

Bee Cave Connectivity Plan

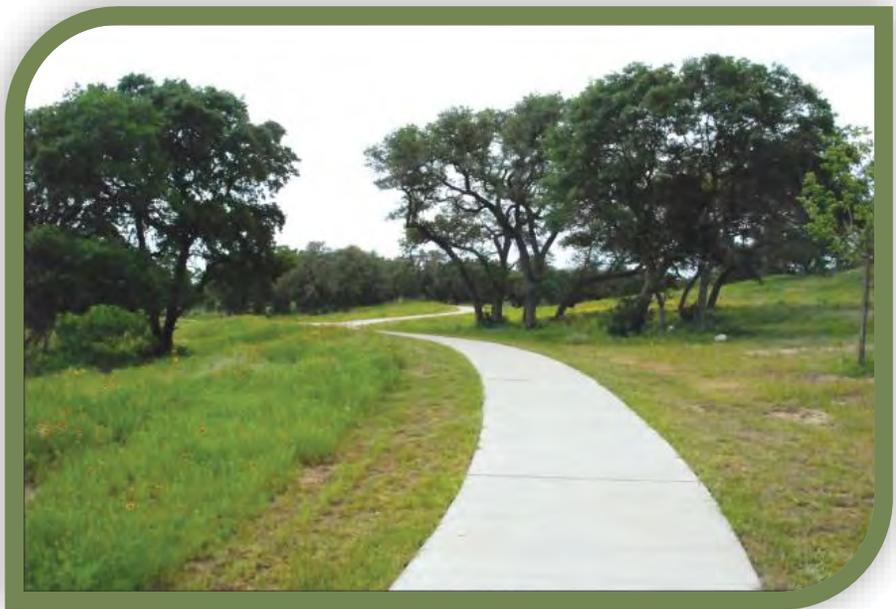


Photo credit Tiffany Young
as per Community Impact

Prepared by
Lee and Associates

November 2016

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Appendix

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Acknowledgements

Public Participants

Thank you to the City of Bee Cave and the citizens of Bee Cave who participated in this planning process. This effort would not been possible without the public involvement and feedback through surveys, public forums, and open houses.

Project Consultants

This document was prepared by Lee and Associates for the City of Bee Cave.

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Disclaimer

Maps and data included in this report have been compiled from general sources and are to be used only as a guide. Lee and Associates assumes no liability for their accuracy or any decisions users make based on these documents.



Chapter 1 – Introduction and Vision

Objective

The primary purpose of the trail system is to provide a safe, convenient, and functional transportation link across the City for pedestrians and bicyclists who seek to utilize non-motorized modes of transportation to meet their regular travel needs as well as for recreational purposes all while maintaining the natural beauty of the City of Bee Cave.



<http://bexarwitness.com/greenway-trails-expand-throughout-city/#.VYAzzPIVhBc>



Plan Overview

The City of Bee Cave's connectivity plan (Appendix A) will consist of a series of interconnecting, multi-modal transportation corridors for walkers, runners, cyclists, hikers and other non-motorized users. The main focus is to create an inner loop to connect the hub of the City, which consists of the Hill Country Galleria and the Shops at the Galleria. The ultimate goal of the connectivity plan was to identify and develop an off-street network of trails and bicycle/pedestrian facilities that connect neighborhoods, existing parks, schools, and other key locations throughout the city. This, however, is not entirely feasible given the existing constraints of the City of Bee Cave. Major highway crossings, existing built-out neighborhoods, and topographic conditions pose challenges in creating an off-street, looped trail system. Therefore, the trail plan will be comprised of bicycle and pedestrian oriented transportation corridors utilizing park paths, floodplains, utility and power line easements, as well as some existing sidewalks and streets. The focus was placed on portions of the trail that could provide the most benefit for the community.

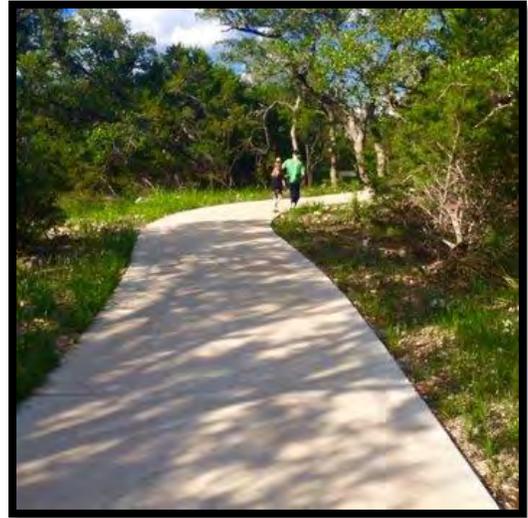


Photo by Kay J.:
http://www.yelp.com/biz_photos/panther-springs-park-san-antonio-2?select=qHFmLNgWLAFlim9lmaalQ

Although trails are used mostly for recreation, they are much more than that. A trail network can increase transportation options, improve air quality, reduce roadway congestion, boost economic development, and help to connect citizens with their community.



Vision and Goals

- *Provide a loop system for recreational purposes around the Central Hub of the City*
- *Provide connections to all the neighborhoods in Bee Cave*
- *Reduce traffic congestion by providing an alternative to driving*
- *Improve safety for pedestrians and cyclists*
- *Provide connections to retail, restaurants, schools, and offices*
- *Provide connections to Bee Cave Central Park and other parks within the City*
- *Establish standards for each facility type depending on the condition*



Image from Youtube video <https://www.youtube.com/watch?v=MENIdeu5Kqw>



Chapter 2 – Data Collection and Existing Conditions

Existing Conditions Map – See Appendix B

Data Collection

Before a connectivity plan could be created, several factors had to be analyzed. The first was to compile all background information for the existing conditions.

Sidewalks – There are over 40 miles of existing sidewalks throughout the City of Bee Cave. Several of these existing sidewalks could be used as part of the trail system with little improvement. Most of the existing sidewalks are 4-5' wide. The ideal width of the new multi-use trail is to average 10'. However, there may still be areas that will need to be narrower to work with natural conditions, such as trees, utilities, fences, or other unforeseen issues.



This is a portion of the existing sidewalk along Vail Divide road to be improved as part of the connectivity plan.

Trails/Paths – Similar to the existing sidewalks, there are several areas of existing trails and paths that were created by people traversing over the same area. These areas are obvious locations for adding trail segments since they are already being utilized and are located off-street.



This is an existing path that has been worn behind Falconhead West. Improving this trail to tie into the connectivity plan would allow residents to easily access restaurants and other retail establishments.



Bike Lanes – Throughout Lake Pointe is a series of on-street bike lanes. Although the proposed trail plan minimizes these types of bike lanes, there will be some instances where on-street bike lanes will need to be utilized. (See section 3-22 for the different types of bike lanes.)



Existing on street bike lane on Sonoma Drive in Lake Pointe.

Topography – One of the appeals of Bee Cave is the beautiful terrain that houses rolling hills and vistas. However, this can create issues with providing accessible, multi-use trails throughout the City. The final location of the trail will be dependent on working with the natural beauty of the topography. The less cut and fill, the more the trees and natural vegetation can remain. This may result in longer trails that meander to allow for minimized slopes. As each portion of the trail is developed, a survey of the existing topography will need to be completed as well as an evaluation of the proposed grading to ensure that each trail is accessible. To be accessible the trail will need to be 5% without handrails and no steeper than 8.33% with handrails.

Destination Points – There are several locations throughout the City that would make ideal destination points for the trails. The two primary locations would be the Hill Country Galleria and the Shops at the Galleria. Both of these areas already have a series of decomposed granite trails and sidewalks throughout their properties which could be upgraded to a wider, multi-use trail. The City of Bee Cave Central Park, with its existing trail system, play areas, and dog park, would be an ideal connector between these two retail areas. Other establishments such as Nitro and Hill Country Golf and Guitar could easily be linked to the Falconhead West neighborhood to allow residents to get to these facilities without having to travel on Highway 71. Schools are also important destination points for the connectivity plan. Having a multi-use trail connection to Lake Travis High School as well as other schools in the area not only helps students get to school, but also provides an alternative means of transportation for events.



Floodplains – Floodplains are ideal locations for trails. They are typically beautiful areas following along creeks or streams that are often underutilized. Proposed trails near floodplains and stream corridors can present both negative and positive influences to trail design. A floodplain prevents the use of a trail when it is inundated by water and can increase trail maintenance with mud, debris or washout during a flood occurrence. Alternatively, trails are well suited to stream corridors for several reasons. Flood damage to a trail is minor compared to above-ground structures. Floodplains are usually left in a natural, vegetative state that provides an enhanced environment for trail users, and they also allow a large variety of plants and animals congregate along stream corridors because of the availability of water, food and habitat.

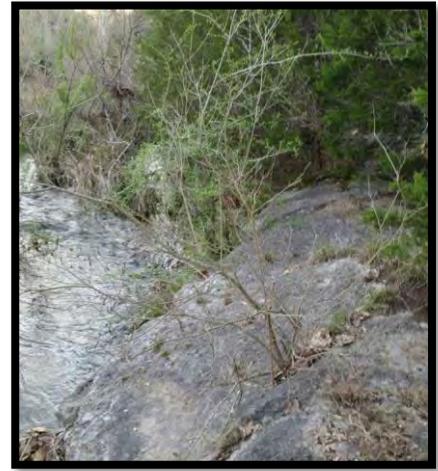
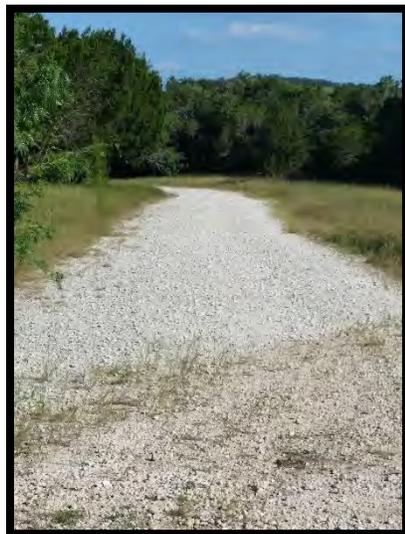


Photo taken of Little Barton Creek behind the Shops at the Galleria

Utility Easements – Existing utility easements are a great place for trails since most of the time the land is undevelopable. There would need to be coordination with the utility company as to what could be located in the easement. The land owner might also have to dedicate a trail easement so that the land could not be developed for another use.



Photos of the existing easement that is located south of the Shops at the Galleria



Proposed Developments – One of the easier ways to continue the connectivity plan through the City is having a standard for future developments as they go through the site planning process. If the land that is being developed is part of the proposed connectivity plan, a requirement could be put in place that the land owner dedicate a trail easement. These locations are identified in the proposed connectivity plan.

Right of Way – There are several streets within the City of Bee Cave that are wide enough to encompass a bike lane. These are shown on the connectivity plan as proposed bike lanes. These widths vary and would ultimately determine the type of bike lane that could exist.



This is a portion of Bee Cave Parkway that could be expanded in the existing right of way to include a separated bike lane.



Public Involvement

Public involvement and support is imperative for the success of the new connectivity plan for the City. Engaging the community ensures the plan meets the needs of the residents, business owners, and visitors and allows them to influence the outcome of the process. The collective knowledge of the community about the recreational opportunities, needs and desires for parks, trails and open spaces ensures that the plan reflects the best information available. The following methods were used in this process.

Open House Presentation - Two open house presentations were held to inform the public about the plan and answer questions that arose. The first open house was held on January 28, 2015. An initial overall map was shared to start discussions and give residents an idea of what the connectivity plan would entail. Feedback about safety, location and types of trails was noted and addressed in the trail plans. There were discussions as to the safety of crossing Highway 71 and how this could be accomplished. Several examples of types of crossings were presented to address this ongoing issue. The second open house was held on March 25, 2015. More refined maps were created based on feedback from the previous open house. Most of the residents that attended the second open house were already familiar with the plan and therefore the discussion was more specific. The type of surface for the trails, connections from each neighborhood, and the typical cross section were all points of discussion.

Online Survey and Polls - Another form of public involvement was the creation of a website to facilitate a public forum as well as conduct an online survey. The results of the survey are included in Appendix C. These results were used to further refine the trail plans and justify the types of trails.



Over 90% of the respondents will use the trail for recreation and/or exercise.



Chapter 3 – Recommendations

Use and Functions

One of the primary challenges in developing a trail system to meet the needs of a City is understanding the preferences and challenges presented by multiple user groups. While it is important to consider the unique needs of each group, the primary goal should be to identify the shared or overlapping needs of these groups to develop a trail system that efficiently meets as many needs as possible.

As there will be a variety of user groups utilizing the trail, the trail surface as well as width will need to accommodate as many users as possible. Pedestrians including walkers, hikers, runners, people pushing strollers, etc. travel at a slow rate of 3-7 miles per hour. According to the Rails to Trails Conservancy, these trail users prefer a surface that is softer than asphalt or concrete to prevent knee, shin and foot strain. In-line skaters tend to prefer something harder with a smooth finished surface. Cyclists use the trail for various reasons including commuting, recreation, and touring. They also use different types of bikes, from road bikes to mountain bikes. All these variants require different design considerations.

Meeting The American Associates of State Highway and Transportations Officials (AASHTO) requirements is important in gathering any type of state or federal funding. AASHTO recommends a minimum of 10 feet for multi-use trails; however, where heavy use is anticipated, a 12 to 14-foot width is recommended.

Based on public input, equestrian activity was also a recommended use for the trails. Equestrian usage, however, can create problems on a paved path. Not only can it injure the horse's hooves, it can also damage the surface of the trail. The ideal equestrian trail would be a 5' wide, soft surface trail, adjacent to the multi-use trail. These trails could be strategically located where the presence of horses is abundant and where there is adequate room for a paralleling trail.



Inner Loop

The trail system will be located to provide the maximum number of people access to the trails. The Inner Loop plan (Appendix D) provides a way to connect the Hill Country Galleria and the Shops at the Galleria into one large “loop”. The idea behind this is to provide recreational use that connects the community while bringing people to the main retail establishments in the City. The Inner Loop would utilize the existing decomposed granite paths located around the Galleria, possibly improving them to a 10' wide, hard surfaced multi-use trail where possible. (The natural conditions will force a narrow trail width in several areas.) The Inner Loop would also encompass the proposed trail behind the Shops at the Galleria that would run along Little Barton Creek, becoming a destination for residents and visitors to Bee Cave. Depending on the final location, this trail may not be comprised of an impervious material, but instead just be a cleared path. This trail would also link to the Bee Cave Sculpture Park and provide more visibility for this area.



Intersections and Crossings

Painted Crossings – Creating a unique, painted crosswalk to convey trail crossings is a way to alert vehicular traffic that they are crossing a pedestrian zone as well as bring awareness to the community about the trail system. Having a standard and unified look for all crossings is imperative in attaining this goal.



http://dig-b.blogspot.com/2008/05/photos-indianapolis-cultural-trail_05.html

Colored Pavement – Based on the Interim Approval for Optional Use of Green Colored Pavement for Bike Lanes by the FHWA, contrasting green color pavement may be used in marked bike lanes and in the extension of bike lanes through intersections. Green colored pavement can be used to denote the presence and preferred position of bicyclists.



<http://nacto.org/publication/urban-bikeway-design-guide/bikeway-signing-marking/colored-bike-facilities/marking/colored-bike-facilities/>

In-Roadway Warning Light System - This is a lighted crosswalk that will alert vehicles that there is a trail crossing. The lights only come on when a pedestrian is sensed before entering the crosswalk.



<http://test.lightguardsystems.com>



Pedestrian Bridges and Tunnels – Bridges and tunnels are appropriate to provide connectivity over high speed arterials and multi-lane highways. Having the pedestrian grade separated from the vehicular traffic is the safest way to provide access across these types of streets. These crossings are most feasible where the terrain allows for crossing over or under without significant ramps. The locations shown on the previous maps identify ideal situations for a bridge or tunnel. Bridges and tunnels, however, do have a much higher cost than at grade crossings. Therefore, it is imperative to ensure that pedestrians actually use the crossing. Studies have found that pedestrian-related crashes decreased by 91 percent by using grade-separated crossings.^[1] However, other studies have determined that if the walking time to use an overpass is 50 percent longer than crossing the street at-grade, then the bridge or underpass will not be used and will be ineffective in reducing crashes.^[2]



<http://iaeimagazine.org>



Andrew King: <http://www.thisweeknews.com/>

1. Fitzpatrick, K., & Park, E. S. (2010). Safety effectiveness of the HAWK pedestrian crossing treatment. (Report No. FHWA-HRT-10-042). Washington, DC: Federal Highway Administration.
2. Fitzpatrick, K., Turner, S., Brewer, M., Carlson, P., Ullman, B., Trout, N., Park, E. S., & Whitacre, J. (2006). Improving Pedestrian Safety at Unsignalized Crossings (NCHRP Report 562). Transportation Research Board. Web.



Surfaces

The type of surface used for each part of the trail has to be based on activity, types of users, maintenance, and accessibility. Hard-surface trails are more accommodating to multiple users and require less maintenance, but tend to be more expensive. Soft-surface trails typically cost less, but generally do not hold up well under heavy use or varying weather conditions. All public facilities should be built to meet the requirements of the Americans with Disabilities Act (ADA). This act was established to prohibit discriminations on the basis of disability by public accommodations.

Following is a list of surface types provided by the Rails to Trails Conservancy:

Asphalt – Asphalt works well for bicycle commuters and inline skaters, which is a reason it is often used in urban areas. It typically can't be used for equestrian activity. It requires regular, minor maintenance such as crack patching, yet has a life expectancy of 7 to 15 years. Asphalt is a flexible surface that requires use to remain pliable and will last longer with heavy use. However, those installing asphalt should be conscious of the possibility of environmental contamination during construction.

Concrete- Concrete is usually the longest lasting of the hard surface materials, but is also one of the most expensive. Well-maintained concrete can last 25 years or more. The surface is appropriate for urban areas with severe climate swings and a susceptibility to flooding. However, the hard surface is taxing on runners' lower limbs, and is thus unpopular with that significant user group. Adjacent soft-surface treads can accommodate runners and equestrians where concrete is necessary for the main trail.

Crushed Stone – This is popular as a trail surface because it will not deteriorate under heavy use and can complement the aesthetic of the natural landscape. It can also accommodate nearly every trail user (with the exception of inline skaters) if crushed and compacted properly. Because crushed stone can be made of nearly any type of rock, including limestone and sandstone, it is one of the most accessible trail surface types.

Pervious Concrete – This type of concrete allows rainwater to pass through to soak back into the ground naturally. This is ideal for situations where drainage is an issue and in instances where there are impervious cover limitations. Maintenance consists of vacuuming annually or more often to remove debris from the surface of the pavements. For best results over a large area, a regenerative vacuum sweeper should be used. Other cleaning options may include power blowing and pressure washing. Research has shown that using any of these methods to clean a clogged pervious concrete pavement can restore 80% to 90% of the original permeability in some cases.



Infrastructure Recommendations

Marked Shared Lane - Travel lanes with specific bicycle markings, often referred to as sharrows are comprised of a bicycle symbol with two white chevrons. This symbol signals to motorists that bicyclists are permitted to use the full lane. Signage along the road can also be used in conjunction with the pavement markings. Pavement markings should be placed immediately after an intersection and spaced no more than 250 feet apart. The preferred placement of the markings is in the center of the travel lane to promote single file positions of vehicles and to minimize the wear of the markings.



Photo by Eric Gilliland

Shared Lane/Signed Route – This type of route is used in areas where the travel lane has been identified as a preferred route for bicycle use. This could be due to a variety of factors, including favorable roadway dimensions, lower present speed limits, or lower vehicular volumes. These routes would be marked with signage only as no pavement markings would be necessary. These lanes should only be used on roadways with a posted travel speed of less than 30 mph.



Picture of development in Bee Cave with narrow streets that could be part of a signed route.

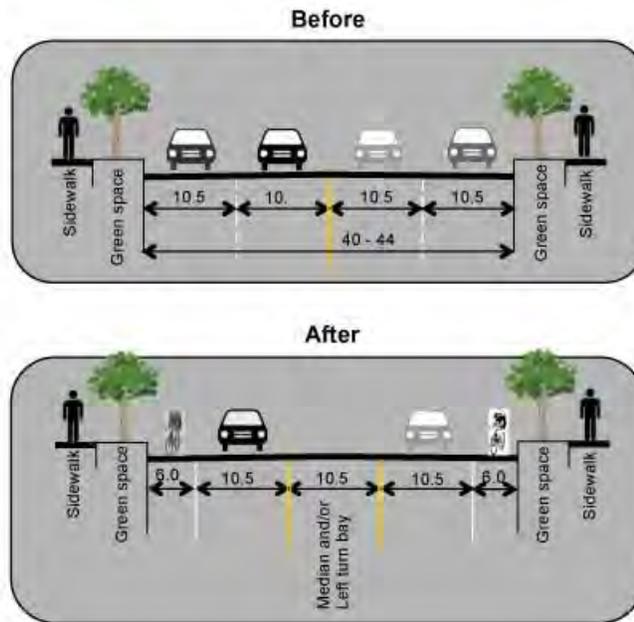
Bike Lane – Designated bike lanes are portions of the roadway designed for bicycle use established with appropriate signs and pavement markings. Bike lanes are typically one-way facilities that carry bicycle traffic in the same direction as the adjacent roadway traffic. Under some circumstances however, bike lanes can also be contra-flow, allowing bicycles to travel in two directions. Bike lanes are typically 5' wide against a curb or adjacent to a parking lane. A solid white line should be placed between the bike lane and the travel lane. These lanes are used on streets with a moderate speed limit of less than 40 mph.



<http://www.bikearlington.com/pages/biking-in-arlington/bicycle-facilities/>

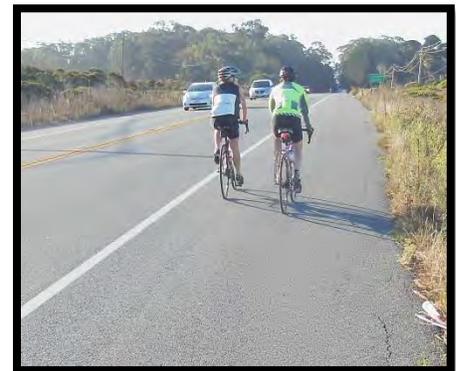


Road Diets - A road diet is a type of roadway conversion project where vehicle travel lanes are repurposed and a portion of the roadway is converted for use as a bicycle lane. It is applied where there is excess road capacity but still preserves the level of service for cars. According to the Road Diet Handbook: *Setting Trends for Livable Streets*, "...the resulting benefits [of a road diet] can include reduced vehicle speeds; improved mobility and access; reduced collisions and injuries; and improved livability and quality of life" [3]



http://www.ctps.org/Drupal/data/html/studies/highway/priority_corridors/Route_203.html

Shoulder Bike Lanes – Maintaining paved shoulders on rural roadways without curbs and gutters may offer a connection to regional destinations, especially for recreational cyclists. Improved maintenance and signage along the shoulder can also contribute to the safety of the bicyclists. The shoulder should have a minimum width of 4' and be increased to 5' when adjacent to a guardrail or other type of barrier. A width of 8' is ideal on roads with speeds over 50 mph. Where right turn lanes are added, the pavement should be marked to show the bicycle lane continuing straight.



<https://thirdwavecyclingblog.wordpress.com/category/interstate-highways/>

- Jennifer Rosales, *Road Diet Handbook: Setting Trends for Livable Cities* (Parsons Brinckerhoff, 2009).



Buffered Bike Lane – This type of bike lane is comprised of a conventional bike lane paired with a designated buffer space separating the bike lane from the adjacent motor vehicle travel lane and/or parking lane. A buffered bike lane is allowed as per MUTCD guidelines for buffered preferential lanes. This buffer adds to the perception of safety and encourages greater use of the on-street bicycle network. The buffered bike lane is beneficial on streets with higher vehicular speeds in excess of 40 mph. Buffers should be delineated by two solid white lines and be at least 2 feet wide. If wider than 3', hatching can be added to further delineate the buffer. Markings and signage should comply with the same standards as conventional bike lanes.



<https://bbandm.wordpress.com/2014/09/17/green-bike-lanes/>

Cycle Tracks – Cycle tracks are facilities along the right-of-way, divided from motor vehicular and pedestrian traffic by some form of vertical separation, such as curbs, parked cars, bollards, or detectable barriers. Cycle tracks provide the best sense of safety for bicycle riders of all levels. Cycle tracks can also be raised above the travel way to create better separation between the cyclist and vehicular traffic. Raised cycle tracks are best implemented when there is extra room in the right-of-way, and the on-street pavement width is limited. When adjacent to a sidewalk, raised cycle tracks should have different pavement markings, textures, or colors to prevent pedestrians from using the area. The cycle tracks can be one way or two-way when there is not enough space to allow for a cycle track on each side of the street. A one-way cycle track should be a minimum of 5 feet in width (with 7 feet preferred) to allow for passing. A two-way cycle track should be 12 feet in width with a minimum width of 8 feet in confined areas. A dashed yellow line should be used to separate the two directions of travel. If cycle tracks are adjacent to parking, a 3 foot barrier should be provided to prevent door collisions.



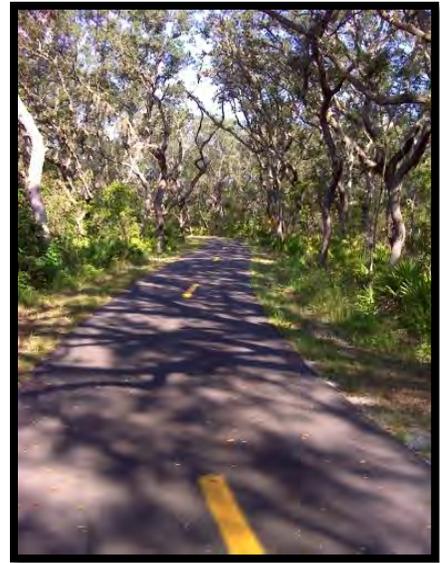
Photo: Cycletrack in Amsterdam, By David Hembrow



Multi-Use Trail – These facilities are typically 10' wide and are physically separated from motorized vehicular traffic by an open space or barrier, either within an easement or within an independent right-of-way. Multi-use trails are designed for two-way travel and for use by cyclists, inline skaters, walkers, joggers, and any other non-motorized use. They typically have a dashed center line mark down the middle to signify the direction of traffic. They should avoid being built in areas with frequent street or driveway crossings to reduce pedestrian/vehicle conflict.



Conceptual Art by GreenWorks for
Minto Island Pedestrian Bridge



<http://www.everytrail.com/guide/timucuan-trail-at->



Standards

There are several other design guides that are also appropriate for pedestrian and bicycle facilities, produced by the United States Access Board, AASHTO, the Institute of Traffic Engineers (ITE), and the National Association of City Transportation Officials (NACTO). The projects must also meet the standards outlined in the Americans with Disabilities Act (ADA). In 2013, FHWA released a memo encouraging and supporting flexibility in the design of pedestrian and bicycle facilities. [4]

FHWA asserts that the AASHTO bicycle and pedestrian design guidelines are the national resource for planning, designing, and operating bicycle and pedestrian facilities. The ITE Designing Urban Walkable Thoroughfares guide and NACTO Urban Bikeway Design Guide build on the flexibilities provided in the AASHTO guides. While design flexibility is encouraged, all project developers should know the requirements of the Manual on Uniform Traffic Control Devices (MUTCD) when considering treatments involving changes to signage and pavement markings. Planners and project managers must also be cognizant of evolving requirements of the Americans with Disabilities Act (ADA). In 2013, the City of Austin officially adopted, as Resolution No. 20131107-049, the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide as a resource for guidance on the development of bicycle facilities in Austin, as well as several other NACTO documents to aid in the design and planning of new bicycle facilities.

Multi-Use Trails and Connectors

The recommended width for a two-directional shared used path is 10 feet. Trails 8 feet in width can be adequate in special circumstances. A one-directional path should be six feet wide. A minimum 2-foot wide graded area should be maintained adjacent to both sides of the path. If the path is adjacent to canals, ditches, or slopes, a wider separation or protective barrier should be considered. Vertical clearance should be at least 8 feet; greater if need be to permit passage of maintenance vehicles. Multi-Use Trails must be built to meet the requirements of the Americans with Disabilities Act (ADA). Particular attention should be paid to alignment and grade.

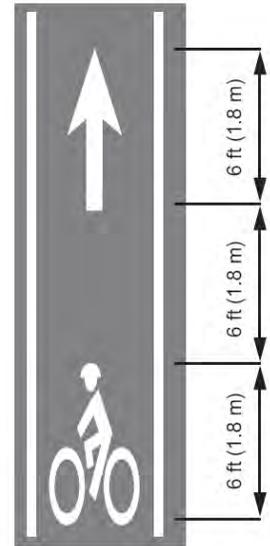
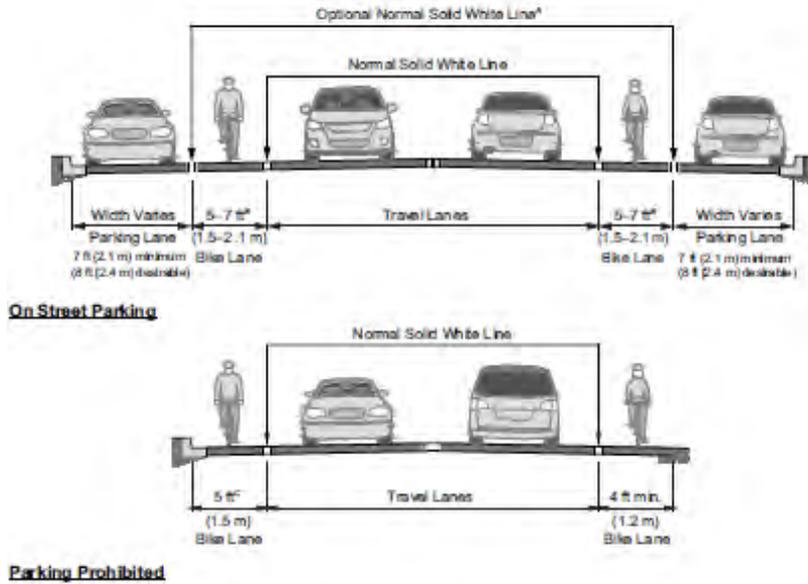
Tunnels

According to AASHTO, the preferred minimum vertical clearance of a multiuse trail tunnel is 10 feet – any lower than 10 feet and emergency vehicles may have difficulty passing through. Additionally, narrower spaces can make the tunnel darker and more “closed-in,” causing the trail users to feel less secure about using the trail. The minimum clear width should be 10 to 20 percent wider than the paved multi-use path, and the desirable clear width on both sides of the surface path should be 2 feet.

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4. FHWA Memorandum: Bicycle and Pedestrian Facility Design Flexibility. http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/design_flexibility.cfm.

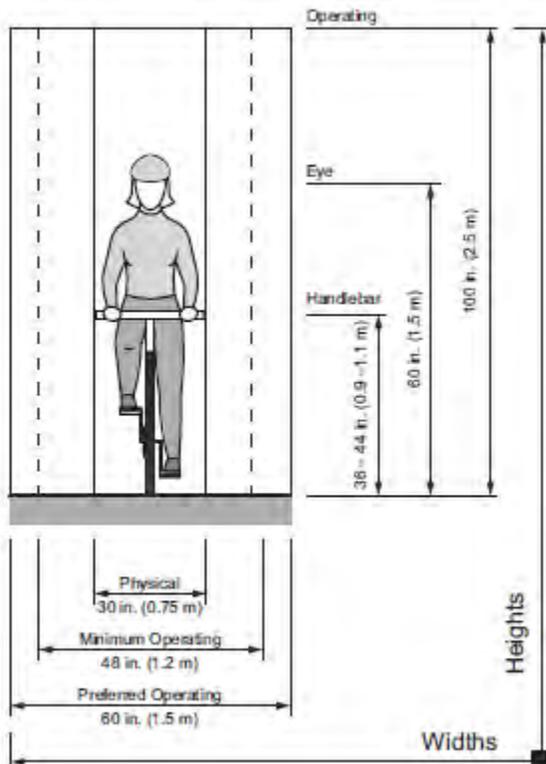


Standard AASHTO Details

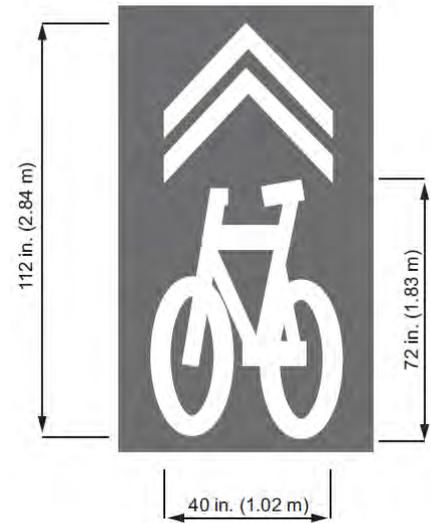


TYPICAL BIKE LANE SECTIONS [5]

BIKE LANE SYMBOL MARKINGS [5]



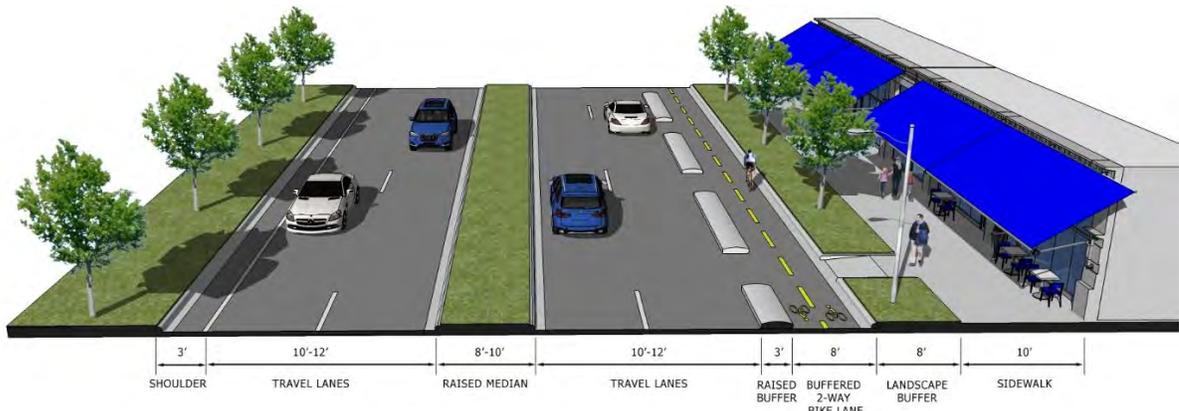
BICYCLIST OPERATING SPACE [5]



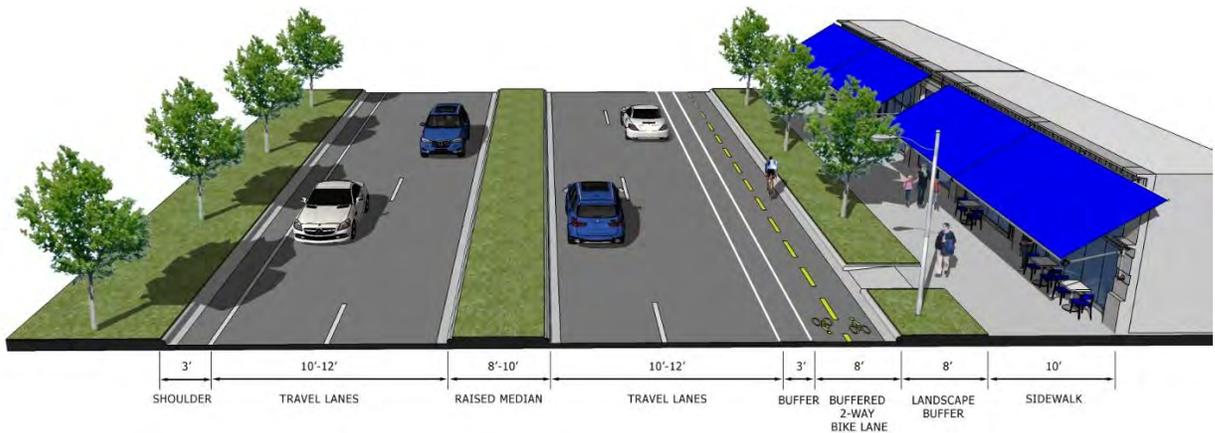
SHARED LANE MARKING [5]



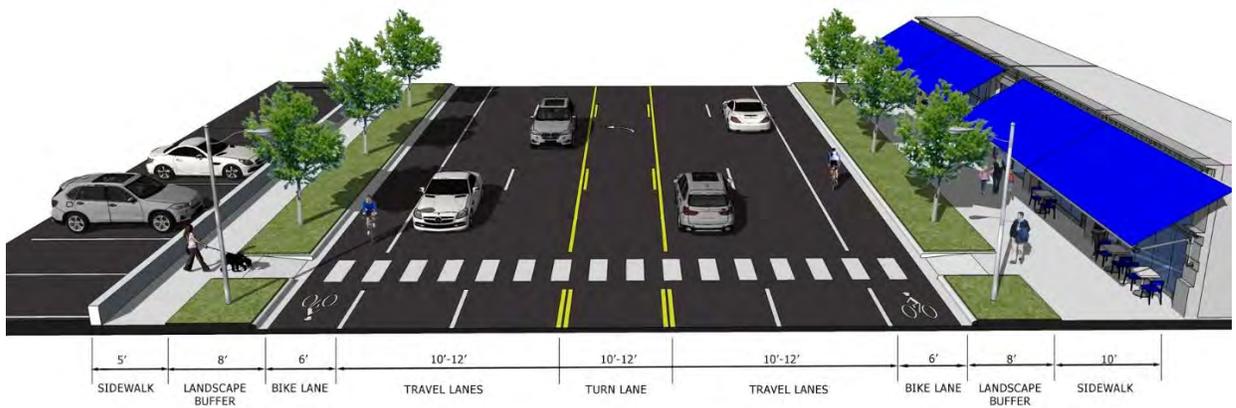
Typical Bike and Pedetrian Sections



Cycle Track along two-way divided road



Buffered Bike Lane along two-way road



Bike Lane along two-way road with a mid-block crossing





Two-way cycle tract along a narrow, high speed road



10' Multi-use Trail (shared use trail)



10' Multi-use Trail with Equestrian Use



Maintenance

Maintenance is a critical consideration with any trail system to ensure the sustainability and success of the trails. Common trail maintenance issues include erosion control, surface repairs, sign upkeep/ replacement, litter management, and vegetation maintenance. These and other trail issues require a detailed and effective maintenance plan carried out on a year-round basis to ensure that the trail system best serves the needs of the users and provides a safe and enjoyable environment for all parties involved. The City of Bee Cave will be responsible for the maintenance of the trails to ensure that they are passable at all times and issues are dealt with in an organized and timely manner.

Surfaces

Asphalt or Concrete will be the main surfacing materials for the trails. In floodplain areas or in areas where impervious cover is not allowed, cleared trails or possibly crushed stone trails may be used.

Concrete is the hardest of all trail surfaces. It is used most often in urban areas with severe climate changes, susceptibility to flooding, and anticipated heavy use. Although concrete is the most expensive surface, it lasts longer than any other – often 25 years or more. Cracks, settling, and other damage to concrete will be dealt with as necessary to maintain a safe, accessible pedestrian thoroughfare. Periodic inspections should take place to ensure that the trail is in good condition and issues are remedied as soon as possible. When properly installed, concrete will need virtually no maintenance

As this is a multi-use trail, re-striping of the “lanes” should be performed as needed to maintain a clear designation between the opposite sides of the trail. Debris should be cleared periodically, especially after heavy rains when erosion and flooding are common.

Asphalt is a hard surface that is very popular in a wide variety of trail settings and landscapes. Because asphalt is flexible, it conforms to the contours of the sub-base and sub-grade. If the sub-grade and sub-base have been prepared properly, the surface will be smooth and level. Under normal surface drainage flows, asphalt pavement will not “bubble up” or float away. However, extreme flooding can damage asphalt, just as it does almost all other trail surfaces, except concrete.

For the crushed stone portions of the trail, adequate material will be maintained along the footpath to provide traction and combat tripping hazards. As with the concrete sections of the trail, periodic inspections of the crushed stone surface should be performed to identify areas of excessive wear or those in need of maintenance.



Litter

The City of Bee Cave will be in charge of designating persons to remove litter along the trail on a regular basis. Trash receptacles and dog waste stations should be provided at trail access points and other designated areas along the trail to provide users with multiple opportunities to discard trash or other items.

Signage

Signs of varying purpose shall be placed along the entire trail where applicable. These may include signs that provide direction, inform users of special considerations or detours, designate bike lanes or recommended routes, and relate safety information. Signs that are damaged, missing, or vandalized should be replaced as soon as possible to maintain a safe and enjoyable environment for the users. (See next section for more detailed information.)

Equestrian Trails

In appropriate areas, equestrian activities may have a designated trail that runs parallel to the main trail. These trails will be for equestrian use only and be clearly marked as such. The trails will be 4' in width and have 3' buffer areas on either side for passing or for those who need to periodically step off the trail. In addition, a branch clearance of 10' will be maintained along the entirety of the trail to ensure the safety and comfort of the horses and riders.

Erosion and Soil Stabilization

Erosion should be dealt with on a defined schedule with special consideration for storm and flooding events. In order to prevent wash outs, both sides of the trail should be maintained with proper vegetation and debris clearing. The grade of the soil adjacent to the trail should be flush with the surface of the footpath and not erode more than 0.5" below that grade. Routine maintenance should be performed to re-establish grades as necessary.



Signage

As mentioned in the previous section, signs will be placed along the trail and streets to provide a variety of information. The primary role of the signs is to aid and instruct users along the linear route. Consistency in the signage is important to provide users a clear understanding of the trail network. All signs for the trail system should be simple and direct. Missing, damaged, or vandalized signs shall be replaced as soon as the City of Bee Cave is notified.

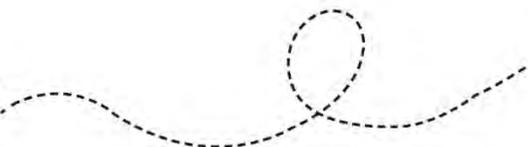
Regulatory Signage - Regulatory signs are easily recognized since they are commonly used for traffic control as well. These include stop and yield signs, right of way signs and exclusions signs. They are typically only placed where the specific regulation applies.

The Federal Highway Administration has outlined the size, shape and color criteria for signs in the Manual for Uniform Traffic Control Devices. Standard shapes and colors should be used for trail signs where feasible. Minimum sizes of signs for bicycle facilities are provided in the MUTCD and at <http://mutcd.fhwa.dot.gov>.

Shared Lane Signage - Bicycles may be operated on most roadways. However certain roads may be more desirable for use due to low traffic speeds and volumes, and do not necessitate a separated bike facility. These roadways can be designated as shared lane bike routes with route signage and/or pavement markings to designate shared use of the travel lanes. Shared lanes should not be used as a substitute for conventional bike lanes when space permits.



Mutcd.fhwa.dot.gov



Directional - Directional signs are located along the trail itself and will provide wayfinding, arrows to other parts of the trail and the direction users should be going, “You Are Here” designations, and be clearly displayed and accessible from both sides of the trail. Directional signs are some of the most important, as they provide valuable information for those not familiar with the trail system, users who find themselves lost or disoriented, and emergency personnel. These signs will be updated as soon as possible if changes to the trail’s alignment occurs and should be checked routinely for maintenance needs and damage that obstructs the information provided on the sign.



Photo of a trail map from the Mission Hike and Bike trail in San Antonio

Informational - Informational signs are located at trailheads or points of interest and provide users with information about the trail system (distances, rest areas, natural features, etc.), facts about the surrounding area or trail itself, designate those allowed to use the trail (pedestrians, bikers, and horses), and sometimes give safety updates. Like directional signs, informational signs should be routinely monitored and updated as necessary to provide accurate and relevant information.



nuxx.net

Safety - Safety signs are located at trailheads or along the trail and can be temporary or permanent. These signs designate detour routes, warn of trail closings, indicate hazards such as falling rock or high water, and raise awareness for certain wildlife species or a change in trail surface material. Like other signage, routine maintenance of safety signage is necessary to keep users safe and informed on the trail. Signs should be installed, updated, and removed as necessary to provide users with accurate information on trail conditions, especially during and after large storm events or construction.



americantrails.org



Chapter 4 – Implementation

Crossings

The largest issue facing the Bee Cave Connectivity plan is the crossing of Highway 71. There have been several discussions about how many crossings should be shown and what type of crossings are proposed. Following are recommendations based on data collection, meetings with Bee Cave staff, and the ED Board as well as the TXDOT district engineer for this area.

Tunnels - There are two locations where existing culverts cross under Highway 71 and are in close proximity to the Galleria and the Shops. To date, these culverts are not large enough to allow a pedestrian to pass through. However, based on discussions with TXDOT, these culverts could either be replaced or a separate culvert could be added adjacent to the existing to facilitate pedestrian and bicycle traffic. There are several examples of Cities or organizations that have utilized a culvert as part of a trail system. The first is the Middle Fork Greenway in Watauga, North Carolina. As part of Phase 2, they created a pedestrian underpass beneath highway 321 that routed the trail through one side of a triple chambered NCDOT culvert. Another example is the Line Creek Trail in Kansas City, Kansas. An existing box culvert underneath Barry Road is being modified to allow trail users the ability to safely cross. As per the City's Engineering firm the tunnel would cost approximately \$3,000 per linear foot.



www.middleforkgreenway.org

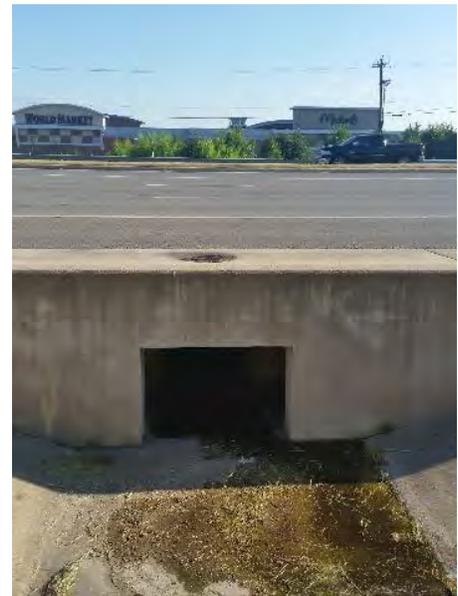
Safety is always an important issue in planning a tunnel as part of a pedestrian or bicycle route. Adequate lighting for both day and nighttime use will need to be provided and maintained. Since the tunnels will be located at low points, drainage will need to be studied to ensure the tunnels are not constantly filled with water.



Location 1 – This culvert is a small drainage channel located behind Michael's that daylights just south of Chili's. This location would work, however, the access to get to the area behind Michael's is not ideal. This area is comprised of the service entries and the fire lane to serve this building. There is not any additional area to accommodate any type of bike lane or trail. The trail would have to run concurrently with the fire lane. It could tie into the walks on the upper level of the Shops, but there is still not an easy way to get down without switchback ramps. This height of this culvert is also challenging. It is only approximately 2'-3'. To enlarge it to 8'-10' to allow pedestrians and bicyclists to use it would require excavating almost three times the existing height. This culvert is approximately 120' and would be estimated at \$360,000.



Eastern most culvert located behind Michael's



Eastern most culvert located south of Chili's



Photo looking into the culvert



Location 2 - The second culvert is located just east of Rosie's and is much larger. A substantial amount of water was still present in the western portion of the channel, even weeks after a significant rain event. The access to this area is better than the first location with regard to accessibility and tying into the overall trail. This location could easily tie to the Bee Cave Central Park to the north though the floodplain serving this channel. The culvert daylights on the south side of Highway 71 west of the Bee Cave police station and could tie into a proposed trail through this area to the sculpture garden and in the future to the trail that connects to Spanish Oaks. The biggest issue with this location will be the drainage and how it is diverted to stay out of the proposed pedestrian tunnel. This culvert is approximately 90' and would be estimated at \$270,000.



Western most culvert adjacent to Rosie's on the north side of Highway 71

Flowing water in the western most culvert adjacent to Rosie's on the north side of Highway 71.



Western most culvert on the south side of Highway 71.



Photo looking from north to south in the culvert.



Pedestrian Bridge

The safest type of crossing over a multi-lane highway is a pedestrian bridge. Bridges can be cost prohibitive, but donations and funding can help with the costs of a bridge. Bridges do not have the safety concerns associated with the pedestrian tunnels and in the proposed location, it could also serve as a gateway into Bee Cave. Signage could be incorporated that would inform the community about upcoming events as well as act as advertising for potential donors. The intersection of Highway 71 and Cross Town Parkway is the ideal location for this bridge. The grade change from the north side of 71 to the south allows the bridge to incorporate a pedestrian ramp for ADA only on one side. The north side catches back up to grade to allow a small transition to the existing trail. The bridge width should be at least the width of the trail and a minimum of 10' for emergency use. There is still the challenge of connecting the trail to the bridge on the south side of the highway. Keeping the bridge on the west side of the intersection allows the possibility of connecting into the future use of the old Backyard space. This is a natural location for a trail connection because it ties in with the trail system around the lake adjacent to Gumbos. In speaking with the TXDOT engineer, he was in favor of a pedestrian bridge as long as people are forced to flow onto the bridge. His concern was the bridge not being used since it is quicker to walk a straight line across the street. Making the bridge a destination point could encourage pedestrians to use the bridge instead of walking across the busy street. This would be accomplished by capitalizing on views of the Hill Country as well as providing shade structures with benches, planters, and unique paving. A precast steel pedestrian bridge could range from \$500,000 - \$750,000 depending on features and enhancements.



<http://www.gizmag.com/high-line-new-york-rail-yards/33933/pictures#1>



<http://www.gizmag.com/paleis-brug-pedestrian-cycle-bridge-park/37784/pictures#3>

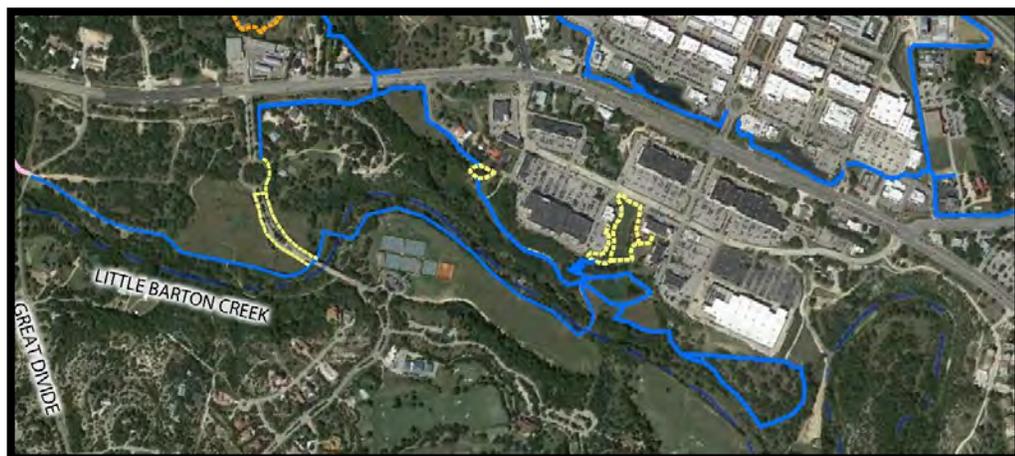




Schematic pedestrian bridge over Highway 71 looking west

Floodplain

There are several locations along Little Barton Creek that are ideal locations for the multi-use trail. Behind the Shops at the Galleria, there are open areas that lead down to the creek. There is also an existing bridge behind the Shops that crosses over the creek into Spanish Oaks property. Security for this location will need to be discussed with Spanish Oaks as well as the Homestead. A trail connection is shown within an existing utility easement adjacent to the creek running all the way to Great Divide. This will allow the residents of the Homestead to access the retail without having to travel on Highway 71. The paths behind the shops could also form a park area down at the creek. Some clearing will need to take place to be able to see the creek and create a path along the bank. The surface of this trail will need to be evaluated based on potential flooding, impervious cover, and topography.



Proposed multi-use trail along Little Barton Creek



Funding

Federal Funding

Moving Ahead for Progress in the 21st Century Act (Map21) is the latest federal transportation funding law. It combined several different programs into one law called Transportation Alternatives and is the largest source of federal funding for trails. Although it is federal money, each states department of transportation is responsible for administering the funds.

One of these Transportation Alternatives is the Recreational Trail Grants. This is a federal grant which will cover up to 80% up to a maximum of \$200,000 for non-motorized trails. It can be used for the construction of new recreational trails, to improve existing trails, to develop trailheads or trailside facilities, and to acquire trail corridors. It is administered by Texas Parks and Wildlife. Killeen applied for this grant this year. Leander received \$56,000 in 2013.

Outdoor Recreation Grants are another type of grant under the Map21. This grant provides 50% matching to municipalities, counties, MUDs and other local units of government with population less than 500,000 to acquire and develop parkland or to renovate existing public recreation areas. If the bridge is developed as a park area, it could be possible that this grant could be used for a portion of the bridge. This grant could also be used for park areas associated with the trail. The award limit is \$400,000.

Small Community Grants are yet another type of grant for Texas communities with a population in the 2010 census of less than 20,000. This is also a 50% matching grant for the development and acquisition of parkland, including fields, picnic facilities, playgrounds, swimming pools, trails, gardens, etc. The award limit is \$75,000.

North Central Texas Council of Governments (NCTCOG) is the first organization in Texas to establish its Transportation Alternatives Program (TAP) since MAP21 became a law in 2012. This metropolitan planning organization (MPO) in the Dallas-Fort Worth area tailored its program to support the region's long-term transportation goals of connectivity and received \$13 million in TE funds for the North Texas area. Hopefully this will spur others in Texas to do the same and the Central Texas area could possibly receive additional grants.



State and Local Funding

4B Sales Tax Revenue is generated from the ¼ cent sales tax allocation. This funding is administered through the Bee Cave Economic Development Board (EDB). To the extent possible, this revenue source should be used to fund facility construction. General Funds are budgeted annually for Parks and Facilities as well as for beautification. These funds can be allocated from a specific department, be part of a capital improvement program budget, or be a portion of a sales tax increase.

Bond propositions could also be a way to raise funds for trails. In 2014, ten Texas cities approved a total of \$172 million dollars in bonds to support local parks and recreation facilities. The City of Pflugerville approved a \$25 million dollar Parks and Recreation Project Bond in the November 2014 election, with a portion of that bond allocated for trails. The City of Buda also passed an \$8 million dollar parks and trails bond in November as well. In 2013, the City of Round Rock approved a \$56.5 million dollar Parks and Recreation Bond with over \$20 million of the funding going towards trails.

The Capital Area Metropolitan Planning Organizations (CAMPO) is another organization that has the potential of funding the trail. Portions of the City of Bee Cave are in the medium-level of the Priority Pedestrian and Priority Bicycle Districts Maps. The Transportation Policy Board has determined to allocate at least 15% of available CAMPO discretionary funds to bicycle and pedestrian projects using the priority maps.

LCRA Community Development Partnership Program provides grants for capital projects that support the community and economic development in its service area. Grants over \$5,000 require a minimum 20% match of the total project cost.

Private Funding

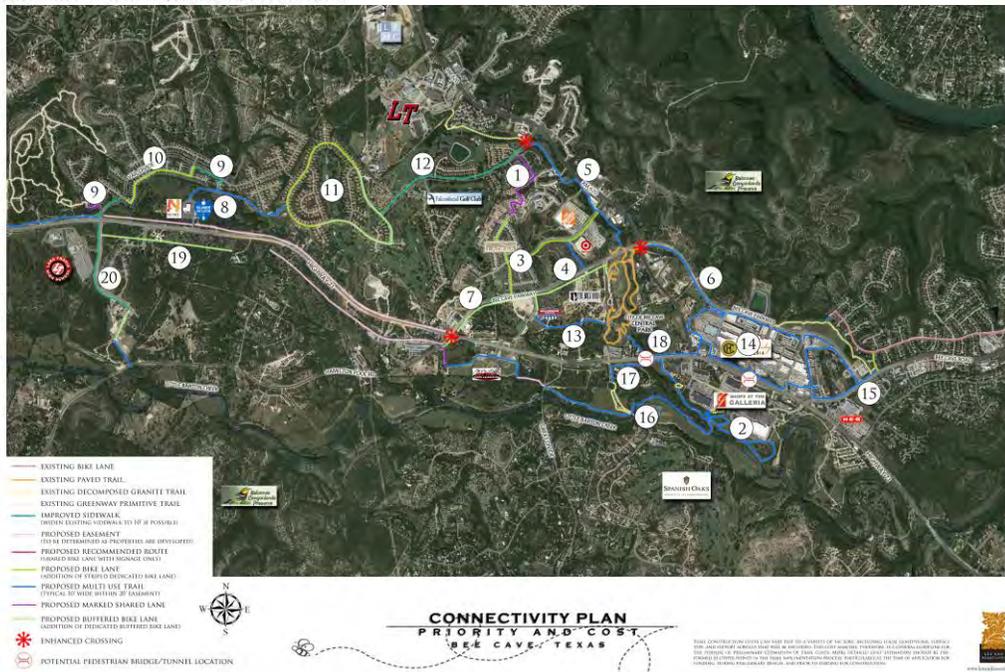
Another way to raise money is from private sources. There are many ways to raise funds throughout the local community. Local businesses interested in the completion of the trail may donate or start a campaign. Foundation or Company grants from local or national businesses are another way for people to donate. Fundraisers and events are a great way to bring the community together while raising money for the trails. After a portion of the trails are complete, having a walk or run along the trail itself to help fund additional portions would be a way to show people what their money is going towards. Local HOAs throughout the City could also donate funds or raise funds to build a portions of the trail that directly benefit their specific neighborhood.



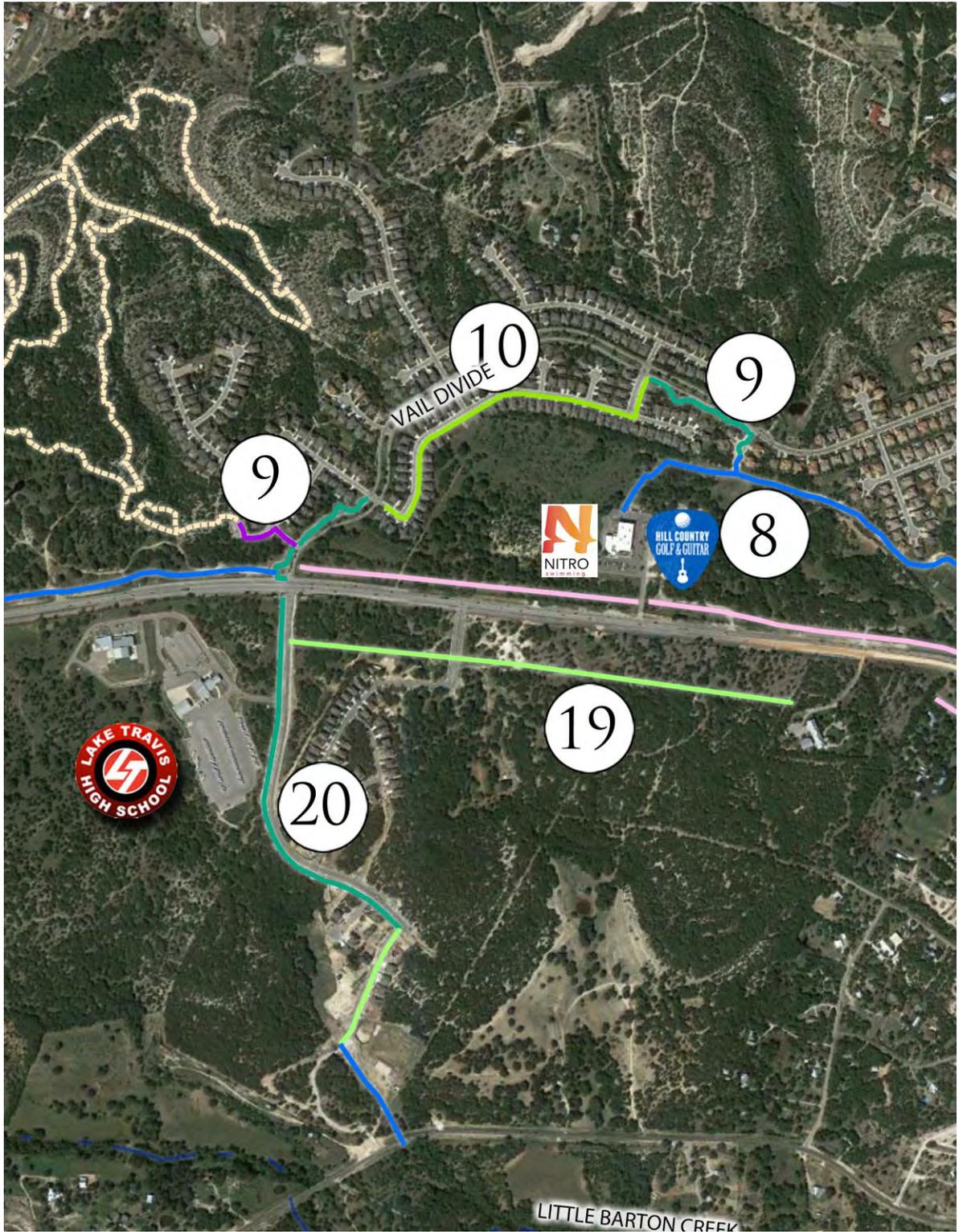
Priority

TRAIL PRIORITY	LENGTH (LF)	MILES	DESCRIPTION	10' CLEAR IN FLOOD PLAIN	IMPROVE EXISTING CONCRETE SIDEWALK	10' CONCRETE MULTI-USE PATH	BICYCLE LANE - BOTH SIDES OF STREET	BUFFERED BICYCLE LANE - BOTH SIDES OF STREET	SHARED LANE MARKING	CLEARING, STRIPING, AND /OR SIGNAGE COSTS	CONCRETE COST	TOTAL COST*
Year 1-5												
1	2500	0.47	RECOMMENDED ROUTE THROUGH MORNINGSIDE						\$ 4.00	\$ 10,000.00	\$ -	\$ 10,000.00
2	7200	1.36	SOUTH LOOP AT SHOPS AT GALLERIA	\$ 2.00		\$ 140.00				\$ 14,400.00	\$ 1,008,000.00	\$ 1,022,400.00
3	2350	0.45	BIKE LANE THROUGH LADERA				\$ 10.00			\$ 23,500.00	\$ -	\$ 23,500.00
4	2775	0.53	BEE CAVE PARKWAY FROM LADERA TO CENTRAL PARK					\$ 14.00		\$ 38,850.00	\$ -	\$ 38,850.00
5	4200	0.80	FROM FALCONHEAD BLVD TO BEE CAVE PKWY			\$ 140.00				\$ -	\$ 588,000.00	\$ 588,000.00
6	3000	0.57	FROM RM 620 TO HILL COUNTRY GALLERIA			\$ 140.00				\$ -	\$ 420,000.00	\$ 420,000.00
												\$ 2,102,750.00
Year 6-10												
7	2000	0.38	BEE CAVE PARKWAY FROM LADERA TO 71					\$ 14.00		\$ 28,000.00	\$ -	\$ 28,000.00
8	3300	0.63	FROM NITRO TO SPILLMAN LOOP							\$ -	\$ -	\$ -
9	2025	0.38	VAIL DIVIDE IMPROVED SIDEWALKS		\$ 40.00					\$ -	\$ 81,000.00	\$ 81,000.00
10	2550	0.48	VAIL DIVIDE BIKE LANE					\$ 14.00		\$ 35,700.00	\$ -	\$ 35,700.00
11	8550	1.62	SPILLMAN RANCH LOOP BIKE LANE					\$ 14.00		\$ 119,700.00	\$ -	\$ 119,700.00
12	4500	0.85	FALCONHEAD BLVD IMPROVED SIDEWALKS		\$ 40.00					\$ -	\$ 180,000.00	\$ 180,000.00
13	2100	0.40	FROM BEE CAVE CENTRAL PARK TO HCI			\$ 140.00				\$ -	\$ 294,000.00	\$ 294,000.00
												\$ 738,400.00
Year 11-15												
14	10600	2.01	NORTH GALLERIA LOOP			\$ 140.00				\$ -	\$ 1,484,000.00	\$ 1,484,000.00
15	1900	0.36	FROM LAKE POINTE TO NORTH GALLERIA LOOP			\$ 140.00				\$ -	\$ 266,000.00	\$ 266,000.00
												\$ 1,750,000.00
Year 16-20												
16	4025	0.76	FROM SOUTH LOOP TO GREAT DIVIDE ALONG	\$ 2.00		\$ 140.00				\$ 8,050.00	\$ 563,500.00	\$ 571,550.00
17	1200	0.23	FROM WEST TUNNEL TO SPANISH OAKS ENTRY			\$ 140.00				\$ -	\$ 168,000.00	\$ 168,000.00
18	750	0.14	FROM WEST TUNNEL TO BEE CAVE CENTRAL PARK			\$ 140.00				\$ -	\$ 105,000.00	\$ 105,000.00
19	3000	0.57	BIKE LANE ALONG FUTURE ROW ADJACNET TO 71					\$ 14.00		\$ 42,000.00	\$ -	\$ 42,000.00
20	4700	0.89	FROM 71 SOUTH THROUGH BELLA COLINAS					\$ 14.00		\$ 65,800.00	\$ -	\$ 65,800.00
												\$ 952,350.00
												\$ 5,543,500.00

* TOTAL COST DOES NOT INCLUDE ACQUISITION, SURVEYING, OR DESIGN COSTS



Map created from aerial imagery and data for a portion of the City, including Lake Georgetown, Leander, and the City of Bee Cave. All other information and data is provided for informational purposes only. The City of Bee Cave is not responsible for the accuracy of the information provided. The City of Bee Cave is not responsible for the accuracy of the information provided. The City of Bee Cave is not responsible for the accuracy of the information provided.







Policy

Recommendations for policy changes are a standard component of most connectivity plans. This includes zoning and land development policies that support bicycling and pedestrian activity such as higher densities of mixed-use development, neighborhood design that provides a high level of bicycle connectivity, bicycle parking ordinances, the need for commuter support facilities such as showers, bike racks, etc.

Water Quality Buffer Zones - As per section 20.04.045(a)(2), water quality buffer zones (WQBZ) and hike and bike trails in accordance with the comprehensive plan are allowed if approved by the city. This section also allows public and private parks and open space, limited to hiking, jogging, or walking trails within the buffer areas. Little Barton Creek has a WQBZ of 300' from the outer limit of the peak two-year flood level. Most of this land is held by private owners, however, this land is not developable since it is within buffer areas and floodplain. Easements would need to be granted and approved by the City for the trail surface and network in order to build in these buffer zones. Assuming impervious cover cannot be placed within the WQBZ, there are other material options to construct trails in these areas, all of which have pros and cons. Decomposed granite has a high tendency to wash out when not compacted but is not pervious when compacted. Crushed stone holds up better during rain events, but still can wash out and is also not pervious when compacted. Keeping a clear path through this area would be the most environmentally friendly for this sensitive area, but extensive maintenance would be needed in order to establish a clear path and the trail may not be ADA accessible. Pervious Concrete could be a solution, but there will need to be discussions with the City to determine if this material would be a viable option.



<http://www.perviouspavement.org>

Future Trail Easements - As per section 32.03.015(c)(1) PD Development, public trail systems should be identified at the PD Concept Plan submittal. As described in section (f)(8), the project should be integrated with the City's open space network as described in the Parks and Open Space section of the City's Comprehensive Plan, including the provision of a trail that would connect to the overall trail system of the City. These policies are a good start to encourage future development to participate in the Connectivity Plan. The standards for what is required should be further defined to ensure that easements or connections are actually shown and it is not just an afterthought.

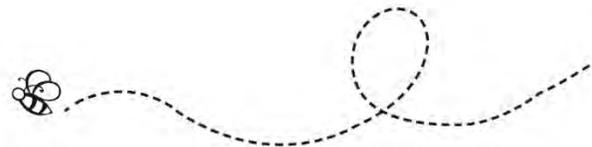


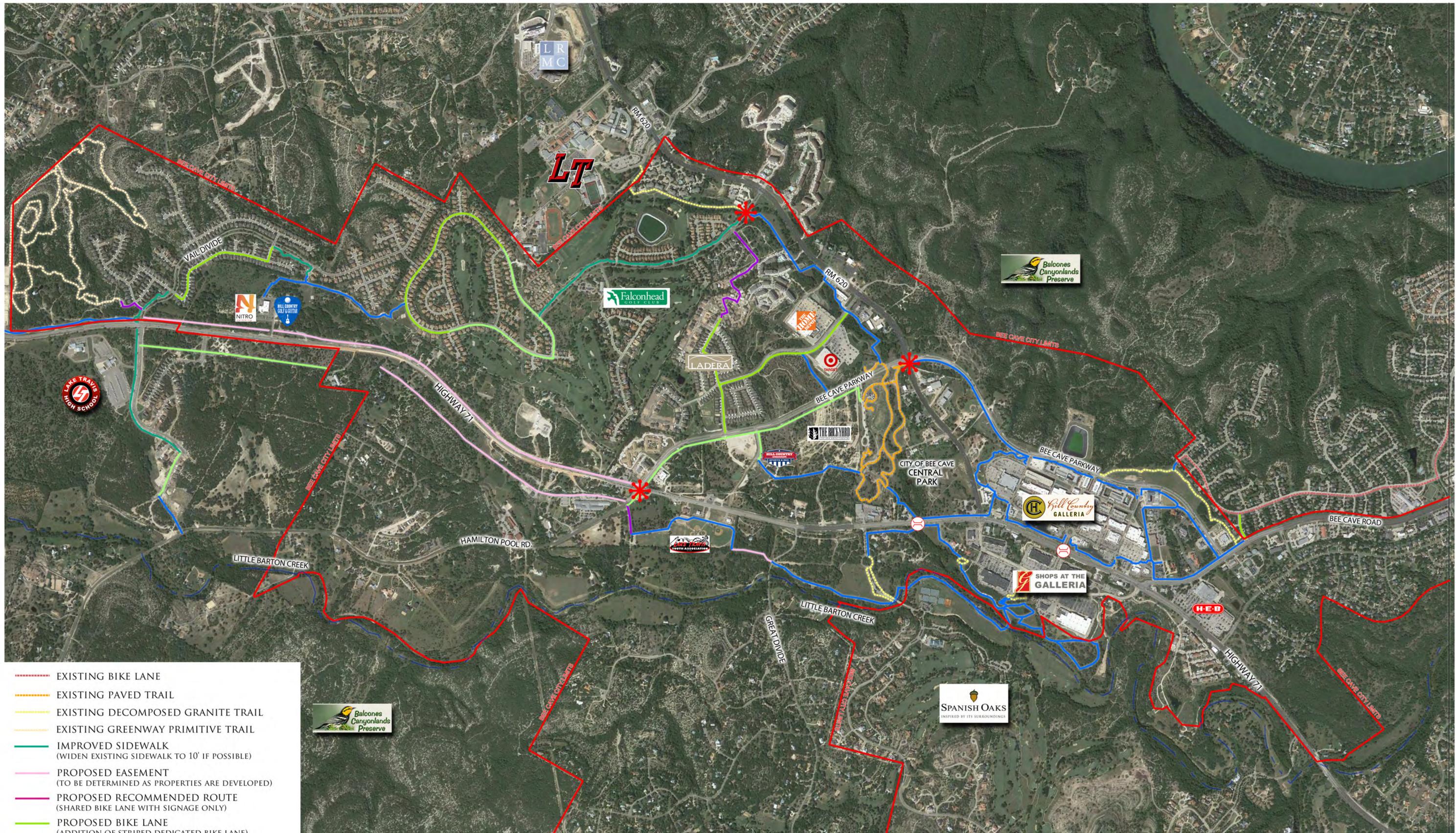
Impervious Cover – As per Ordinance 251, if a public trail is owned and maintained by the City of Bee Cave and constructed of an impervious material it shall include a minimum of 4' of vegetative filter strips, landscaping, or natural vegetation. The impervious cover created by this public trail shall not be applicable to the impervious cover percentages.

Required Sidewalks – Section 30.03.005 requires a 4 or 5 foot sidewalk to be constructed in the right of way. Does this impervious cover count towards the impervious cover for the lot being developed? In instances where this sidewalk coincides with the trail network, could the size be increased to 10'? Would the developer have to pay for this? If so, what would he/she get in return?

Follow up questions for Policy discussion:

- Are there any restrictions to surface type for trails located in existing or proposed easements?
- If the trail is located on private land, is there any circumstance that would require the City to purchase the land as opposed to just having a dedicated easement?
- Are there any developer incentives for dedicating an easement or dedicating land to the City? Could it count toward any parkland dedication if required? Could there be density bonuses?
- Who maintains the trail when in an easement on private property?
- Who is liable for injury on the trail if in an easement on private property?
- Can the trail be located in the ROW?





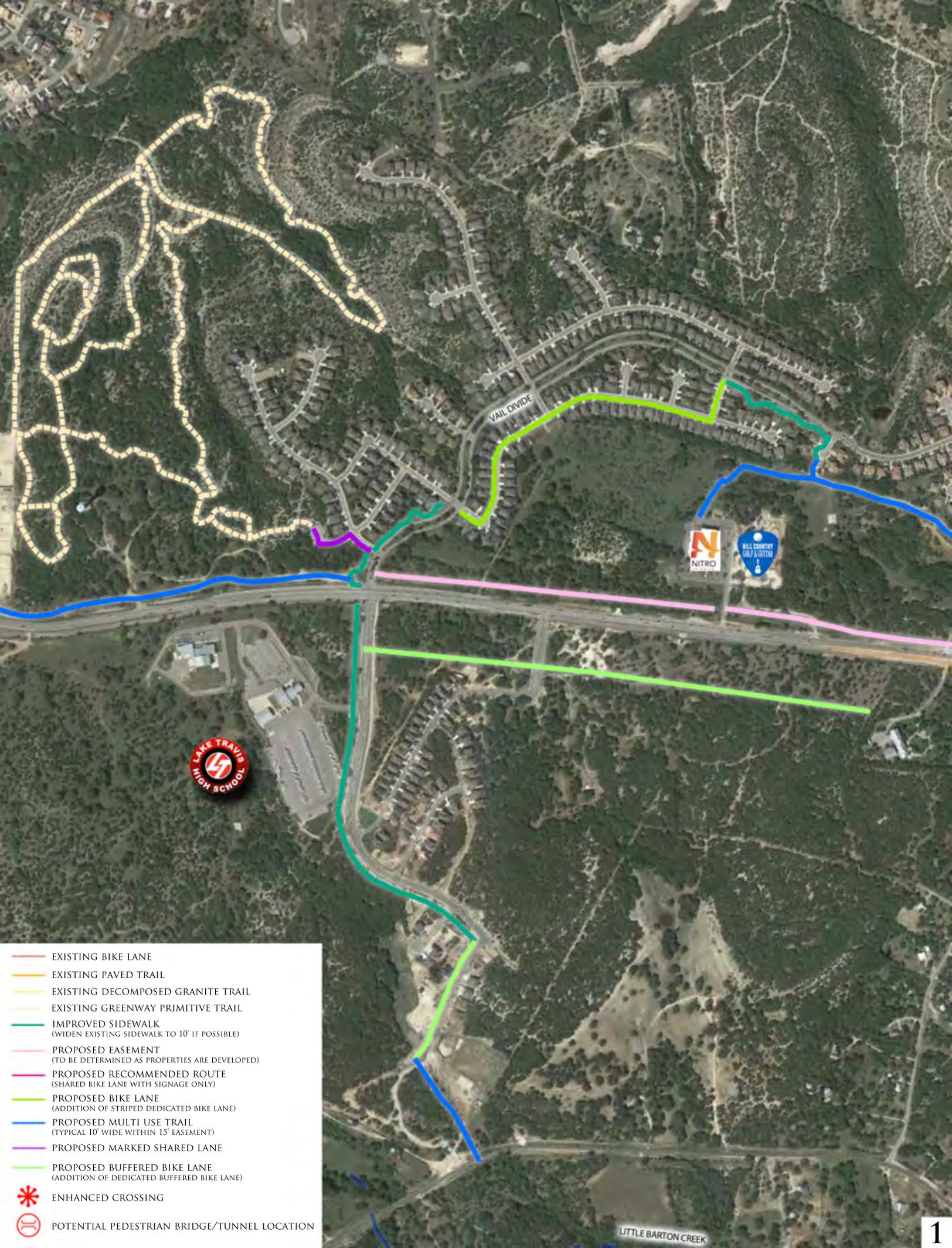
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-  EXISTING DECOMPOSED GRANITE TRAIL
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-  IMPROVED SIDEWALK
(WIDEN EXISTING SIDEWALK TO 10' IF POSSIBLE)
-  PROPOSED EASEMENT
(TO BE DETERMINED AS PROPERTIES ARE DEVELOPED)
-  PROPOSED RECOMMENDED ROUTE
(SHARED BIKE LANE WITH SIGNAGE ONLY)
-  PROPOSED BIKE LANE
(ADDITION OF STRIPED DEDICATED BIKE LANE)
-  PROPOSED MULTI USE TRAIL
(TYPICAL 10' WIDE WITHIN 15' EASEMENT)
-  PROPOSED MARKED SHARED LANE
-  PROPOSED BUFFERED BIKE LANE
(ADDITION OF DEDICATED BUFFERED BIKE LANE)
-  ENHANCED CROSSING
-  POTENTIAL PEDESTRIAN BRIDGE/TUNNEL LOCATION



APPENDIX A CONNECTIVITY PLAN

BEE CAVE, TEXAS



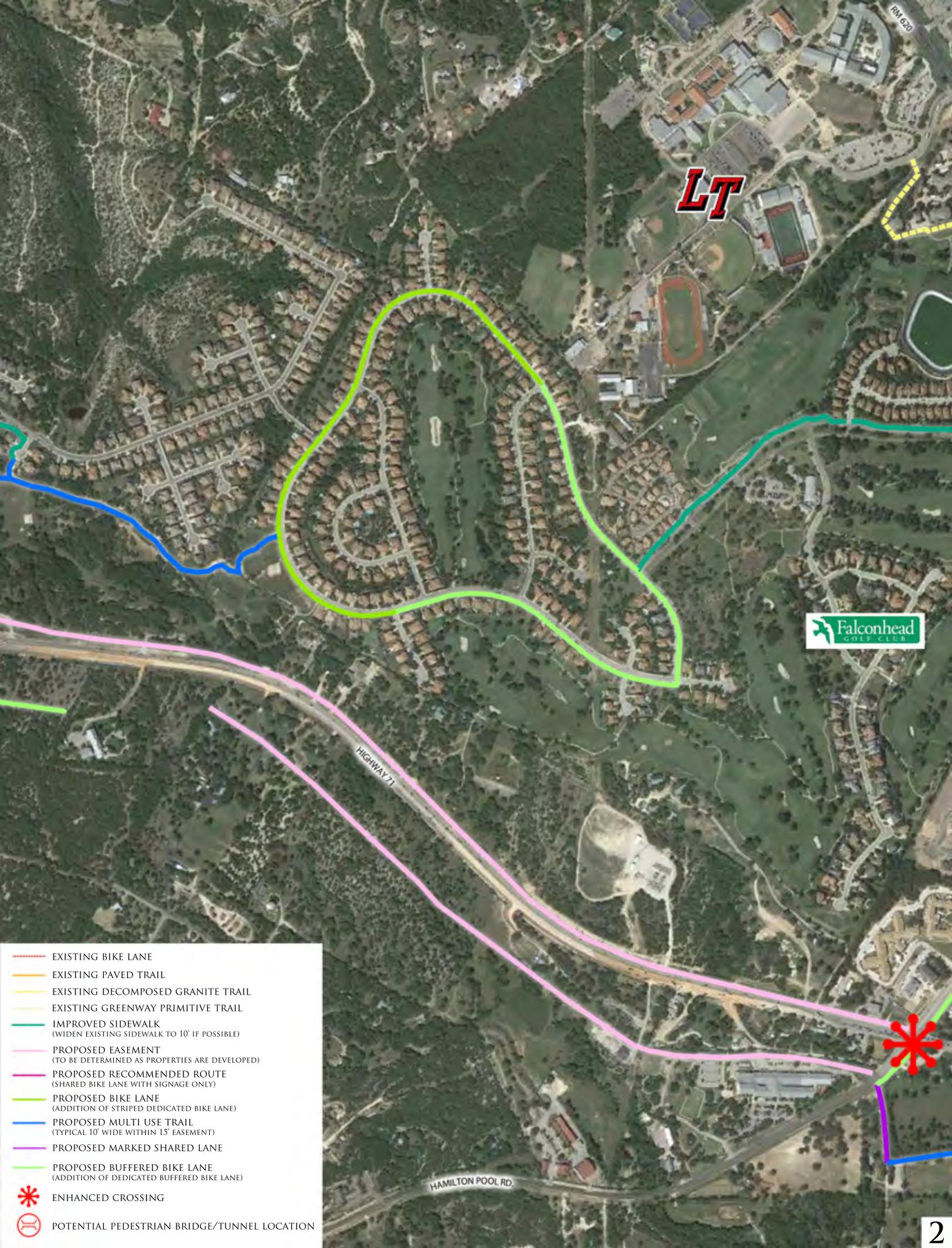


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VAIL DIVIDE



LITTLE BARTON CREEK

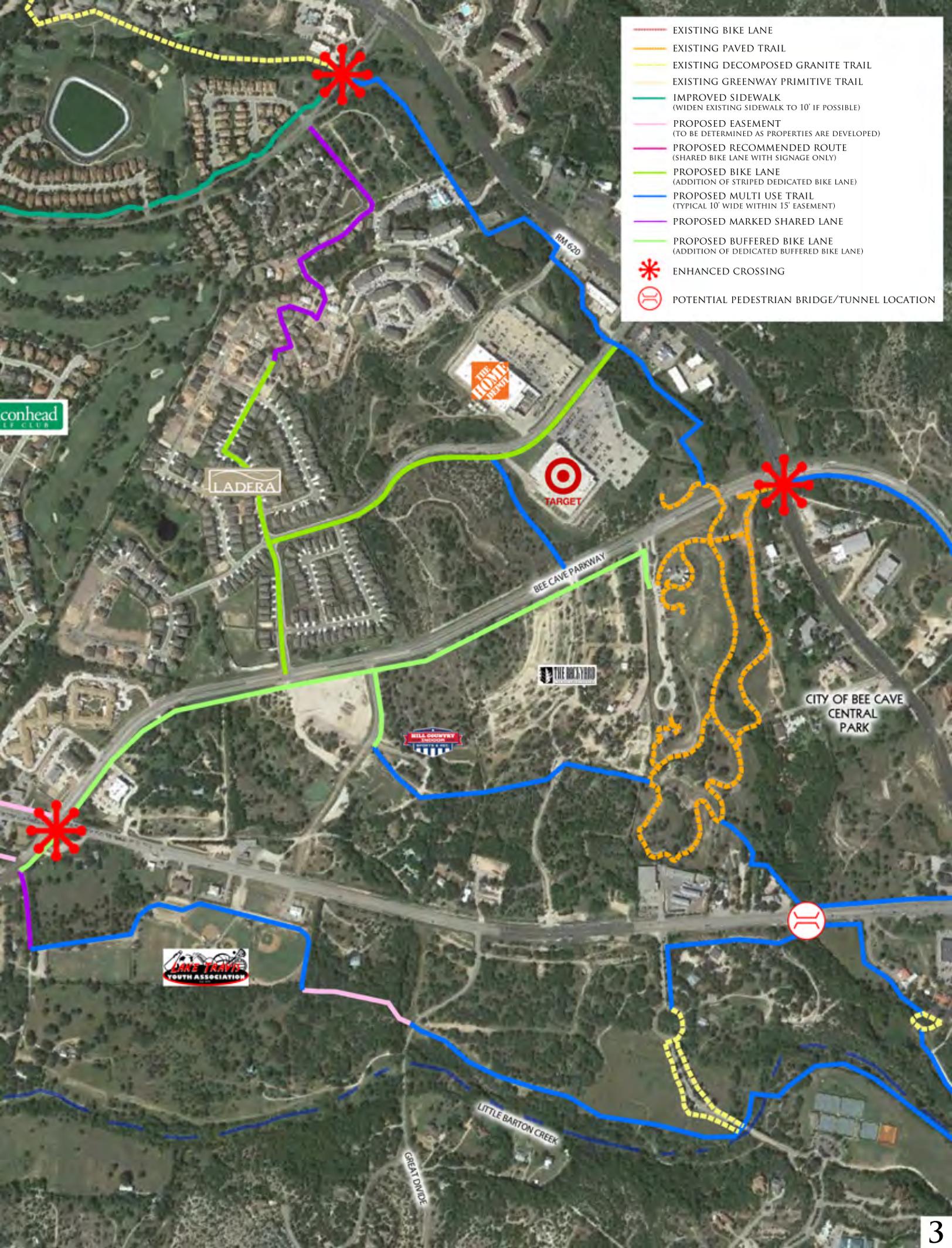


LT



-  EXISTING BIKE LANE
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OF BEE CAVE
CENTRAL
PARK

BEE CAVE PARKWAY



HIGHWAY 71

-  EXISTING BIKE LANE
-  EXISTING PAVED TRAIL
-  EXISTING DECOMPOSED GRANITE TRAIL
-  EXISTING GREENWAY PRIMITIVE TRAIL
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-  ENHANCED CROSSING
-  POTENTIAL PEDESTRIAN BRIDGE/TUNNEL LOCATION

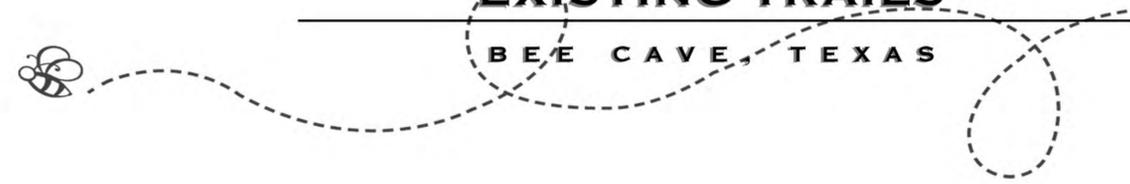


Google earth

- EXISTING BIKE LANE
- EXISTING PAVED TRAIL
- EXISTING DECOMPOSED GRANITE TRAIL
- EXISTING GREENWAY PRIMITIVE TRAIL
- EXISTING SIDEWALK TO BE IMPROVED
- EXISTING SIDEWALK

APPENDIX B EXISTING TRAILS

BEE CAVE, TEXAS

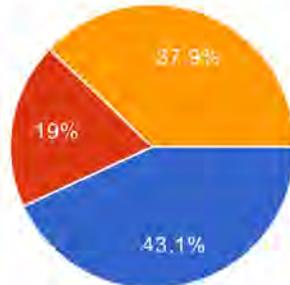


www.leeandassociates.net

APPENDIX C

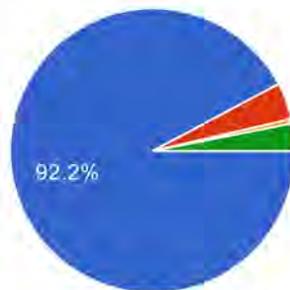
Summary

What time of day would you most often use the trail?



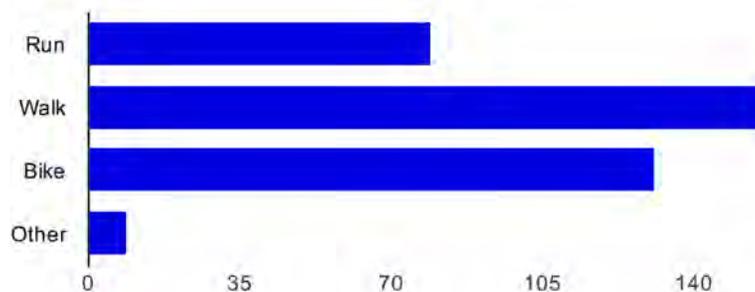
Morning	84	43.1%
Afternoon	37	19%
Evening	74	37.9%

For what activity would you primarily use the trail?



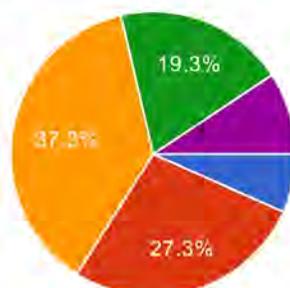
Recreation/exercise	178	91.3%
Groceries/errands	8	4.1%
Commute to work	1	0.5%
Restaurant/bar/movies/entertainment	6	3.1%

How would you use the trail?



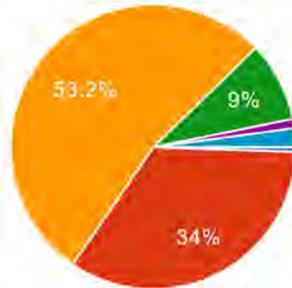
Run	79	40.9%
Walk	157	81.3%
Bike	131	67.9%
Other	9	4.7%

If you are biking, what is your average distance per trip?



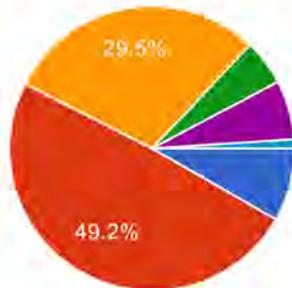
Less than 2 miles	10	6.7%
2 - 5 miles	41	27.3%
6 - 10 miles	56	37.3%
over 10 miles	29	19.3%
not sure	14	9.3%

If you are walking/running, what is your average distance per trip?



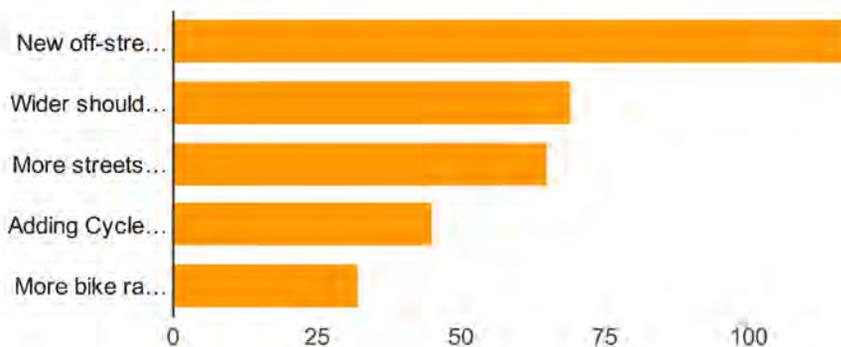
Less than 0.5 mile	1	0.5%
1 - 2 miles	64	34%
3 - 5 miles	100	53.2%
5 - 10 miles	17	9%
over 10 miles	2	1.1%
not sure	4	2.1%

How often would you use the trails?



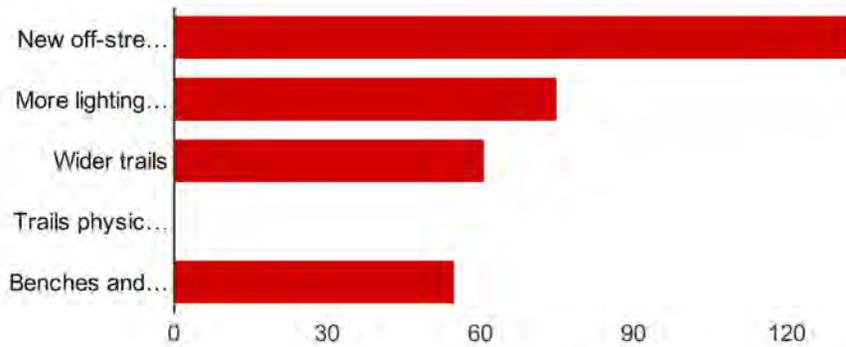
Every day	16	8.3%
3 - 6 times a week	95	49.2%
1 - 2 times a week	57	29.5%
once a week	10	5.2%
2 - 3 times a month	13	6.7%
never	2	1%

As a cyclist, what would encourage you to use the trails more often?



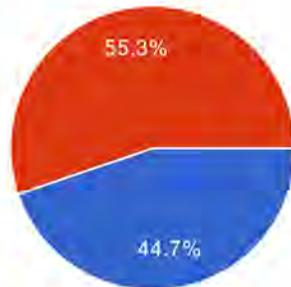
New off-street trails	118	80.3%
Wider shoulders on roadways	69	46.9%
More streets striped with dedicated bike lanes	65	44.2%
Adding Cycle Tracts	45	30.6%
More bike racks throughout the city	32	21.8%

As a walker/runner, what would encourage you to use the trails more often?



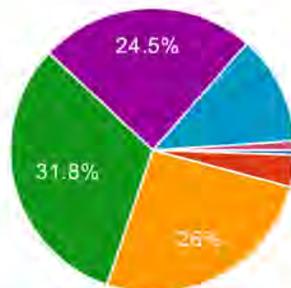
New off-street trails	133	72.7%
More lighting on trails	75	41%
Wider trails	61	33.3%
Trails physically separated from streets	0	0%
Benches and other amenities along the trail	55	30.1%

Gender



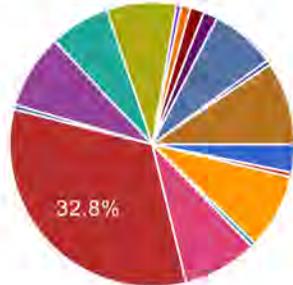
Male	85	44.7%
Female	105	55.3%

Age



Younger than twenty	1	0.5%
Twenties	7	3.6%
Thirties	50	26%
Forties	61	31.8%
Fifties	47	24.5%
Sixties	24	12.5%
Seventies	2	1%
Eighties and above	0	0%

In which neighborhood do you reside?



Avanti Hills Apartments	6	3.2%
Bee Cave West	1	0.5%
Bella Colinas	16	8.5%
Cielo Apartments	0	0%
Cottages at Spillman Ranch	0	0%
The Estates Luxury Residences at Bee Cave	1	0.5%
Falconhead	16	8.5%
Falconhead Apartments	0	0%
Falconhead West	62	32.8%
The Grove	1	0.5%
Homestead	16	8.5%
Ladera	13	6.9%
Lake Pointe	15	7.9%
Meadowfox	1	0.5%
Paseo Apartments	2	1.1%
The Preserve	3	1.6%
Spanish Oaks	3	1.6%
Spring Creek Estates	0	0%
The Uplands	14	7.4%
Wildwood	1	0.5%
Other	18	9.5%



- EXISTING BIKE LANE
- EXISTING PAVED TRAIL
- EXISTING DECOMPOSED GRANITE TRAIL
- PROPOSED EASEMENT
(TO BE DETERMINED AS PROPERTIES ARE DEVELOPED)
- PROPOSED BIKE LANE
(ADDITION OF STRIPED DEDICATED BIKE LANE)
- PROPOSED MULTI USE TRAIL
(TYPICAL 10' WIDE WITHIN 15' EASEMENT)
- PROPOSED MARKED SHARED LANE
- PROPOSED BUFFERED BIKE LANE
(ADDITION OF DEDICATED BUFFERED BIKE LANE)

- ✱ ENHANCED CROSSING
- ⌒ POTENTIAL PEDESTRIAN BRIDGE LOCATION

APPENDIX D
INNER LOOP CONNECTIVITY PLAN
 BEE CAVE, TEXAS

