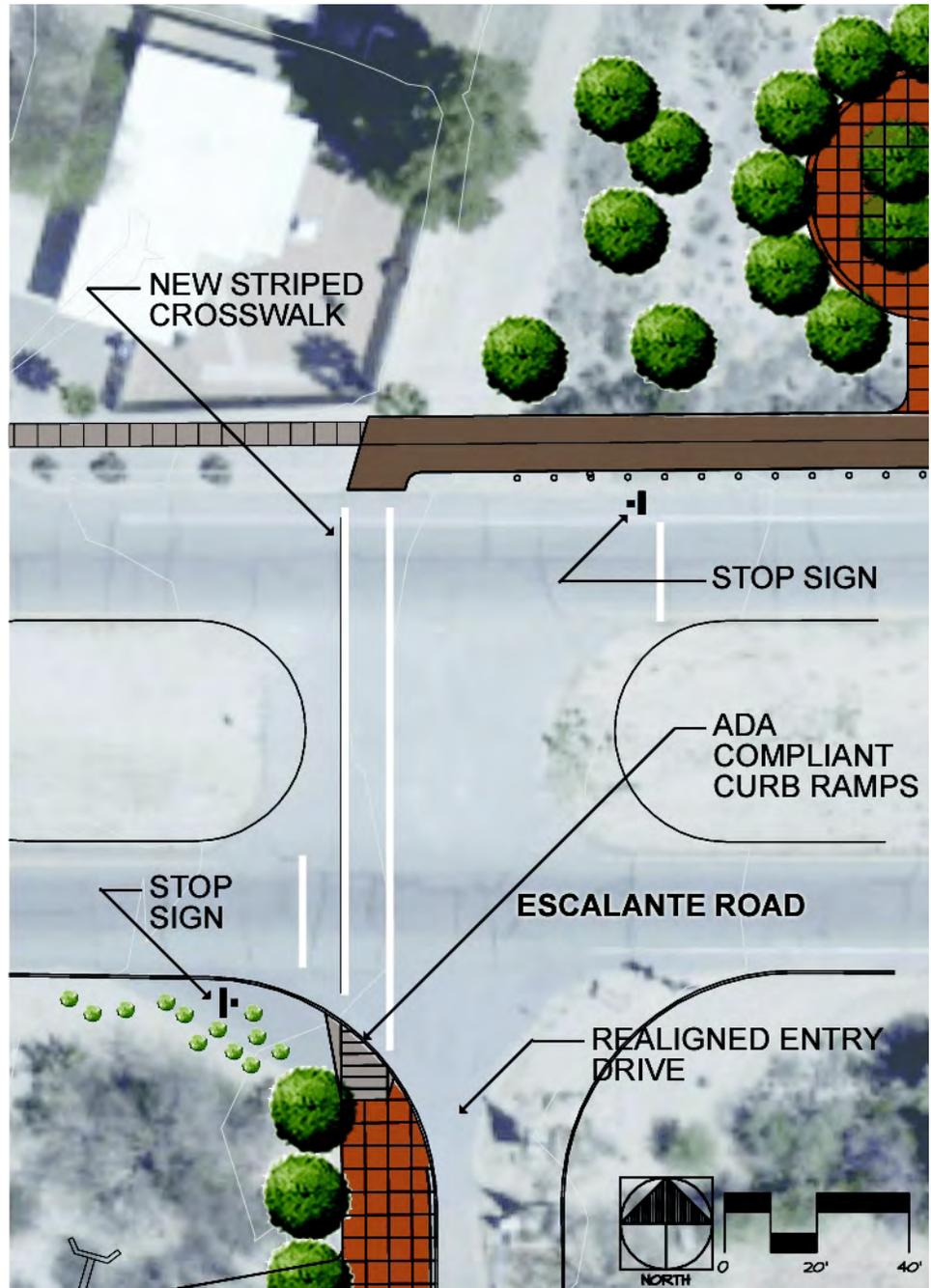


Figure 7-B: Escalante Road - Greenway Intersection

Greenway / Roadway Intersections

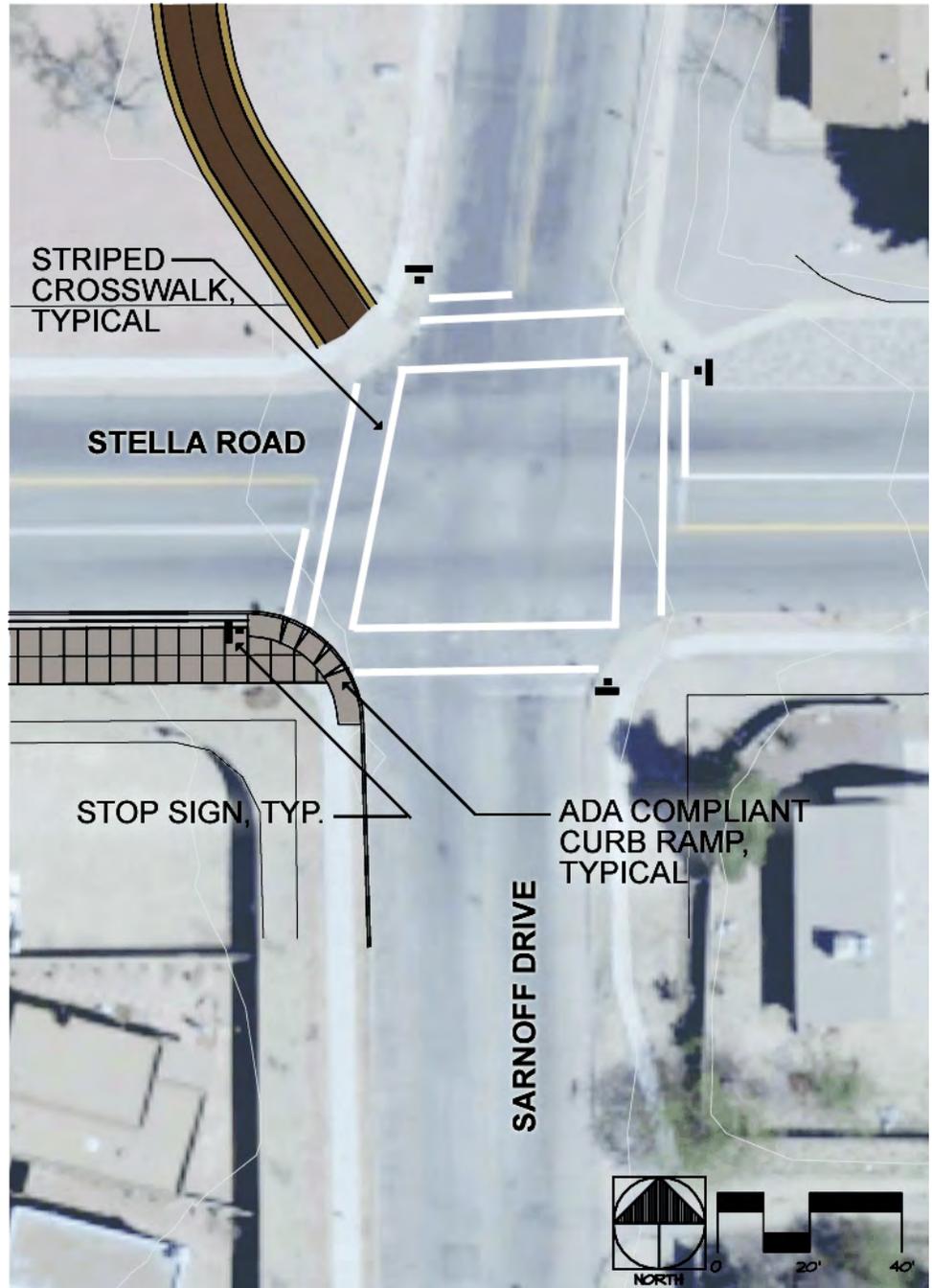


Figure 7-C: Stella Road - Greenway Intersection

Greenway / Roadway Intersections

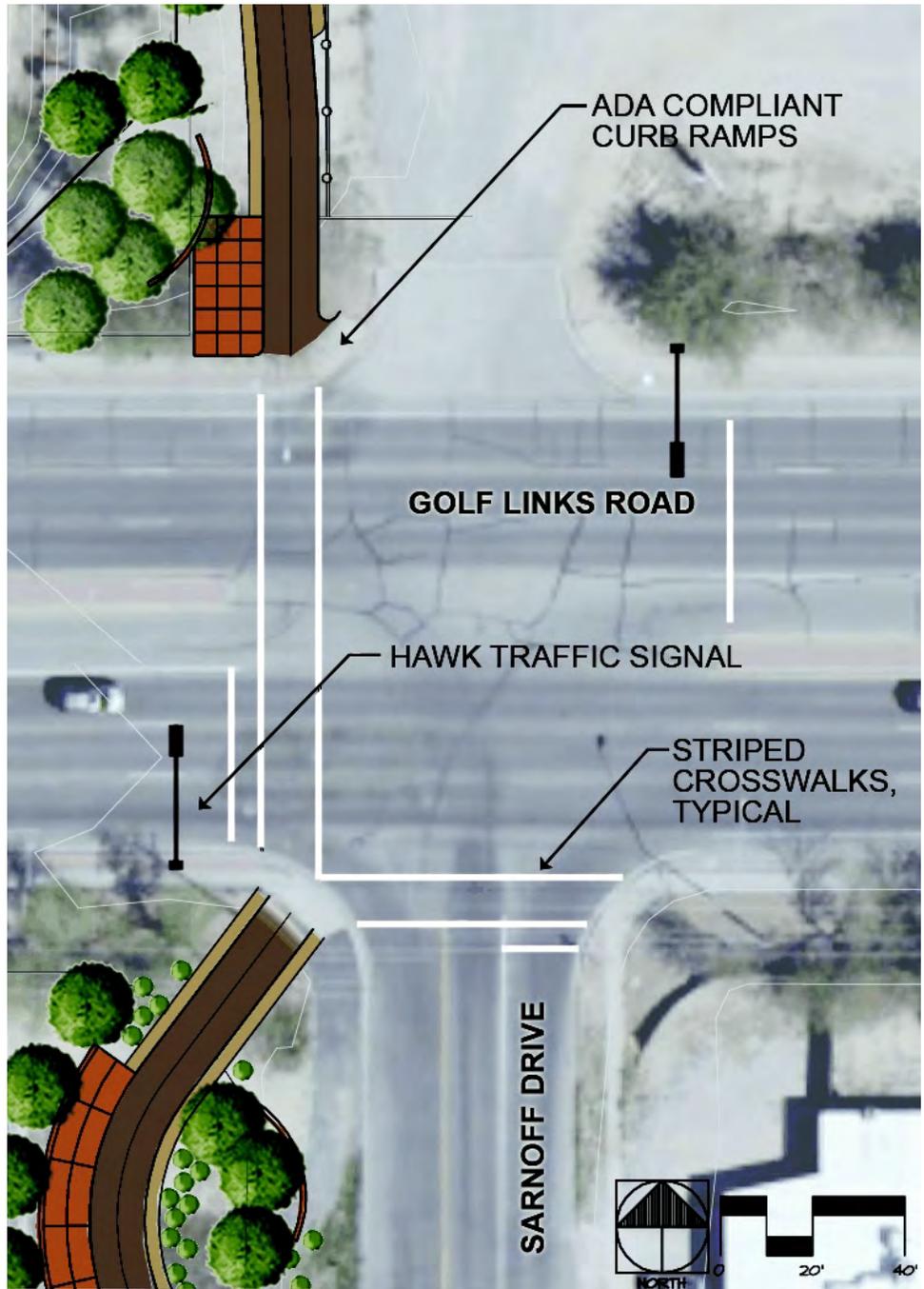


Figure 7-D: Golf Links Road - Greenway Intersection

Atturbury Wash Greenway Master Plan
Appendix A
Construction Cost Estimates

Fred Enke Drive Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Fred Enke Drive Segment					
		Unit	Quantity	Unit Cost	Extension
Utility Relocations					
	Relocate / Adjust UG Utilities / Boxes	LS	1	\$1,500.00	\$1,500.00
	Protect Utilities During Construction	LS	1	\$2,500.00	\$2,500.00
Demolition / Relocations					
	Site Clean-Up	LS	1	\$1,000.00	\$1,000.00
	Sawcut and Remove Curb	LF	40	\$2.50	\$100.00
	Sawcut and Remove Pavement	SF	0	\$3.50	\$0.00
	Relocate Chain Link Fence (5')	LF	1,800	\$10.00	\$18,000.00
	Relocate Post-and-Cable Barrier	LF	0	\$8.00	\$0.00
	Relocate Vehicle Access Gate	EA	1	\$1,500.00	\$1,500.00
	Relocate Traffic Control Sign	EA	2	\$200.00	\$400.00
Earthwork and Grading					
	Excavation / Cut	CY	460	\$7.50	\$3,450.00
	Fill and Compact	CY	460	\$2.50	\$1,150.00
	Grade for Pavement	SF	22,000	\$0.10	\$2,200.00
	Grade for DG Path / Revegetation	SF	47,000	\$0.05	\$2,350.00
Drainage Improvements					
	CMP Drainage Pipe / End Sections	EA	0	\$1,000.00	\$0.00
	Scupper w/ Steel Plate Cover	EA	0	\$2,000.00	\$0.00
Paving					
	Subgrade Preparation	SF	22,000	\$0.30	\$6,600.00
	Aggregate Base Course (4")	CY	266	\$40.00	\$10,640.00
	Asphalt Pavement (2")	TN	260	\$75.00	\$19,500.00
	Concrete Sidewalks	SF	0	\$5.00	\$0.00
	Special Paving	SF	0	\$7.00	\$0.00
	Curb Ramps	EA	3	\$1,000.00	\$3,000.00
	Decomposed Granite Paths	SF	10,800	\$0.40	\$4,320.00
Structures					
	Retaining Walls	SF	250	\$20.00	\$5,000.00
	Gabion Walls	SF	0	\$18.00	\$0.00
	Bicycle / Pedestrian Bridges	EA	0	\$0.00	\$0.00
Native Plan Salvage and Mitigation					
	Salvage Replant Tree (48" - 60")	EA	2	\$1,500.00	\$3,000.00
	Salvage / Replant Tree (30" - 42")	EA	2	\$750.00	\$1,500.00
	Salvage / Replant Cacti	EA	10	\$50.00	\$500.00
Landscape and Revegetation					
	Trees - 24" Box	EA	45	\$275.00	\$12,375.00
	Trees - 15 Gal.	EA	45	\$80.00	\$3,600.00
	Shrub - 5 Gal.	EA	225	\$30.00	\$6,750.00
	Cacti / Accent Plant	EA	45	\$50.00	\$2,250.00
	Hydroseed	SF	36,000	\$0.10	\$3,600.00

Fred Enke Drive Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Fred Enke Drive Segment					
		Unit	Quantity	Unit Cost	Extension
Irrigation					
	Water Supply (Meter)	LS	1	\$3,500.00	\$3,500.00
	Mainline (Inc. Isolation Valves)	LF	1,800	\$3.00	\$5,400.00
	Controller	EA	1	\$1,500.00	\$1,500.00
	Backflow Preventer	EA	0	\$750.00	\$0.00
	Remote Control Valve Assembly	EA	4	\$250.00	\$1,000.00
	Lateral Line Piping	LF	4,000	\$1.50	\$6,000.00
	Emitter Assembly	EA	180	\$15.00	\$2,700.00
	Testing and Miscellaneous	LS	1	\$2,500.00	\$2,500.00
Fencing and Access Control					
	New Chain Link Fence - 5'	LF	0	\$20.00	\$0.00
	New Chain Link Fence - 10'	LF	300	\$60.00	\$18,000.00
	Maintenance Gate 5' x 16'	EA	1	\$1,500.00	\$1,500.00
	Post and Cable Barrier	LF	0	\$8.00	\$0.00
	Safety Rail	LF	100	\$18.00	\$1,800.00
Traffic Control Devices					
	HAWK Traffic Signal	EA	0	\$150,000.00	\$0.00
	Pavement Markings	LS	1	\$1,000.00	\$1,000.00
	Traffic Control Signs	EA	5	\$350.00	\$1,750.00
Site Furniture					
	Bench	EA	2	\$500.00	\$1,000.00
	Bicycle Rack	EA	0	\$500.00	\$0.00
	Trash Receptacle	EA	2	\$200.00	\$400.00
	Other (*)	LS	0	TBD	\$0.00
Subtotal					\$164,835.00
Contractor General Conditions, Insurance, Bonds, Sales Tax, Overhead, Profit (20%)					\$32,967.00
Survey / Design / Engineering / Testing (12%)					\$23,736.24
Contingency (10%)					\$16,483.50
Total					\$238,021.74
Estimated Total Design and Construction Cost - This Segment (Rounded)					\$238,000.00

Note: Includes miscellaneous improvements at Irvington Road intersection.

Lincoln Park Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Lincoln Park Segment					
		Unit	Quantity	Unit Cost	Extension
Utility Relocations					
	Relocate / Adjust UG Utilities / Boxes	LS	1	\$2,500.00	\$2,500.00
	Protect Utilities During Construction	LS	1	\$2,500.00	\$2,500.00
Demolition / Relocations					
	Site Clean-Up	LS	1	\$2,000.00	\$2,000.00
	Sawcut and Remove Curb	LF	150	\$2.50	\$375.00
	Sawcut and Remove Asphalt Pavement	SF	3,000	\$3.50	\$10,500.00
	Relocate Chain Link Fence	LF	0	\$10.00	\$0.00
	Relocate Post-and-Cable Barrier	LF	0	\$8.00	\$0.00
	Relocate Vehicle Access Gate	EA	0	\$1,500.00	\$0.00
	Relocate Traffic Control Sign	EA	2	\$200.00	\$400.00
Earthwork and Grading					
	Excavation / Cut	CY	1,225	\$7.50	\$9,187.50
	Fill and Compact	CY	1,225	\$2.50	\$3,062.50
	Grade for Pavement	SF	60,000	\$0.10	\$6,000.00
	Grade for DG Path / Revegetation	SF	125,000	\$0.05	\$6,250.00
Drainage Improvements					
	CMP Drainage Pipe / Ends	EA	2	\$1,000.00	\$2,000.00
	Scupper w/ Steel Plate Cover	EA	2	\$2,000.00	\$4,000.00
Paving					
	Subgrade Preparation	SF	60,000	\$0.30	\$18,000.00
	Aggregate Base Course (4")	CY	680	\$40.00	\$27,200.00
	Asphalt Pavement (2")	TN	665	\$75.00	\$49,875.00
	Concrete Sidewalks	SF	0	\$5.00	\$0.00
	Special Paving	SF	5,000	\$7.00	\$35,000.00
	Curb Ramps	EA	3	\$1,000.00	\$3,000.00
	Decomposed Granite Paths	SF	33,000	\$0.40	\$13,200.00
Structures					
	Retaining Walls	SF	250	\$20.00	\$5,000.00
	Gabion Walls	SF	0	\$18.00	\$0.00
	Bicycle / Pedestrian Bridges	EA	0	\$0.00	\$0.00
Native Plan Salvage and Mitigation					
	Salvage Replant Tree (48" - 60")	EA	4	\$1,500.00	\$6,000.00
	Salvage / Replant Tree (30" - 42")	EA	10	\$750.00	\$7,500.00
	Salvage / Replant Cacti	EA	20	\$50.00	\$1,000.00
Landscape and Revegetation					
	Trees - 24" Box	EA	170	\$275.00	\$46,750.00
	Trees - 15 Gal.	EA	170	\$80.00	\$13,600.00
	Shrub - 5 Gal.	EA	680	\$30.00	\$20,400.00
	Cacti / Accent Plant	EA	170	\$50.00	\$8,500.00
	Hydroseed	SF	92,000	\$0.10	\$9,200.00

Lincoln Park Segment

Irrigation					
	Water Supply (Meter)	LS	2	\$3,500.00	\$7,000.00
	Mainline (Inc. Isolation Valves)	LF	4,600	\$3.00	\$13,800.00
	Controller	EA	2	\$1,500.00	\$3,000.00
	Backflow Preventer	EA	0	\$750.00	\$0.00
	Remote Control Valve Assembly	EA	10	\$250.00	\$2,500.00
	Lateral Line Piping	LF	10,350	\$1.50	\$15,525.00
	Emitter Assembly	EA	680	\$15.00	\$10,200.00
	Testing and Miscellaneous	LS	1	\$2,500.00	\$2,500.00
Fencing and Access Control					
	New Chain Link Fence - 5'	LF	0	\$20.00	\$0.00
	New Chain Link Fence - 10'	LF	0	\$60.00	\$0.00
	Maintenance Gate 5' x 16'	EA	0	\$1,500.00	\$0.00
	Post and Cable Barrier	LF	300	\$8.00	\$2,400.00
	Safety Rail	LF	200	\$18.00	\$3,600.00
Traffic Control Devices					
	HAWK Traffic Signal	EA	0	\$150,000.00	\$0.00
	Pavement Markings	LS	1	\$1,000.00	\$1,000.00
	Traffic Control Signs	EA	15	\$350.00	\$5,250.00
Site Furniture					
	Bench	EA	10	\$500.00	\$5,000.00
	Bicycle Rack	EA	2	\$500.00	\$1,000.00
	Trash Receptacle	EA	10	\$200.00	\$2,000.00
	Other (Monument Sign)	LS	2	\$2,500.00	\$5,000.00
	Subtotal				\$392,775.00
Contractor General Conditions, Insurance, Bonds, Sales Tax, Overhead, Profit (20%)					\$78,555.00
Survey / Design / Engineering / Testing (12%)					\$56,559.60
Contingency (10%)					\$39,277.50
	Total				\$567,167.10
Estimated Total Design and Construction Cost - This Segment (Rounded)					\$567,000.00

Note: Includes miscellaneous improvements at Escalante Road crossing.

Escalante Road to Stella Road Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Escalante Road to Stella Road Segment					
		Unit	Quantity	Unit Cost	Extension
Utility Relocations					
	Relocate / Adjust UG Utilities / Boxes	LS	1	\$5,000.00	\$5,000.00
	Protect Utilities During Construction	LS	1	\$10,000.00	\$10,000.00
Demolition / Relocations					
	Site Clean-Up	LS	1	\$10,000.00	\$10,000.00
	Sawcut and Remove Curb	LF	0	\$2.50	\$0.00
	Sawcut and Remove Pavement	SF	1,600	\$3.50	\$5,600.00
	Relocate Chain Link Fence	LF	0	\$10.00	\$0.00
	Relocate Post-and-Cable Barrier	LF	0	\$8.00	\$0.00
	Relocate Vehicle Access Gate	EA	0	\$1,500.00	\$0.00
	Relocate Traffic Control Sign	EA	2	\$200.00	\$400.00
Earthwork and Grading					
	Excavation / Cut	CY	720	\$7.50	\$5,400.00
	Fill and Compact	CY	720	\$2.50	\$1,800.00
	Grade for Pavement	SF	28,000	\$0.10	\$2,800.00
	Grade for DG Path / Revegetation	SF	73,000	\$0.05	\$3,650.00
Drainage Improvements					
	CMP Drainage Pipe / Ends	EA	0	\$1,000.00	\$0.00
	Scupper w/ Steel Plate Cover	EA	2	\$2,000.00	\$4,000.00
Paving					
	Subgrade Preparation	SF	28,000	\$0.30	\$8,400.00
	Aggregate Base Course (4")	CY	410	\$40.00	\$16,400.00
	Asphalt Pavement (2")	TN	340	\$75.00	\$25,500.00
	Concrete Sidewalks	SF	3,200	\$5.00	\$16,000.00
	Special Paving	SF	3,500	\$7.00	\$24,500.00
	Curb Ramps	EA	2	\$1,000.00	\$2,000.00
	Decomposed Granite Paths	SF	17,000	\$0.40	\$6,800.00
Structures					
	Retaining Walls	SF	0	\$20.00	\$0.00
	Gabion Walls	SF	4,800	\$18.00	\$86,400.00
	Bicycle / Pedestrian Bridges	EA	0	\$0.00	\$0.00
Native Plan Salvage and Mitigation					
	Salvage Replant Tree (48" - 60")	EA	0	\$1,500.00	\$0.00
	Salvage / Replant Tree (30" - 42")	EA	2	\$750.00	\$1,500.00
	Salvage / Replant Cacti	EA	10	\$50.00	\$500.00
Landscape and Revegetation					
	Trees - 24" Box	EA	110	\$275.00	\$30,250.00
	Trees - 15 Gal.	EA	110	\$80.00	\$8,800.00
	Shrub - 5 Gal.	EA	550	\$30.00	\$16,500.00
	Cacti / Accent Plant	EA	110	\$50.00	\$5,500.00
	Hydroseed	SF	56,000	\$0.10	\$5,600.00

Escalante Road to Stella Road Segment

Irrigation					
	Water Supply (Meter)	LS	2	\$3,500.00	\$7,000.00
	Mainline (Inc. Isolation Valves)	LF	2,800	\$3.00	\$8,400.00
	Controller	EA	1	\$1,500.00	\$1,500.00
	Backflow Preventer	EA	2	\$750.00	\$1,500.00
	Remote Control Valve Assembly	EA	6	\$250.00	\$1,500.00
	Lateral Line Piping	LF	5,600	\$1.50	\$8,400.00
	Emitter Assembly	EA	330	\$15.00	\$4,950.00
	Testing and Miscellaneous	LS	1	\$2,500.00	\$2,500.00
Fencing and Access Control					
	New Chain Link Fence - 5'	LF	0	\$20.00	\$0.00
	New Chain Link Fence - 10'	LF	0	\$60.00	\$0.00
	Maintenance Gate 5' x 16'	EA	0	\$1,500.00	\$0.00
	Post and Cable Barrier	LF	0	\$8.00	\$0.00
	Safety Rail	LF	300	\$18.00	\$5,400.00
Traffic Control Devices					
	HAWK Traffic Signal	EA	0	\$150,000.00	\$0.00
	Pavement Markings	LS	1	\$1,000.00	\$1,000.00
	Traffic Control Signs	EA	10	\$350.00	\$3,500.00
Site Furniture					
	Bench	EA	5	\$500.00	\$2,500.00
	Bicycle Rack	EA	0	\$500.00	\$0.00
	Trash Receptacle	EA	5	\$200.00	\$1,000.00
	Other	LS	0	\$0.00	\$0.00
	Subtotal				\$352,450.00
	Contractor General Conditions, Insurance, Bonds, Sales Tax, Overhead, Profit (20%)				\$70,490.00
	Survey / Design / Engineering / Testing (12%)				\$50,752.80
	Contingency (10%)				\$35,245.00
	Total				\$508,937.80
	Estimated Total Design and Construction Cost - This Segment (Rounded)				\$509,000.00

Note: Includes miscellaneous improvements on south side of Stella Road.

Lakeside Park Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Lakeside Park Segment					
		Unit	Quantity	Unit Cost	Extension
Utility Relocations					
	Relocate UG Utilities	LS	1	\$2,500.00	\$2,500.00
	Protect Utilities During Construction	LS	1	\$2,500.00	\$2,500.00
Demolition / Relocations					
	Site Clean-Up	LS	1	\$2,000.00	\$2,000.00
	Sawcut and Remove Curb	LF	50	\$2.50	\$125.00
	Sawcut and Remove Pavement	SF	1000	\$3.50	\$3,500.00
	Relocate Chain Link Fence	LF	300	\$10.00	\$3,000.00
	Relocate Post-and-Cable Barrier	LF	0	\$8.00	\$0.00
	Relocate Vehicle Access Gate	EA	1	\$1,500.00	\$1,500.00
	Relocate Traffic Control Sign	EA	5	\$200.00	\$1,000.00
Earthwork and Grading					
	Excavation / Cut	CY	685	\$7.50	\$5,137.50
	Import Soil for Behind Retaining Wall(s)	CY	850	\$15.00	\$12,750.00
	Fill and Compact	CY	1535	\$2.50	\$3,837.50
	Grade for Pavement	SF	31200	\$0.10	\$3,120.00
	Grade for DG Path / Revegetation	SF	69000	\$0.05	\$3,450.00
Drainage Improvements					
	CMP Drainage Pipe / Ends	EA	0	\$1,000.00	\$0.00
	Scupper w/ Steel Plate Cover	EA	2	\$2,000.00	\$4,000.00
Paving					
	Subgrade Preparation	SF	31200	\$0.30	\$9,360.00
	Aggregate Base Course (4")	CY	385	\$40.00	\$15,400.00
	Asphalt Pavement (2")	TN	375	\$75.00	\$28,125.00
	Concrete Sidewalks	SF	0	\$5.00	\$0.00
	Special Paving	SF	1000	\$7.00	\$7,000.00
	Curb Ramps	EA	4	\$1,000.00	\$4,000.00
	Decomposed Granite Paths	SF	17000	\$0.40	\$6,800.00
Structures					
	Retaining Walls	SF	3300	\$20.00	\$66,000.00
	Gabion Walls	SF	0	\$18.00	\$0.00
	Bicycle / Pedestrian Bridges (50 Feet)	EA	1	\$140,000.00	\$140,000.00
Native Plan Salvage and Mitigation					
	Salvage Replant Tree (48" - 60")	EA	0	\$1,500.00	\$0.00
	Salvage / Replant Tree (30" - 42")	EA	2	\$750.00	\$1,500.00
	Salvage / Replant Cacti	EA	10	\$50.00	\$500.00
Landscape and Revegetation					
	Trees - 24" Box	EA	85	\$275.00	\$23,375.00
	Trees - 15 Gal.	EA	85	\$80.00	\$6,800.00
	Shrub - 5 Gal.	EA	425	\$30.00	\$12,750.00
	Cacti / Accent Plant	EA	85	\$50.00	\$4,250.00
	Hydroseeding	SF	52000	\$0.10	\$5,200.00

Lakeside Park Segment

Irrigation					
	Water Supply (Meter)	LS	1	\$3,500.00	\$3,500.00
	Mainline (Inc. Isolation Valves)	LF	2600	\$3.00	\$7,800.00
	Controller	EA	1	\$1,500.00	\$1,500.00
	Backflow Preventer	EA	1	\$750.00	\$750.00
	Remote Control Valve Assembly	EA	6	\$250.00	\$1,500.00
	Lateral Line Piping	LF	6500	\$1.50	\$9,750.00
	Emitter Assembly	EA	340	\$15.00	\$5,100.00
	Testing and Miscellaneous	LS	1	\$2,500.00	\$2,500.00
Fencing and Access Control					
	New (Replacement) Chain Link Fence - 5'	LF	300	\$20.00	\$6,000.00
	New Chain Link Fence - 10'	LF	0	\$60.00	\$0.00
	Maintenance Gate 5' x 16'	EA	1	\$1,500.00	\$1,500.00
	Post and Cable Barrier	LF	0	\$8.00	\$0.00
	Safety Rail	LF	550	\$18.00	\$9,900.00
Traffic Control Devices					
	HAWK Traffic Signal	EA	0	\$150,000.00	\$0.00
	Pavement Markings	LS	1	\$1,000.00	\$1,000.00
	Traffic Control Signs	EA	10	\$350.00	\$3,500.00
Site Furniture					
	Bench	EA	5	\$500.00	\$2,500.00
	Bicycle Rack	EA	1	\$500.00	\$500.00
	Trash Receptacle	EA	5	\$200.00	\$1,000.00
	Other (Monument Sign)	LS	1	\$2,500.00	\$2,500.00
	Subtotal				\$440,280.00
Contractor General Conditions, Insurance, Bonds, Sales Tax, Overhead, Profit (20%)					\$88,056.00
Survey / Design / Engineering / Testing (12%)					\$63,400.32
Contingency (10%)					\$44,028.00
	Total				\$635,764.32
Estimated Total Design and Construction Cost - This Segment (Rounded)					\$636,000.00

Golf Links Road to Pantano Wash Segment

Atturbury Wash Greenway - Order-of-Magnitude Cost Estimate					
Segment: Irvington Road to Pantano Wash Segment					
		Unit	Quantity	Unit Cost	Extension
Utility Relocations					
	Relocate UG Utilities	LS	1	\$2,500.00	\$2,500.00
	Protect Utilities During Construction	LS	1	\$2,500.00	\$2,500.00
Demolition / Relocations					
	Site Clean-Up	LS	1	\$5,000.00	\$5,000.00
	Sawcut and Remove Curb	LF	50	\$2.50	\$125.00
	Sawcut and Remove Pavement	SF	0	\$3.50	\$0.00
	Remove Chain Link Fence	LF	1,700	\$10.00	\$17,000.00
	Relocate Post-and-Cable Barrier	LF	0	\$8.00	\$0.00
	Relocate Vehicle Access Gate	EA	0	\$1,500.00	\$0.00
	Relocate Traffic Control Sign	EA	4	\$200.00	\$800.00
Earthwork and Grading					
	Excavation / Cut	CY	440	\$7.50	\$3,300.00
	Fill and Compact	CY	440	\$2.50	\$1,100.00
	Grade for Pavement	SF	20,400	\$0.10	\$2,040.00
	Grade for DG Path / Revegetation	SF	44,200	\$0.05	\$2,210.00
Drainage Improvements					
	CMP Drainage Pipe / Ends	EA	0	\$1,000.00	\$0.00
	Scupper w/ Steel Plate Cover	EA	2	\$2,000.00	\$4,000.00
Paving					
	Subgrade Preparation	SF	20,400	\$0.30	\$6,120.00
	Aggregate Base Course (4")	CY	255	\$40.00	\$10,200.00
	Asphalt Pavement (2")	TN	245	\$75.00	\$18,375.00
	Concrete Sidewalks	SF	500	\$5.00	\$2,500.00
	Special Paving	SF	1,500	\$7.00	\$10,500.00
	Curb Ramps	EA	2	\$1,000.00	\$2,000.00
	Decomposed Granite Paths	SF	10,200	\$0.40	\$4,080.00
Structures					
	Retaining Walls	SF	0	\$20.00	\$0.00
	Gabion Walls	SF	0	\$18.00	\$0.00
	Bicycle / Pedestrian Bridges (180 Feet)	EA	1	\$504,000.00	\$504,000.00
Native Plan Salvage and Mitigation					
	Salvage Replant Tree (48" - 60")	EA	0	\$1,500.00	\$0.00
	Salvage / Replant Tree (30" - 42")	EA	2	\$750.00	\$1,500.00
	Salvage / Replant Cacti	EA	10	\$50.00	\$500.00
Landscape and Revegetation					
	Trees - 24" Box	EA	70	\$275.00	\$19,250.00
	Trees - 15 Gal.	EA	70	\$80.00	\$5,600.00
	Shrub - 5 Gal.	EA	350	\$30.00	\$10,500.00
	Cacti / Accent Plant	EA	70	\$50.00	\$3,500.00
	Hydroseed	SF	34,000	\$0.10	\$3,400.00

Golf Links Road to Pantano Wash Segment

Irrigation					
	Water Supply (Meter)	LS	1	\$3,500.00	\$3,500.00
	Mainline (Inc. Isolation Valves)	LF	1,700	\$3.00	\$5,100.00
	Controller	EA	1	\$1,500.00	\$1,500.00
	Backflow Preventer	EA	1	\$750.00	\$750.00
	Remote Control Valve Assembly	EA	4	\$250.00	\$1,000.00
	Lateral Line Piping	LF	3,825	\$1.50	\$5,737.50
	Emitter Assembly	EA	280	\$15.00	\$4,200.00
	Testing and Miscellaneous	LS	1	\$2,500.00	\$2,500.00
Fencing and Access Control					
	New Chain Link Fence - 5'	LF	0	\$20.00	\$0.00
	New Chain Link Fence - 10'	LF	0	\$60.00	\$0.00
	Maintenance Gate 5' x 16'	EA	0	\$1,500.00	\$0.00
	Post and Cable Barrier	LF	1,700	\$8.00	\$13,600.00
	Safety Rail	LF	100	\$18.00	\$1,800.00
Traffic Control Devices					
	HAWK Traffic Signal	EA	1	\$150,000.00	\$150,000.00
	Pavement Markings	LS	1	\$2,500.00	\$2,500.00
	Traffic Control Signs	EA	10	\$350.00	\$3,500.00
Site Furniture					
	Bench	EA	4	\$500.00	\$2,000.00
	Bicycle Rack	EA	0	\$500.00	\$0.00
	Trash Receptacle	EA	4	\$200.00	\$800.00
	Other (Monument Sign)	LS	1	\$2,500.00	\$2,500.00
	Subtotal				\$843,587.50
Contractor General Conditions, Insurance, Bonds, Sales Tax, Overhead, Profit (20%)					\$168,717.50
Survey / Design / Engineering / Testing (12%)					\$121,476.60
Contingency (10%)					\$84,358.75
	Total				\$1,218,140.35
Estimated Total Design and Construction Cost - This Segment (Rounded)					\$1,218,000.00

Note: Includes miscellaneous improvements at Golf Links Road crossing.

Atturbury Wash Greenway Master Plan
Appendix B
Bridge Structures Report

STRUCTURE COST MEMO
for the
Atturbury Wash Pedestrian Bridges

1. EXECUTIVE SUMMARY

This memo documents the approximate cost estimate for two (2) pedestrian crossings along the Atturbury Wash Greenway.

The structure cost is based on actual cost estimates (bid estimates) received March 2008 on a similar bridge type currently being constructed over the CDO wash just downstream of SR77 (Oracle Rd) in Oro Valley. These bid item costs were similar from all five bidders.

The structure type estimated for the two bridge crossing is a Steel Plate Girder with a composite concrete deck with stay-in-place metal forms. This structure type was chosen for this preliminary concept due to the ability to customize the design to blend with the surroundings and minimize the structure depth. During the final design phase, other structure types such as pre-cast pre-stressed concrete structures as well as pre-fabricated steel trusses can also be evaluated.

2. PROJECT LOCATION AND GEOMETRY

The two crossing are located in Tucson, Arizona in the vicinity of Golf Links Rd and Pantano Rd where the new Atturbury Wash Greenway is to be located.

The first crossing spans the confluence at Pantano Wash. This bridge is anticipated to be approximately 180 ft and will have a center pier. The bridge will accommodate a 12 ft wide path and therefore have an overall structure width of 14 ft.

The second crossing spans the dip crossing just south of Golf Links. This bridge is anticipated to be approximately 50 ft. The bridge will accommodate a 12 ft wide path and therefore have an overall structure width of 14 ft.

3. APPROXIMATE COST ESTIMATES

The following table itemizes the cost estimate for the two crossings based on recent bid tabs obtained from a similar bridge design currently under construction for ADOT over the CDO wash just downstream of SR77 (Oracle Rd). The bridge width for both crossings on the Atturbury Wash Greenway are assumed to be 14 ft

Table 1: Cost Estimate for Bridge

Crossing	Structure Type	Bridge Length	Bridge Area (ft ²)	Construction Cost/ft ²	Total Cost
1	Composite Plate Girder	180 ft	2520	\$ 200	\$ 504,000
2	Composite Plate Girder	50 ft	700	\$ 200	\$ 140,000

APPENDIX A



Crossing No. 1- Confluence at Pantano Wash



Crossing No. 2- DIP Crossing South of Golf Links

Atturbury Wash Greenway Master Plan
Appendix C
Recommended Plant List

Atturbury Wash Greenway - Inventory of Existing Plant Species

		GREENWAY SEGMENT(S)				
		1	2	3	4	5
		Fred Enke Drive	Lincoln Park	Escalante to Stella	Lakeside Park	Golf Links to Pantano Wash
NATIVE SPECIES						
TREES						
<i>Celtis reticulata</i>	netleaf hackberry			X		
<i>Chilopsis linearis</i>	desert willow			X		
<i>Parkinsonia florida</i>	blue paloverde	X	X	X		
<i>Parkinsonia microphylla</i>	foothills paloverde	X	X	X	X	
<i>Prosopis velutina</i>	velvet mesquite	X	X	X	X	
LARGE SHRUBS AND CACTI						
<i>Acacia constricta</i>	white-thorn acacia	X	X	X		
<i>Anisacanthus thurberi</i>	desert honeysuckle					
<i>Atriplex canescens</i>	four-wing saltbush	X	X	X		
<i>Baccharis sarothroides</i>	desert broom	X		X		X
<i>Celtis pallida</i>	desert hackberry		X	X		
<i>Condalia warnockii</i>	bitter condalia			X		
<i>Cylindropuntia fulgida</i>	chain-fruit cholla	X	X	X		
<i>Dasyliirion wheeleri</i>	desert spoon	X			X	
<i>Ephedra trifurca</i>	Mormon tea		X	X		
<i>Ferocactus wislizenii</i>	fishhook barrel	X	X			
<i>Fouquieria splendens</i>	ocotillo	X	X			
<i>Hymenoclea monogyra</i>	burrowbush			X	X	
<i>Justicia californica</i>	chuparosa	X				
<i>Larrea tridentata</i>	creosote	X	X	X		
<i>Lycium sp.</i>	wolfberry		X			
<i>Opuntia engelmannii</i>	Engelmann's prickly pear	X	X	X		
<i>Opuntia phaeacantha</i>	sprawling prickly pear		X	X		
<i>Opuntia santa-rita</i>	Santa Rita prickly pear	X				
<i>Zizyphus obtusifolia</i>	graythorn	X	X	X		

Atturbury Wash Greenway - Inventory of Existing Plant Species

		GREENWAY SEGMENT(S)				
		1	2	3	4	5
		Fred Enke Drive	Lincoln Park	Escalante to Stella	Lakeside Park	Golf Links to Pantano Wash
SUB-SHRUBS, GRASSES, and GROUNDCOVERS						
<i>Ambrosia deltoidea</i>	triangle-leaf bursage	X	X			
<i>Aristida purpurea</i>	purple three-awn	X	X	X		
<i>Aristida ternipes</i>	spidergrass		X	X		
<i>Bahia absinthifolia</i>	desert bahia		X			
<i>Baileya multiradiata</i>	desert marigold	X	X			
<i>Bothriochloa barbinodis</i>	cane beardgrass			X		
<i>Bouteloua aristidoides</i>	needle grama	X	X			
<i>Brickellia coulteri</i>	Coulter's brickle bush		X			
<i>Calliandra eriophylla</i>	fairy duster	X	X			
<i>Datura meteloides</i>	sacred datura			X		
<i>Dicliptera resupinata</i>	Arizona foldwing			X		
<i>Digitaria californica</i>	Arizona cottontop		X	X		
<i>Dyssodia pentacheata</i>	dogweed		X			X
<i>Encelia farinosa</i>	brittlebush	X	X	X		X
<i>Erionueron pulchellum</i>	fluffgrass		X	X		
<i>Eschscholtzia mexicana</i>	Mexican poppy	X	X			
<i>Isocoma tenuisecta</i>	burrowweed	X	X	X		X
<i>Mammillaria grahamii</i>	fishhook pincushion	X	X			
<i>Mentzelia sp.</i>	blazing star		X	X		
<i>Nicotiana obtusifolia</i>	desert tobacco	X	X			
<i>Penstemon parryi</i>	Parry's penstemon	X	X			
<i>Porophyllum gracile</i>	odora	X	X			
<i>Psilostrophe cooperi</i>	western paperflower		X			
<i>Senna covesii</i>	desert senna	X	X			
<i>Sphaeralcea ambigua</i>	globemallow	X	X			
<i>Verbesina encelioides</i>	golden crownbeard	X		X		
<i>Zinnia acerosa</i>	desert zinnia		X			
VINES						
<i>Clematis drummondii</i>	virgin's bower			X		
<i>Sarcostemma cynanchoides</i>	desert milkweed		X			

Atturbury Wash Greenway - Inventory of Existing Plant Species

		GREENWAY SEGMENT(S)				
		1	2	3	4	5
		Fred Enke Drive	Lincoln Park	Escalante to Stella	Lakeside Park	Golf Links to Pantano Wash
NON-NATIVE SPECIES						
<i>Aloe sp.</i>	aloe			X		
<i>Arundo donax</i>	giant reed			X	X	
<i>Caesalpinia sp.</i>	bird of paradise			X		
<i>Cynodon dactylon</i>	Bermuda grass			X	X	
<i>Eragrostis lehmanniana</i>	Lehmann lovegrass			X		
<i>Eucalyptus sp.</i>	eucalyptus					X
<i>Nerium oleander</i>	oleander					X
<i>Opuntia basilaris</i>	beavertail cactus			X		
<i>Opuntia microdasys</i>	bunny ears cactus			X		
<i>Parkinsonia aculeata</i>	Mexican paloverde	X		X	X	
<i>Pennisetum ciliare</i>	buffelgrass	X	X	X	X	
<i>Pennisetum setaceum</i>	fountain grass			X		
<i>Pithecellobium flexicaule</i>	Texas ebony	X				
<i>Salsola sp.</i>	Russian thistle				X	X
<i>Senna artimisioides</i>	feathery senna	X				
<i>Sorghum halapense</i>	Johnson grass			X	X	
<i>Xanthium strumarium</i>	cocklebur			X	X	

Atturbury Wash Greenway Master Plan

Appendix D

Invasive Species Management Guidelines

Atturbury Wash Greenway - Invasive Species Management

	Mechanical Treatment	Chemical Treatment	Timing	Important Considerations
Tier 1: Priority Invasives (Goal is for heavy control or eradication)				
Giant reed (<i>Arundo donax</i>)	Remove all biomass (may require backhoe) and haul offsite. Ensure no root or leaf material is left behind. Treat resprouts with herbicide.	Glyphosate should be applied after flowering in late summer, either as a cut stump treatment or as a foliar spray.	Seasonality not important for mechanical removal, but herbicide should occur once flowering is complete (late summer).	Follow-up control should occur at least twice per year.
Mexican paloverde (<i>Parkinsonia aculeata</i>)	Trees should be cut as low to the ground as possible and stumps treated immediately with herbicide. Small trees may be removed with a backhoe as long as 100% of the roots are removed.	Immediately (within 15 seconds) after cutting treat with picloram or triclopyr herbicide to prevent resprouting.	ANY	Trees should be monitored for resprouting and re-treated as necessary.

Atturbury Wash Greenway - Invasive Species Management

	Mechanical Treatment	Chemical Treatment	Timing	Important Considerations
Buffelgrass <i>(Pennisetum ciliare)</i>	Individual plants should be removed by shovel or digging bar immediately. Seed heads should be carefully clipped and securely bagged prior to digging to reduce the number of seeds that escape.	Glyphosate.	Glyphosate should be applied when the plant is actively growing but before seed is set, during the summer rain season.	All buffelgrass should be removed prior to any construction activity. Once plantings are installed it may be preferable to control buffelgrass chemically to avoid ground disturbance. Neighborhood education will increase the efficacy of buffelgrass control and may be an integral part of the control program.

Atturbury Wash Greenway - Invasive Species Management

	Mechanical Treatment	Chemical Treatment	Timing	Important Considerations
African sumac (<i>Rhus lancea</i>)	Individual plants should be removed by shovel or digging bar immediately. Larger plants should be removed by bulldozer. Ensure no root or leaf material is left behind.	N/A	ANY	This species needs to be hauled off site, even when there are no seeds, as it is allelopathic.
Salt cedar (<i>Tamarix sp.</i>)	N/A	Cut shrub near ground and immediately (within 30 seconds) apply triclopyr or glyphosate to the cut stump.	ANY	All cut vegetative material should be bagged and hauled off-site. Follow up control should occur twice per year.
Fountain grass (<i>Pennisetum setaceum</i>)	Individual plants should be removed by shovel or digging bar immediately. Seed heads should be carefully clipped and securely bagged prior to digging to reduce the number of seeds that escape.	Glyphosate.	Glyphosate should be applied when the plant is actively growing but before seed is set, during the summer rain season.	All fountain grass should be removed prior to any construction activity. Once plantings are installed it may be preferable to control fountain grass chemically to avoid ground disturbance. Neighborhood education will increase the efficacy of fountain grass control and may be an integral part of the control program.

Atturbury Wash Greenway - Invasive Species Management

	Mechanical Treatment	Chemical Treatment	Timing	Important Considerations
Starthistles (<i>Centaurea spp.</i>)	Small infestations can be hand dug.	Mature plants are harder to control than young rosettes, Spot treatments of glyphosate are effective.	These plants grow and set seed quickly - they should be treated immediately upon identification and preferably before the seeds mature.	Once plants flower they can produce viable seeds in eight days.
Bermuda grass (<i>Cynodon dactylon</i>)	Mulching or solarization.	Glyphosate kills both the tops of the plant and the roots. Apply to vigorously growing Bermuda grass that is not water stressed. Spray the area evenly and withhold water for 7 days, then cultivate the area to cut surface stolons and bring rhizomes to the surface to dry out. Another treatment of glyphosate will be necessary once it starts growing again.	Mulching or Solarization must occur during the hot summer months. herbicide should be applied during vigorous, active growth.	Bermuda grass treatment should occur well in advance of construction activities. Follow up treatment will be critical, especially in the Xeroriparian Restoration area.

Atturbury Wash Greenway - Invasive Species Management

	Mechanical Treatment	Chemical Treatment	Timing	Important Considerations
Tier 2: Secondary Invasives (Goal is for control)				
Lehmann lovegrass (<i>Eragrostis lehmanniana</i>)	Individual plants should be removed by shovel or digging bar.	Spot application of glyphosate may be used after project installation to avoid unnecessary ground disturbance.	Apply herbicide when plant is actively growing.	
Russian thistle (<i>Salsola sp.</i>)	Individual plants should be removed by shovel prior to seed set.	Apply glyphosate when the plant is actively growing but before flowering. Herbicide application rate should wet the plant thoroughly. Chemical control may be preferred after installation to limit unnecessary ground disturbance.	Control methods should be applied before the plants set seed and while they are actively growing. Seeds are produced during the summer, and by fall the plant dries out, breaks off, and rolls away, dispersing new seeds as it travels. Therefore, the best time to control Russian thistle is in the spring during active growth.	This species may need to be removed more than once during a growing season.
London rocket and other mustards (<i>Sisymbrium iro et al.</i>)	Individual plants should be removed by shovel prior to seed set.	Apply glyphosate when the plant is actively growing but before flowering. Herbicide application rate should wet the plant thoroughly. Chemical control may be preferred after installation to limit unnecessary ground disturbance.	Spring.	

Atturbury Wash Greenway Master Plan
Appendix E
Rezoning Ordinance

ADOPTED BY THE
MAYOR AND COUNCIL

ORDINANCE NO. 10104

RELATING TO ZONING: AMENDING CERTAIN CONDITIONS AND THE APPROVED PRELIMINARY DEVELOPMENT PLAN AS ESTABLISHED BY ORDINANCE NO. 9676 FOR THE PROPERTY LOCATED AT THE NORTHWEST CORNER OF GOLF LINKS ROAD AND THE PANTANO WASH IN CASE C9-89-39, PERILLO – GOLF LINKS ROAD, C-2 ZONING; AND SETTING AN EFFECTIVE DATE.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF TUCSON, ARIZONA, AS FOLLOWS:

SECTION 1. The zoning conditions established in Ordinance No. 9676 are hereby amended for that area upon a final plat being recorded in the office of the Pima County Recorder in substantial compliance with the requirements attached hereto as Exhibit "A" set forth by the Mayor and Council on January 4, 2005.

SECTION 2. This ordinance becomes effective thirty (30) days after it is adopted by the Mayor and Council and is available from the City Clerk.

SECTION 3. The provisions of this ordinance, including the attached conditions, cannot be given effect individually, and to this end, the provisions of this ordinance and the attached conditions are not severable.

SECTION 4. The various officers and employees are authorized and directed to perform all acts necessary or desirable to give effect to this ordinance.

PASSED, ADOPTED, AND APPROVED by the Mayor and Council of the City of Tucson, Arizona, _____.

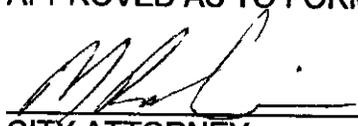
ATTEST:

MAYOR

CITY CLERK

APPROVED AS TO FORM:

REVIEWED BY:



CITY ATTORNEY

CITY MANAGER

MWLM
MWLM:dc
2/27/2004 9:59 AM

EXHIBIT "A" TO ORDINANCE No. 10104

Requirements for Rezoning Case C9-89-39 (Perillo – Golf Links Road, C-2) as established by Mayor and Council on January 4, 2005. For clarity, new text is underlined, deleted text is ~~strikethrough~~.

This ordinance is subject to the following conditions:

Recommended conditions 1-16 apply to the 5.5 acre self-storage facility only, unless otherwise noted. Recommended conditions ~~23-34~~ 17 - 42 apply to the 8.7 acre balance of the rezoning site only, unless otherwise noted.

1. An approved development plan in substantial compliance with the revised preliminary development plan dated ~~February 2002~~ in substantial compliance with the preliminary development plan dated November 1, 2004, for the C-2 self-storage site, submitted in accordance with Section 5.3.8 of the *Land Use Code* including but not limited to:
 - a. All lighting to be shielded and directed down and away from adjacent uses to the interior of the proposed development.
 - b. A maximum of three access points to Golf Links Road to serve the entire 14.2 acres site.
 - c. A maximum building height of 12 feet, and a maximum height of pole mounted lights of 18 feet, measured to the light source.
 - d. A dedication of 25 feet of right-of-way for Golf Links Road, per the *Major Streets and Routes Plan*, as required.
2. Installation of fire hydrants to comply with the Tucson Fire Code.
3. Compensation to the Pima County Flood Control District in the amount of fifty percent of the cost of the bank protection along the subject property frontages of the Pantano and Atterbury Washes.
4. Dedication of a one foot no-access easement along the Golf Links Road frontage, except at points of ingress/egress.
5. A drainage report addressing/including detention and retention calculation requirements and other requirements as provided by the Engineering Division of the City of Tucson Department of Transportation shall be submitted. Drainage outflow from the site shall be approved by the Pima County Flood Control District and the Engineering Division of the City of Tucson Department of Transportation.

6. Dust control measures, as approved by Pima County Air Quality Control.
7. Any relocation, modification, etc., of existing utilities and/or public requirements necessitated by the proposed development will be at no expense to the public.
8. Three years to comply with all Code requirements and conditions of rezoning.
9. A six (6) to ten (10)-foot-wide landscape buffer and continuous screening of the interior of the self storage facility shall be provided adjacent to the Pantano Wash including wrought iron, tubular steel, or similar attractive fencing on the property line. Chain link is not permitted. Additional screening shall be provided by the outer row of storage units where parallel to and within ten (10) feet of the property line. The exterior wall of the storage units shall be masonry block or stucco, and shall jog a minimum of four (4) feet every 75 linear feet. Groupings of accent plants and shrubs shall be planted in the insets in the wall of the storage units. Where there are no storage units within ten (10) feet of the property line, screening shall be provided by a dense hedge of Arizona Rosewood located within ten feet of the property line. The required screening shall be augmented with a variety of drought adapted canopy trees, planted inside and within ten feet of the fence, an average of one every 33 linear feet.
10. Provide mitigation in the 42-foot sewer and drainage easement along the Atterbury Wash in compliance with the WASH Ordinance in coordination with Pima County Wastewater Management.
11. Locate unsightly and noise generating elements such as dumpsters, loading zones, free standing items stored on site that exceed 16 feet in height, and loudspeakers away from property boundaries that are adjacent to the Pantano Wash.
12. Maximum of two drive-throughs for the C-1 frontage sites. No drive throughs are permitted for the C-2 frontage.
13. Augmentation of the existing trees within the linear park area adjacent to the Pantano Wash with additional trees so that there is an average one tree every 25 linear feet. Location, species, and timing of planting to be coordinated with the Pima County and City of Tucson Parks and Recreation Departments.
14. "Safe by Design" concepts shall be incorporated in the development plans and landscape plans for review by the Tucson Police Department and Tucson Parks and Recreation Department. No access to the linear park is permitted from the rezoning site
15. The applicant shall upgrade the unimproved bus stop along the property frontage on Golf Links Road to include a bus shelter, garbage receptacle, and concrete

pad. The improvements shall be coordinated with the Department of Transportation, Engineering Division.

16. Dedication of 30 feet of right-of-way along the Atterbury Wash for a linear park.

Conditions 17-42 apply to the 8.7 acre balance of the rezoning site only, unless otherwise noted.

17. An approved ~~development plan~~ subdivision plat in substantial compliance with the preliminary development plan dated November 1, 2004, submitted in accordance with Section ~~5.3.8~~ 4.1.1 of the *Land Use Code* including but not limited to:
- a. ~~All lighting to be shielded and directed down and away from adjacent uses to the interior of the development, mounted no higher than eighteen (18) feet, measured to the light source.~~ Maximum building height not to exceed 25 feet.
 - b. A maximum of three access points to Golf Links Road to serve the entire 14.2 acres site.
 - c. A dedication of 25 feet of right-of-way for Golf Links Road, per the *Major Streets and Routes Plan* as required.
18. Dedication of a one foot no-access easement along the Golf Links Road frontage, except at points of ingress/egress.
19. A modified drainage report addressing/including detention and retention calculation requirements and other requirements as provided by the Engineering Division of the City of Tucson Department of Transportation shall be submitted. Drainage outflow from the site shall be approved by the Pima County Flood Control District and the Engineering Division of the City of Tucson Department of Transportation.
20. Dust control measures, as approved by Pima County Air Quality Control.
21. Any relocation, modification, etc., of existing utilities and/or public requirements necessitated by the proposed development will be at no expense to the public.
22. ~~Perimeter landscaping and screening shall be provided as required per the *Land Use Code*. As an alternative, adjacent to the Atterbury and Pantano Washes, a six (6) to ten (10) foot wide landscape buffer and continuous screening of the interior of the site shall be provided. Screening shall include a dense hedge of Arizona Rosewood located on the development side of property line within ten feet of the property line together with minimum six (6) foot tall wrought iron,~~

- ~~tubular steel, or similar attractive fencing on the property line. The required screening shall be augmented with a variety of drought-adapted canopy trees, planted inside and within ten feet of the fence, an average of one every 33 linear feet. Chain-link is not permitted. All walls visible from a public right-of-way, are to be graffiti-resistant and incorporate one or more visually appealing design treatments, such as: the use of two or more decorative materials like stucco, tile, stone, or brick; visually interesting design on the wall surface; varied wall alignments (jog, curve, notch, setback, etc.), and where appropriate, trees and shrubbery should be located in voids created by wall variations.~~
23. ~~Locate unsightly and noise-generating elements such as activities producing noise through open doors, dumpsters, loading zones, and outdoor storage in excess of six (6) feet tall, a minimum of 50 from property boundaries that are adjacent to the Pantano and Atterbury Washes. Rooflines adjacent to the Pantano Riverpark and Atterbury Linear Park shall vary.~~
 24. ~~Maximum of two drive-throughs for the C-1 frontage sites. Building facades at rear and side are to be designed with attention to architectural character and detail comparable to the front facade, with consistent design treatment, including but not limited to, comparable color palette, signs, lighting, screen walls, rooflines, and materials. Dimensioned elevation drawings are to be submitted as a part of the development plan.~~
 25. Augmentation of the existing trees within the linear park area adjacent to the Pantano Wash with additional trees so that there is an average one tree every 25 linear feet. Location, species, and timing of planting to be coordinated with the Pima County and City of Tucson Parks and Recreation Departments.
 26. "Safe by Design" concepts shall be incorporated in the development plans and landscape plans for review by the Tucson Police Department and Tucson Parks and Recreation Department. ~~No access to the linear park is permitted from the rezoning site. Pedestrian access to the Atterbury and Pantano Wash trails shall be provided. Two eight-foot wide pedestrian easements with a five-foot wide all-weather access path are to be provided along the western edge of the subdivision. One eight-foot wide pedestrian easement with a five-foot wide all-weather access path is to be provided along the eastern side to provide pedestrian connectivity to the Atterbury and Pantano Wash trails, as approved by the Tucson Police Department for "safety by design" criteria. The access points shall be located to provide appropriate, safe, and direct access to the trails.~~
 27. The applicant shall upgrade the unimproved bus stop along the property frontage ~~on~~ located at the northeast corner of Panther Place and Golf Links Road to include a bus shelter, garbage receptacle, and concrete pad. The improvements

shall be coordinated with the Department of Transportation, ~~Engineering~~ Transit Services Division.

28. Dedication of 30 feet of right-of-way along the Atterbury Wash for a linear park.
29. Dedication or verification of existence of 50 feet of right-of-way along the Pantano Wash for a linear park.
30. The applicant shall Contribute \$35,000 toward construction of the Pantano Riverpark. Contribution to be made at the time permits are pulled.
29. To the extent permitted by Pima County Wastewater Management, the retention basin-open space area at northwest point of the subdivision should include trees and shrubs throughout the basin in addition to benches, picnic tables, and tot lots, that will enhance the effectiveness of this area to create a park-like environment. Pedestrian and bicycle access should be provided to facilitate use of the area.
30. Each detention/retention basin shall include a sediment trap, or other sediment control measures as approved by the City Engineer, to prevent sedimentation of the detention/retention basin. Each sediment trap, or other sediment control measure, shall have a provision for total drainage.
31. Detention/retention basin floors shall be graded to drain either toward the outlet structure or other logical point. Basin floors shall not be flat.
32. Detention/retention basins in or adjacent to the residential area shall be located adjacent to a street or other accessible area. Basin sideslopes shall be designed and constructed in accordance with the requirements of the Detention/Retention Manual for human activity zones.
33. Rectangular basin shapes shall be avoided unless necessitated by recreational or visual amenities within the basin.
34. Vegetation shall be used as screening and/or security barrier for a minimum of ten percent of the basin perimeter.
35. Signage is to be integrated into the overall design of the project, demonstrating aesthetic appeal and promoting ease of use of the development.
36. The applicant shall submit a category I Traffic Impact Analysis.
37. Parking shall be provided on both sides of the street.

38. The owner / developer shall obtain written documentation from the Pima County Wastewater Management Department that treatment and conveyance capacity for the proposed development is available, no more than 90 days before submitting any tentative plat, development plan, sewer improvement plan or request for building permit for review, and time all development within the rezoning area to coincide with the availability of treatment and conveyance capacity in the downstream public sewerage system. Should treatment and / or conveyance capacity not be available at the proposed time of development, the owner / developer shall have the option of funding, designing and constructing the necessary improvements to Pima County's public sewerage system cooperatively with others and the Pima County Wastewater Management Department.
39. The owner / developer shall connect all development within the rezoning area to Pima County's public sewer system at the location and in the manner specified by the Wastewater Management Department in the required capacity response letter and as specified by the Development Services Department at the time of review of the tentative plat, development plan, sewer construction plan, or request for building permit.
40. The owner / developer shall fund, design, construct, and maintain all necessary on-site sewers on a private basis, unless otherwise authorized at the time of review of the tentative plat, development plan, sewer construction plan or request for building permit.
41. The owner / developer shall complete the construction of all public and/or private sewerage facilities necessary to serve the rezoning area, obtain all necessary discharge authorizations (approvals of construction) from the Arizona or Pima County Department of Environmental Quality, and convey those sewerage facilities that will be publicly maintained to Pima County, before treatment and conveyance capacity will be permanently committed for new development within the rezoning area.
42. The owner / developer shall bring all existing public sewer easements (and/or public utility easements containing public sewer lines) within the rezoning area into accordance with the most recent Pima County Wastewater Management Department's standards for such easements, including granting additional easement area and providing adequate turnaround areas if necessary, as specified at the time of review of the tentative plat, development plan, sewer construction plan, or request for building permit.



Atturbury Wash Greenway Master Plan



McClann & Associates