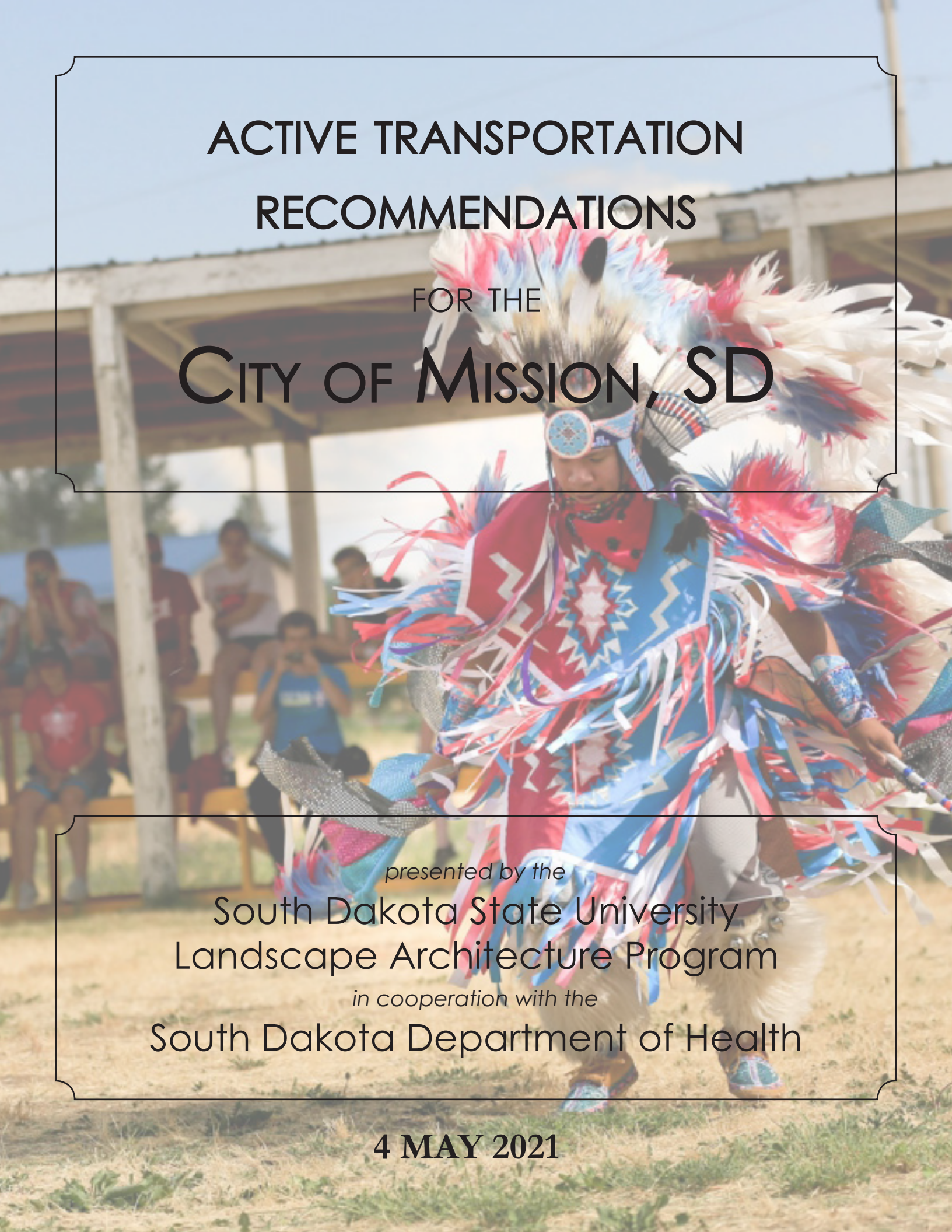

ACTIVE TRANSPORTATION RECOMMENDATIONS

FOR THE

CITY OF MISSION, SD

presented by the

South Dakota State University
Landscape Architecture Program

in cooperation with the

South Dakota Department of Health

4 MAY 2021

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Introduction

The built environment affects public and personal health. This fact has been proven and re-proven through studies, interviews, and surveys the world over. In addition to physical metrics of health such as obesity rates, dietary habits, and steps walked in a day, there are less-tangible indicators of a community's health. These include perceived friendliness, sense of community, and livability. The built environment impacts all of these indicators.

In 2012, the South Dakota Department of Health initiated the Active Transportation Advisory Team (ATAT) to facilitate change in the built environment of South Dakota. In particular, an effort has been made to help communities encourage using alternative means of transportation (such as walking or cycling) for completing one's daily routine. An outgrowth of the ATAT is the Active Transportation Collaboration project. This project provides resources and expertise to one or two South Dakota communities annually in developing strategies to improve active transportation.

Recommendations are developed over the course of a 16-week semester by students and faculty from the South Dakota State University Landscape Architecture program. In the case of the present study, representatives from SDSU traveled to Mission, South Dakota, in mid-March to conduct interviews with key stakeholders within the community. They also conducted an analysis of transportation infrastructure, parks and recreation facilities, and neighborhood composition in the adjoining communities of Mission, Antelope, and White Horse.

Following this data-gathering process, students developed a series of recommendations touching all aspects of active transportation issues, including the further development of active transportation infrastructure, improvement of park and recreation facilities, activating public spaces, community engagement, and embracing indigenous culture. By approaching active transportation in this holistic way, a balanced, comprehensive plan for improving public and personal health can be achieved.

These recommendations represent a global shift in how people think of their community. Some recommendations represent a major investment. By shifting community priorities and identifying existing resources within the community, the City of Mission can be an example for tribal communities throughout the region of how to cherish and renew that which is inherently most valuable: the people who make up this incredible community.

Infrastructure Improvements

Highway 18 is a major east-west route through Southern South Dakota, connecting three Lakota reservations with the Black Hills to the west and Sioux City and Sioux Falls to the east. Due to its prominence, it is a heavily-trafficked thoroughfare. Likewise, Highway 83 is a major north-south road connecting Mission to Canada in the north and Mexico to the south, running through the center of the United States.

These two highways have a significant impact on the City of Mission. Highway 18 bisects the city, with most residences on the north side of the highway, and most businesses and schools on the south side. Highway 83 separates Mission from the neighboring community of Antelope, where Sinte Gleska University is located. It is also the main route linking to Mission schools south of town. Intense traffic on these roads poses a barrier to pedestrians seeking access from their homes to the other destinations in the community. There are few crosswalks provided, and while both roads have integrated sidewalks, those sidewalks often abut the road, providing little separation between fast-moving cars and the pedestrians.

RECOMMENDATION 1: COLLECT HIGHWAY TRAFFIC DATA

The traffic lights provided on Highway 18 are inadequate by themselves to slow traffic, despite posted speed limit signs. A first step in combating the fast-moving traffic is to invest in data logging devices like the Traffic Tally 200, pictured in Figure 1.

Figure 1: Traffic Tally 200 (Diamond Traffic Products)

This data logger can collect information such as vehicle length, speed, direction and traffic volume for a cost of $810 per unit at Diamond Traffic Products. This data should be collected and used to help decision-makers at the SDDOT and other agencies responsible for the highways implement traffic-calming measures necessary to ensure pedestrian and driver safety.

The City of Mission has two options when choosing how to deploy the TT-200. Solution number one would be to buy one unit and reposition the TT-200 through these three locations in increments of 4 months for a total of one year. The second option would be to purchase three units and run one in each location for one year, collecting data from each section of the roadway it is assigned to.

For the most comprehensive coverage, it is recommended that three TT-200 units be purchased and installed in the following locations (see Figure 2). Two locations are embedded within the city on Highway 18 and will demonstrate to state officials that there is a safety concern that warrants immediate attention. The third location is on Highway 83 near the Todd County School District. This was chosen because it will demonstrate that the children of Mission and surrounding areas are at risk when going to and from school.

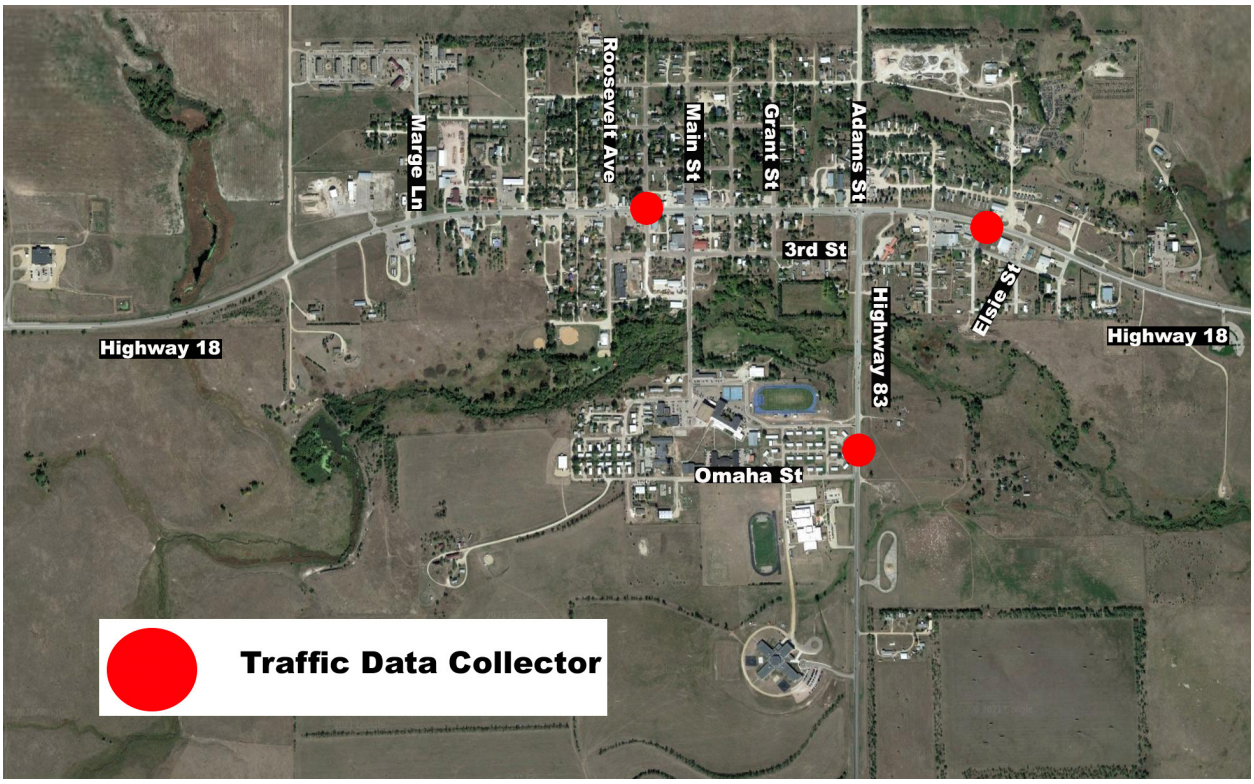

Figure 2: Traffic Tally 200 Proposed Locations

This will give the City of Mission the right steps and solution to obtain the funding and resources it needs to make the next critical recommendations to Highway 18 and Highway 83 possible, improving street articulation, pedestrian safety, and driver awareness.

RECOMMENDATION 2: IMPLEMENT TRAFFIC-CALMING ON HIGHWAYS 18 AND 83

Highway 18 transitions from a two-lane highway to a four-lane highway as it enters Mission. This same road design occurs on Highway 83 from its entry into Mission on the south until it intersects Highway 18 in Mission's downtown. These vital arterials for the city pose a significant barrier for pedestrians, as they are required to cross 5 lanes of traffic on either road within city limits, a distance of over 70 feet with no breaks or islands and limited crosswalks and other crossing aids.

This wide street cross-section also gives drivers a sense of openness with little attention paid to speed limits, pedestrians, or other surroundings. The wider the road, the faster people tend to drive. Research based on more than 650,00 observations shows that adding just one foot onto a road, making a 11-foot-wide road to a 12-foot-wide road, will increase speeds up to 1.1mph (McCahill, 2016). Accordingly, it is recommended that the in-town sections of Highway 18 and Highway 83 undergo a road diet, wherein the travel lanes are reduced by 24 inches each. A planted median should be installed in the current turning lane, and boulevards with street trees should be installed between the sidewalk and the edge of the road, along with a bike lane between the curb and the travel lanes on each side. These features will help to naturally slow traffic through town, making Mission feel more like a community.

RECOMMENDATION 3: CONSTRUCT PLANTED BUFFERS ON HIGHWAYS 18 AND 83

Creating planted buffers between the road and the sidewalk on Highways 18 and 83 will improve pedestrian safety by separating pedestrians from vehicles. This separation reduces the chances of pedestrian crashes and the risk of incapacitating injuries or death when crashes do occur (City of Austin). "A landscaping screen or buffer is a natural or man-made feature which separates land uses. Screening, buffering, and landscaping requirements address visual, light, and sound impacts. Screens and buffers can enhance community appearance, reduce land use conflicts by separating incompatible land uses, improve the appearance of parking areas and public rights-of-way, minimize soil erosion, and reduce stormwater runoff" (Almost Perfect Landscaping, 2020). Buffers also improve the aesthetic appeal of roads and walkways. Mission has some buffers along the highways, but the buffers are either grass or concrete. Due to the wide array of possible buffer options, three approaches are recommended: street trees, bioswales, and planted medians.

Street Trees

Using trees as buffers is a common practice in the United States. A strip of grass with at least one tree is the most popular method (Safer Routes To School). Despite the simplicity of street tree buffers, this method works well in towns and cities. Tree-lined roadways and sidewalks have been shown to slow vehicular traffic by creating an enclosed feeling, which prompts drivers to be more cautious, thus calming areas prone to speeding issues (Burden). Beyond physical safety and separation, street trees are known to improve physical and mental health. Tree-lined streets have been shown to lower blood-pressure and improve mental health in community residents (Yuen). Trees also improve air and water quality, and provide shade to pedestrians (Sterling Codifiers). Trees in cities and towns encourage residents to go out more and spend time around the trees, which decreases anxiety and depression levels in residents while keeping residents physically safe and improving the aesthetics of the community (Burden).

To develop street tree buffers, Mission can choose between hiring a landscaping agency, creating community-wide project to plant trees, or develop a mix of the two options. The average cost to purchase and plant a 6' to 8' tree is $344 (South Dakota Department of Transportation). The Urban

Figure 3: Street trees on Highway 18

& Community Forestry Comprehensive Challenge Grant provides funding for communities that want to improve the landscape of their community (SD Department of Agriculture).

In addition to providing buffers, incorporating street trees will contribute positively to Mission's urban forest. "They are dynamic ecosystems that provide critical benefits to people and wildlife. Urban forests help to filter air and water, control storm water, conserve energy, and provide animal habitat and shade. They add beauty, form, and structure to urban design. By reducing noise and providing places to recreate, urban forests strengthen social cohesion, spur community revitalization, and add economic value to our communities" (Forest Service: U.S. Department of Agriculture). Appropriate street trees include American Elm (*Ulmus americana*) and Northern Red Oak (*Quercus rubra*).

Bioswales

A bioswale is a channeled depression planted vegetation in mulch and/or soil that receives rainwater runoff from streets or parking lots. Bioswales are often used for their filtration capabilities; they slow water infiltration and filter pollutants out of runoff (Merriam-Webster). Just like the previously proposed street trees, bioswales will clearly delineate the sidewalk/walkway from the road and protect pedestrians. Each bioswale can contain different plants to adapt to different locations throughout the city.

Bioswales are street gardens, and provide the same health benefits a traditional garden would. Namely, living landscapes like gardens and bioswales improve mental health. In Denmark, the University of Aarhus conducted a nationwide study on how childhood exposure to green spaces affected a person's future mental health. The study found that exposure to green space reduced the risk for developing mental health disorders in adulthood. The study also showed that green space in adulthood is important and beneficial by encouraging exercise (Rocchio and Carlowicz).

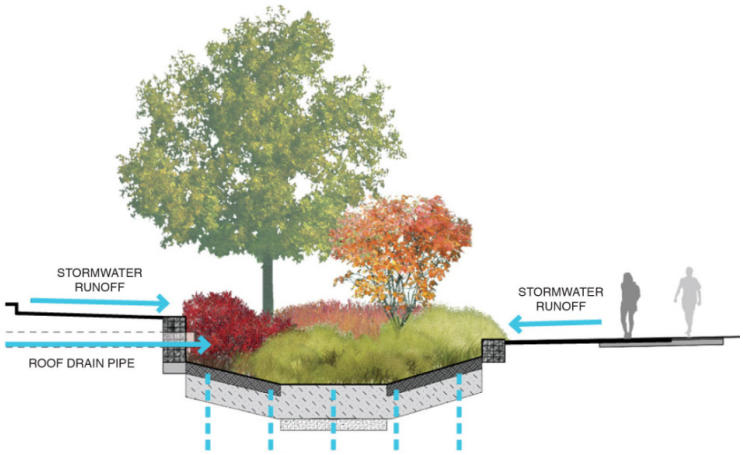

Figure 4: Cross-sectional diagram of a bioswale

Figure 5: Integrated urban forestry and stormwater management

If proper signage is provided, bioswales can provide educational opportunities. Mission's bioswales should be filled with native plants that fit the region. Bioswales improve air and water quality, slow traffic, and improve pedestrian safety (Frey et al.). Like street trees, green infrastructure creates an improved sense of wellbeing in residents and slows vehicular traffic by creating a sense of enclosure (Remmel 2016). Bioswales require more intense maintenance than standard grass and concrete, and must be properly designed by a qualified professional (Remmel). They cost $7 to $10 per square foot to install (Coffman). Funding may be found in the EPA 319 Non-point Source Grant Program and the Urban Waters Small Grants Program (Environmental Protection Agency).

Figure 6: A bioswale acting as a parking lot buffer

Planted Medians

A planted median will calm traffic and reduce the scale of the street. The median proposed is a hybrid design between a "landscape island" and a "refuge island". The median will be planted along its length, and at intersections will allow pedestrians a place to seek refuge as they cross the road. These medians also help create attractive streets by providing street trees to unify the urban streetscape.

Medians slow traffic by introducing a driver's side curb with plantings to increase enclosure. While unplanted medians along long stretches of roadways can increase vehicle speeds, properly planted and maintained medians have been proven to calm traffic (Morrison, 2003). The cost to implement medians along the target stretch of roadway is approximately $8 per square foot.

RECOMMENDATION 4: CREATE CULTURALLY-RELEVANT CROSSWALK PAINTING

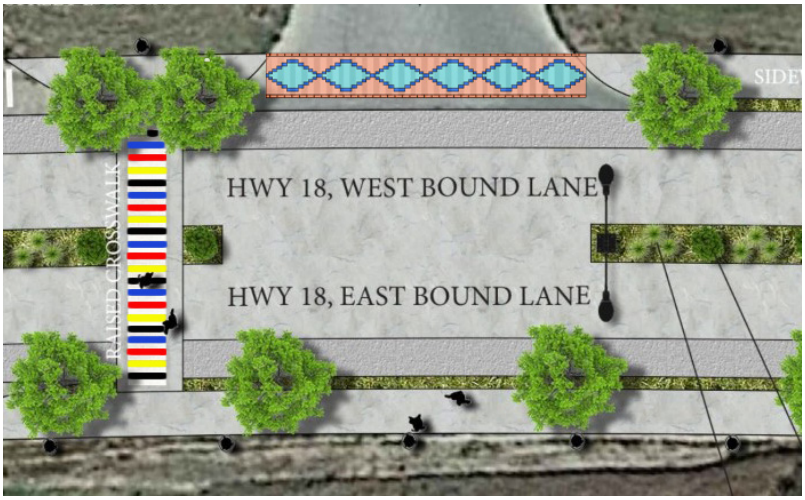

Figure 7: Example of culturally-relevant painted crosswalks

Higher-visibility painted crosswalks should be implemented. To evoke Mission's unique culture through the built environment and improve pedestrian safety throughout Mission, Antelope, and White Horse, the city should use culturally-relevant artwork on raised and level pedestrian crosswalks along US Highways 18 and 83. These art installations will provide residents an opportunity to express their artistic skills in a constructive manner. Since crosswalk paint wears off over time, there will be opportunities to repaint these crosswalks on an annual or biannual basis, allowing for more art and making the streets of Mission a temporary, rotating art installation. The changing paint will also encourage greater motorist attentiveness and interest while traversing the city. A case study in three Minnesota cities found that at intersections with painted crosswalks, motorists were more careful and began to decrease in speed (Knoblauch, 2001).

Once implemented, these recommendations will diminish the barrier that divides Mission by improving pedestrian safety with street trees, raised and at-grade crosswalks, and a planted refuge median. Finally, these proposals will reduce traffic speed and make motorists more aware of their surroundings. They will also contribute positively to beautifying the city and helping residents take greater pride in their community.

RECOMMENDATION 5: INSTALL RAISED CROSSWALKS ON HIGH-TRAFFIC ROADS

Raised crosswalks are a vital part of the sought-after pedestrian safety and traffic calming. These crosswalks make pedestrians crossing the road more visible to motorists, and will help to slow motorists through town. They are also more accessible to all pedestrians, including those with disabilities (Safe Routes to School, 2021).

Figure 8: Raised crosswalk

It is recommended that raised crosswalks be distributed along Highway 18 to connect pedestrians with key community destinations, including commercial, recreational, and educational facilities and services (see Figure 4). An additional raised crosswalk focusing on the Todd County School District is vital to the safety of the children walking to and from school, particularly from communities to the east. In Bellevue, Idaho, raised crosswalks decreased vehicle speeds in school zones by an average of five miles per hour (Gonzalez, 1999).

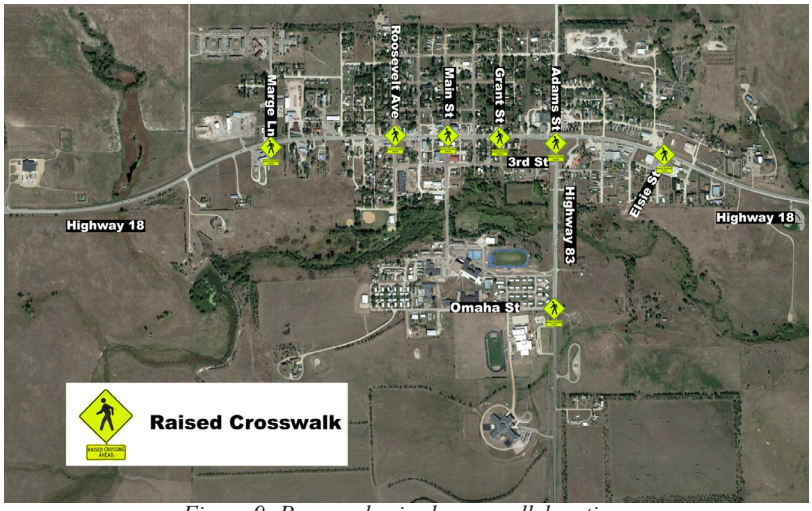

Figure 9: Proposed raised crosswalk locations

RECOMMENDATION 6: IMPLEMENT TRAFFIC-CALMING SIGNS

More signage is proposed to improve driver awareness and safety. One method is the installation of transverse rumble strips and accompanying warning signs. The rumble strips should be placed at the entrances to town on Highways 18 and 83. The proposed rumble strips and accompanying signs will help alert drivers to impending lower speeds, creating a safer environment for motorists and pedestrians alike. The average cost to install transverse rumble strips is $667 per section.

Figure 10: Transverse rumble strip locations

School speed zones are essential to promote safety for the children and school faculty. Slower speeds around schools make drivers slow down and pay more attention to the surrounding area. Slower speeds make it easier to come to a complete stop faster when children are present.

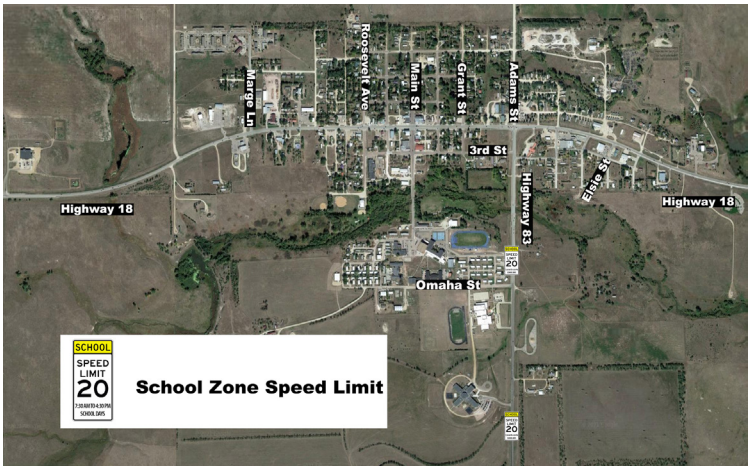

Figure 11: School zone speed limit locations

Radar speed signs are an effective means of slowing driver speeds, a perennial problem in Mission. Radar speed signs should be placed at the three entrances to the city. One Texas community implemented radar speed signs in several locations and recorded that "overall, average speeds were reduced by 9 miles per hour at the school speed zone.

Figure 12: Radar speed sign locations

Elsewhere... average speeds reduced [up to] 5 mph...depending on the location tested." (Rose and Ullman, 2003). The average price of a radar speed sign is $9,510.

Flashing speed signs help to further attract driver attention. Speeds through Mission should be reduced to 30 mph, and the new signage should include flashing lights around their perimeter to alert motorists of the change.

Figure 13: Reduced speed warning sign locations

Bike lane signage is needed to promote bike user safety. A bike lane is proposed to promote pedestrian activity throughout the city, and to provide safety to the bike users a sign is needed to make drivers aware. Bike pavement markings should also be implemented.

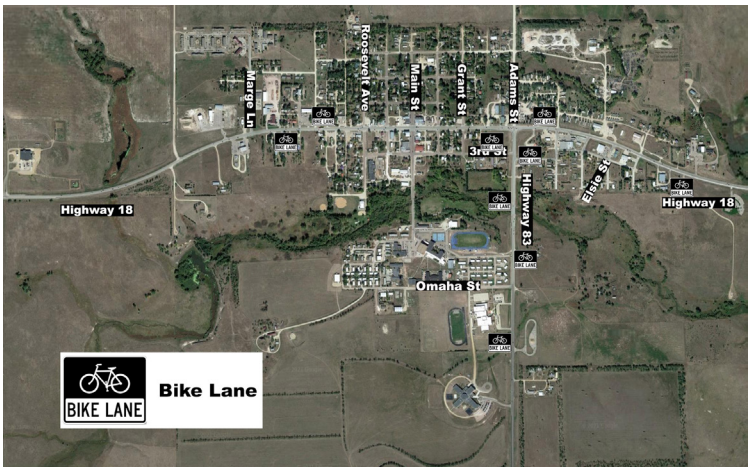

Figure 14: Bike lane sign locations

Signage and crosswalks will likely be put in by the South Dakota Department of Transportation and maintained by the City. Installing a pedestrian crossing sign will cost $55, but a stop sign could cost anywhere from $100 to $500, and other traffic signs vary between $25 to $40 per square foot (South Dakota Department of Transportation). Crosswalks range from $750 to $2,600 (Safe Routes to School). Funding can be found in the Federal Highway Administration's Bicycle and Pedestrian Program grants (Federal Highway Administration). These grants cover crossings and signage. Anything improvements on federal highways may also receive funding from the FHWA's Surface Transportation Block Grant Program.

Figure 15: Other examples of pedestrian signs

RECOMMENDATION 7: INSTALL BICYCLE RACKS IN KEY LOCATIONS

To encourage cycling in Mission, an investment in bicycle infrastructure is necessary. Many residents have expressed a desire to cycle to school, work, and other locations in town. To facilitate this, bicycle racks should be installed around the city, focused mainly around the schools, grocery stores, and the downtown. This will allow residents to safely lock up their bikes and use them when the weather permits. Bike racks come in a variety of styles. Some are bolted to the ground while others are inserted into concrete. The price also varies widely. Some bike racks only cost $89, but a more resilient and stable rack can cost up to $600 (Madrax Bicycle Security). Mission should invest in durable racks, which could be designed and manufactured locally.

Figure 16: Bicycle rack examples

RECOMMENDATION 8: INSTALL PEDESTRIAN-ORIENTED LIGHTING

The residents of Mission walk a lot. As a result, pedestrian-scale lighting needs to be installed to ensure pedestrian safety. Pedestrian lighting is different from roadway lighting. Pedestrian lighting illuminates the sidewalk specifically, instead of focusing on lighting the road. This helps pedestrians see where they are going, provides a comfortable walking environment and it also makes it easier for motorists to see pedestrians long before they are near an intersection or near parked cars (City of Seattle).

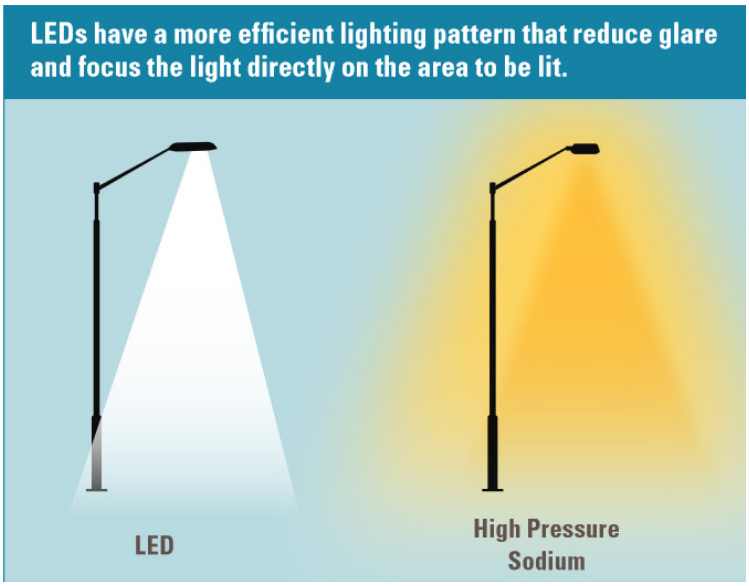

Figure 17: Advantages of LED vs. HPS street lights

Pedestrian street lights reduce night-time pedestrian crashes by approximately 50%, and improve how safe pedestrians feel walking in the evening and at night, and help reduce crime (International Road Assessment Programme). Pedestrian-oriented lighting should not exceed 16 feet in height (Downtown Area Plan Partnership). Since this may not be tall enough for motorists, supplemental lighting may need to be placed along the road to provide proper lighting for vehicles.

LED street lights should be used due to their increased efficiency, longer lifespan, and reduced maintenance needs compared to traditional high pressure sodium streetlights (Met-Ed). Additionally, Mission should consider acorn-style lights over cobra-head lights where possible. The cost of lighting fixtures depends on the type of light post, whether the post is within the pavement or on top of it, and the type of bulb. Streetlights will cost approximately $3,000 per standard to install (City of Sturgis, 2020).

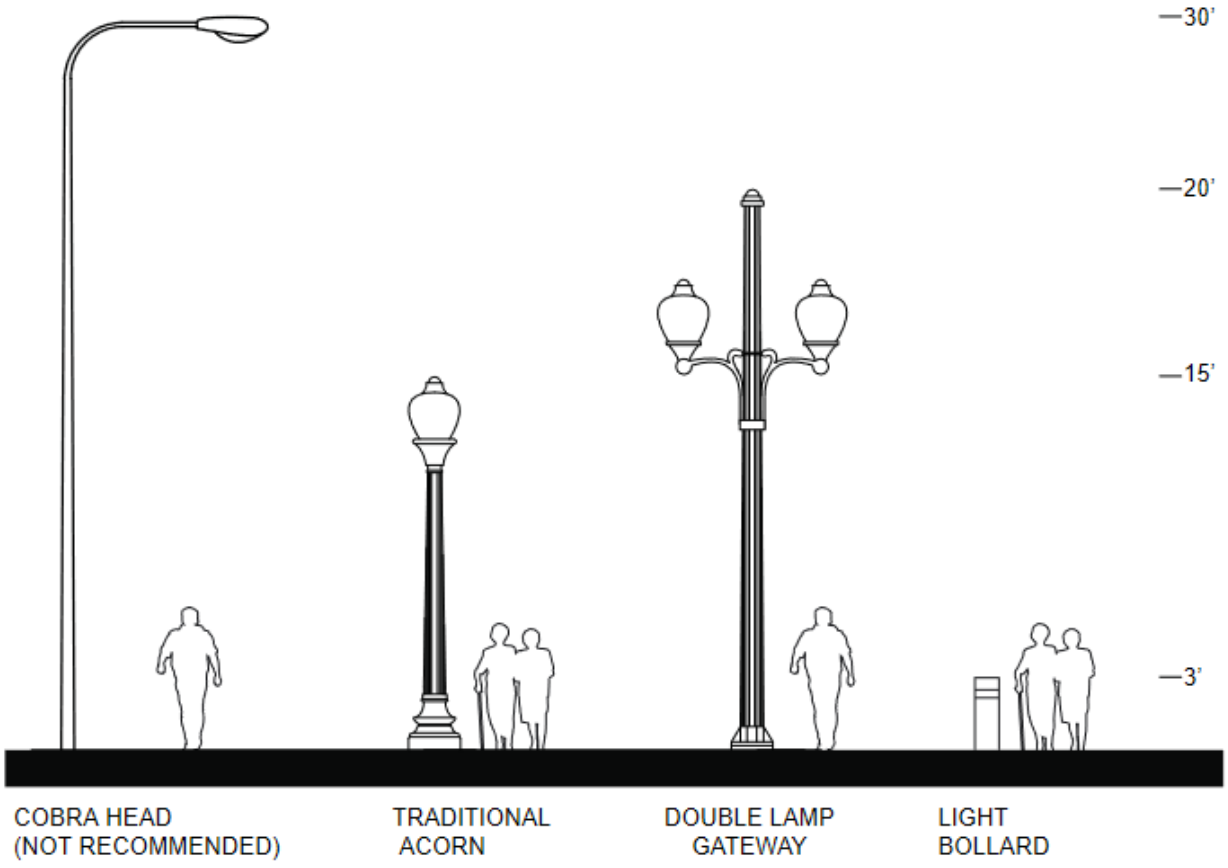

Figure 18: Comparison of various street and pedestrian lights

Figure 19: Acorn-style pedestrian lights

RECOMMENDATION 9: ADOPT BLUE LIGHTING TECHNIQUES

The community should implement blue pedestrian lighting to help combat depression and crime rates. Blue pedestrian lighting is simply having light posts that are emitting blue light instead of the white or yellowish glow they normally give off. Crime and suicide rates decrease in neighborhoods where blue lighting is implemented.

Figure 20: Blue lighting in Glasgow, Scotland

Scotland and Japan have implemented blue lights into their communities with favorable results. In Scotland, the city of Glasgow changed the lights in the city to blue street lighting to improve the city's appearance. While this was implemented, Glasgow saw a significant decrease in crime. Nara, Japan, also incorporated blue lighting and crime decreased by 9%. In Tokyo these lights were used in some railroad stations. The suicides in those areas stopped or slowed considerably. Research reported no measurable increase in suicides at neighboring stations, suggesting the installation of blue streetlights stopped the behavior rather than shifting it to other locations.

There are many theories as to why blue lights reduce crime, but the most common one is that they can cure depression. A collection of research connects poverty, depression, and fight-or-flight behavior with violent crime. 4.2% of those convicted of committing violent crimes were diagnosed with depression compared to 1.7% of the general population.

Figure 21: Blue lighting in Nara, Japan

Research proves that blue lights can alleviate depression as effectively as anti-depressants. The research explains why blue lighting can decrease violent crimes, suicides, and also illegal drug use. In Switzerland, officials recently have begun to install blue lights inside public bathrooms to deter drug use.

Figure 22: Blue lighting in Tokyo, Japan, train station

In Mission, blue lighting should be implemented in the neighborhoods first, including around Kimmel Park, near the schools and teacher housing, and in the residential neighborhood north of Highway 18 as pedestrian-oriented lighting is implemented. Residents can change out yellow or white porch lights for blue lights as a beginning measure.

RECOMMENDATION 10: ADOPT A CONNECTED SECURITY LIGHTING SYSTEM

Alleyways and dimly-lit residential roads are primary locations for criminal activity. Most crimes happen in transitional zones such as these because they are perceived as unsupervised. A connected security lighting system provides light when necessary (motion- or timer-activated) and conserves energy when not in active use.

	General Pedestrian with CSLS	Potential Criminal
Detection method	By beacon	By infrared sensor (initiated by beacon from general pedestrian with CSLS)
Anticipated effect	Reduces the fear of the crime	Deterrence of the criminal intent

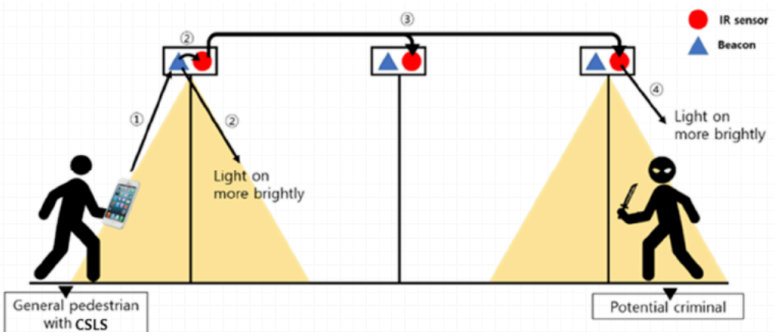

Figure 23: Function of a connected security lighting system

According to Younjoo Cho et al. (2019), there is historical and ongoing pedestrian anxiety about night crimes in alleys. There have been recommended light levels established for the alleys but to the pedestrian, it still feels that much of the area is not illuminated well enough to provide the sense of safety they require. In this study, there was an installation of a smart security lighting system, which is named Connected Security Lighting System (CSLS). This system has been designed to reduce the fear of crime. Brighter security lighting is one of the methods of crime prevention through environmental design (CPTED). Brighter lighting provides positive psychological effects to pedestrians by ensuring good visibility in the street. The brighter light enhances the pedestrians feeling of safety versus being in a darker space that increases fear. This theory of why improved lighting leads to reduced crime is that better lighting leads to increased surveillance of potential offenders and increases the deterrence of potential offenders.

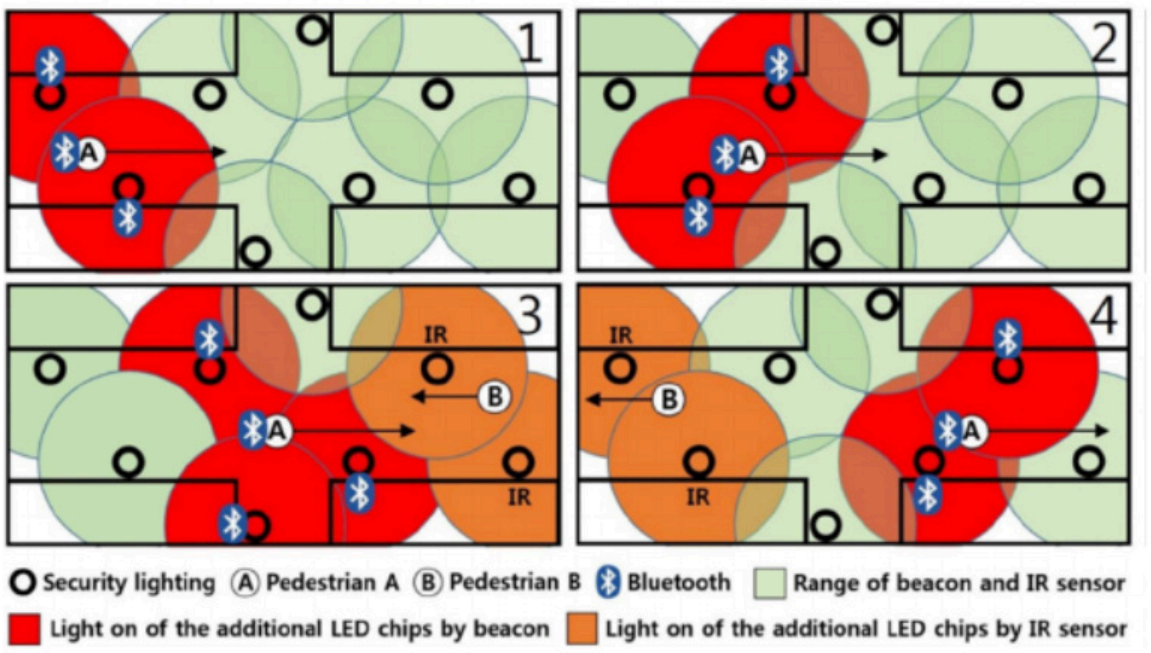

Figure 24: Plan-view of CSLS functionality

The smart security lighting system depends on a Bluetooth connection or motion sensor. When a pedestrian walks under the lights a sensor increases light output levels. Once the pedestrian leaves, the light dims to its regular level. This effect is also present with adjacent luminaires. This system increases visibility, provides positive psychological effects for the pedestrian and limits the energy consumption from lighting these areas.

RECOMMENDATION 11: IMPLEMENT AN INCLUSIVE SIDEWALK AND TRAIL PLAN

Walking is the primary means of transportation for many residents. Currently, sidewalks are only available in three areas in Mission: along Highway 18 and Highway 83; along Roosevelt Avenue leading to the schools; and on the west side of Adams Street. The lack of marked sidewalks and walkways is dangerous for pedestrians and drivers alike. 4,500 pedestrians are killed in crashes with motor vehicles every year in the US; 8% of these are pedestrians killed while "walking along the roadway". Much of this can be prevented by providing paved walkways (FHWA).

A lack of sidewalks also makes a community feel unwelcoming and inhospitable. Clear, well-made walkways ease trips to the grocery store, walks to work and school, and make using a stroller, wheelchair, or cart easier. People with visual impairments need a walking environment free of sharp edges, uneven levels, and obstructions that can cause tripping. Implementing detectable warning surfaces like tactile paving can help warn visually impaired pedestrians of their proximity to the road. Other options that can be installed include Accessible Pedestrian Signals (APS) that help the visually impaired to identify crosswalks at intersections.

A 20-year comprehensive sidewalk plan is necessary to ensure pedestrian safety and access.

Phasing Plan

A comprehensive sidewalk plan is a significant investment for any community. Reinforced concrete sidewalks cost $6 per linear foot (SDDOT, 2021). A phased approach balances fiscal resources over a manageable time frame. SDDOT has two grants to help fund sidewalk development: The Transportation Economic Development Grant and the Transportation Alternatives Funding Grant. Each grant is designed specifically for communities lacking resources and other forms of support to improve economic development through active transportation.

Phase One provides enhanced access from Highway 18 to Kimmel Park along Roosevelt Avenue, and between Antelope and Mission. As Mission focuses on revitalizing Kimmel Park, it is necessary for the new space to be accessible and open to the public, which means having well-built sidewalks. The proposed trail to Antelope will start in Kimmel Park and follow Antelope Creek to Antelope, terminating near Cheyenne Road. This trail will connect Mission and Antelope together, and make it safer for residents to access both communities' amenities and services.

Phase Two includes walks on Main Street, Marge Lane. and Roosevelt Avenue north of Highway 18. Main Street connects Avenue C with the high school, while Roosevelt Avenue leads to Kimmel Park, both important areas for pedestrians. Marge Lane is included in Phase Two due to the large number of residents who live in the northwestern portion of the city.

Phase Three will put sidewalks along the remaining north-south streets in Mission: Taft Street, Labeau Lane, Washington Street, Lincoln Street, Grant Street, Blanche Street, Elise Street, and Ruth Street. The north-south routes connect more of the city to amenities and resources than east-west streets do. Providing sidewalks on these streets thus connects more residents to city destinations.

Phase Four implements sidewalks on the remaining streets in the city: Jefferson Street, Harrison Street, Jane Street, Todd Street, Rosebud Street, 1st Street, Dakota Street, 3rd Street, and 3rd Ave. These are primarily the east-west streets that connect neighborhoods together.

Trails

As an alternative to a formal concrete sidewalk system, Mission may consider implementing a trails system. Trails are developed, open, and maintained walkways of stabilized gravel and/or dirt (Washington Trails Association). They are a less expensive alternative to concrete sidewalks. A six-foot gravel path will cost $2.50 per linear foot to install (Homestratosphere's Editorial Staff & Writers). While cheaper to install, trails require additional maintenance (grooming, resurfacing, etc.) and are not as easy to plow and traverse for pedestrians, even if well made and compacted (Landscaping Network).

Trails have many of the same benefits as sidewalks (encouraging pedestrian traffic, improved health, and improved safety for pedestrians and drivers), and compacted gravel can support bicycle and wheelchair traffic if the trail is properly constructed above the floodplain (City of Columbia, Missouri). Trails are a strong alternative to sidewalks, and the city should carefully consider the cost-benefit ratio of both strategies. If implemented, trails would be most appropriate as solutions for pathways in Phases Three and Four.

Figure 25: Highway 18 traffic-calming and pedestrian improvements

RECOMMENDATION 12: CREATE SMALL PLAZAS AND COMMUNITY SEATING

Seating is a great opportunity to enhance the pedestrian experience in Mission. Seating invites people to the street, builds a sense of community, and creates a positive, welcoming environment. On under-utilized lots, small plazas can be created as gatherings places for community events. Ample seating in such plazas is necessary to ensure a welcoming and usable layout.

Figure 26: Gabion bench as a low-cost seating solution

Bench-style seating is most desirable along sidewalks. Benches can be with or without backs, and should be 5' to 6' long. If backless benches are used, the benches should be 3' deep to ensure that people can comfortably sit facing both directions. Seating should be placed in both shade and sun to ensure people can sit where they are most comfortable. Benches should be sited to ensure views to points and activities of interest. This strategy also encourages "eyes on the street", natural surveillance that improves comfort while simultaneously decreasing vandalism and similar behaviors.

Traditional benches can cost up to $3,000 each. A lower-cost solution is a gabion-bench. A gabion is a wire mesh cage filled with stones, crushed concrete, or similar materials, often used as retaining walls. A gabion can be used as a bench by adding a suitable seating material to the top. This reduces costs and provides opportunities for community members to join in. These can be built for as little as $300.

Figure 27: Plan-view of traffic-calming and pedestrian improvements, Highway 18 @ Marge Lane

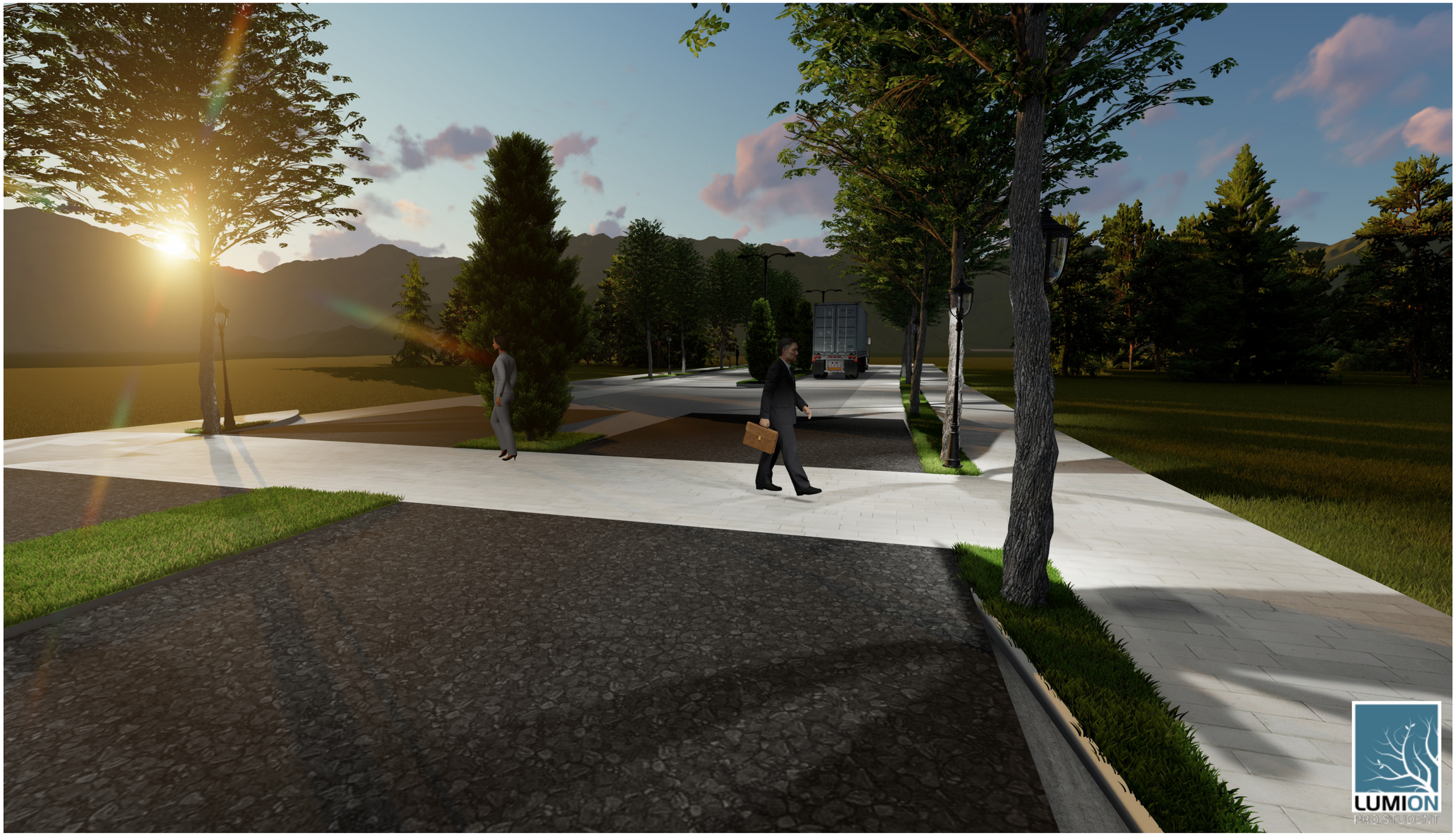

Figure 28: Traffic-calming and pedestrian improvements, Highway 18 @ Marge Lane

Figure 29: Highway 18 traffic-calming and pedestrian improvements

RECOMMENDATION 13: CONSTRUCT A ROUNDABOUT AT THE INTERSECTION OF HIGHWAYS 18 AND 83

Currently there is a four-way intersection where Highway 18 and Highway 83 meet near the center of town. For a pedestrian or cyclist, this is a dangerous intersection, with only a traffic light to control traffic and over seventy feet of roadway to cross. This intersection is also onerous for vehicular traffic that is forced to wait for the light to change, or for traffic to ease to continue on one's journey.

Figure 30: Single-Lane Roundabout

One solution is a roundabout. Roundabouts lower the likelihood of a fatal accident either between vehicles or a vehicle and pedestrian (Federal Highway Administration, 2021). They also allow pedestrians a much safer way to cross this intersection much more comfortably and confidently. Single lane roundabouts like that proposed here (see Figure 9) have 50 percent fewer vehicle/pedestrian conflicts and reduce severe crashes by approximately 80% than traditional stop- or signal-controlled intersections.

The roundabout design features raised crosswalks to slow traffic before entering the intersection and raise motorist awareness of pedestrians. These crosswalks are set back from the intersection to improve visibility and decrease conflicts between pedestrians and motorists. Planted medians give way to paved teardrop islands to separate traffic while still providing refuge islands for pedestrians. Painted and posted yield signs encourage proper use of the intersection and assist traffic to flow naturally. A warning sign a few blocks in advance of the roundabout will alert drivers to this new intersection and the need to slow. The average cost of a roundabout sign is $233.

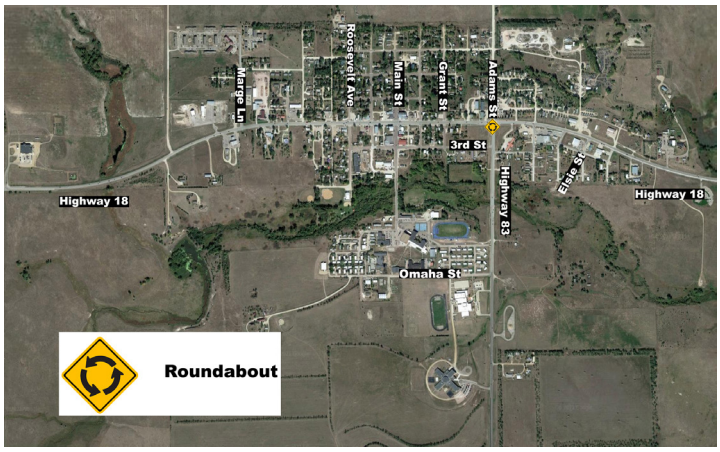

Figure 31: Roundabout warning sign

Figure 32: Roundabout design for Highway 18 @ Highway 83

Figure 33: Vehicular experience at roundabout

Figure 34: Pedestrian experience at roundabout

RECOMMENDATION 14: CONSTRUCT A DIGITAL WELCOME SIGN

Mission lacks a centralized monument welcoming people into the city. Also, aside from the local Lakota Times newspaper and the city-run Facebook page, Mission does not have a means of disseminating information to the public. To mitigate this, it is recommended to build a monument sign at the southeast corner of US Highways 18 and 83, also known locally as the intersection of 2nd Street and Adams Street. This sign will face west and east with a setback of fifty feet from the eastbound shoulder of US Highway 18. This dual-sided monument sign includes an LED message board that displays the time and temperature, plus any events or messages that the city of Mission wanted to promote. The city should also lease advertising time on the sign to local and regional companies. Examples include special deals at one of the local grocery stores, rummage sales, and community engagement events. Mission could use the revenue realized from advertisements to fund any necessary repairs, thus preventing the welcome sign from becoming a liability. The initial cost for constructing a monument sign is approximately $35,000, depending on which details and specifications are included ("How Much Does an Outdoor LED Business Sign Cost?", 2021).

RECOMMENDATION 15: IMPLEMENT DUAL-LANGUAGE STREET SIGNS

The residents of Mission, Antelope, and elsewhere on the Rosebud Indian Reservation have a strong desire to retain and revive their Lakota culture and continue passing Lakota language and traditions onto younger generations. While progress has been made in preserving the Lakota language digitally through the *New Lakota Dictionary Online* and Tipi Kaga, a Lakota learning app designed by Carl Peterson (2021), Mission and Antelope have very few places where residents and visitors can read Lakota in the built environment. Additionally, signage is largely absent throughout these communities. Most street intersections lack signage. A lack of street identifying signage can cause problems for residents, visitors, or emergency personnel trying to navigate the city.

One way to facilitate this culture preservation while mitigating the navigation problem is to install dual-language signage displaying the names of streets, parks, businesses and other landmarks in both English and Lakota. This would help bridge language barriers in the community while also providing educational opportunities for residents of all ethnicities. Through collaboration with native Lakota speakers and educators, community members can gain a sense of pride in displaying their language throughout the community. The implementation of dual-language signage will cover four categories: *STREETS*, *PARKS & PLAYGROUNDS*, *WAYFINDING,* and *PLANT IDENTIFICATION*.

Figure 35: Digital welcome sign with advertising

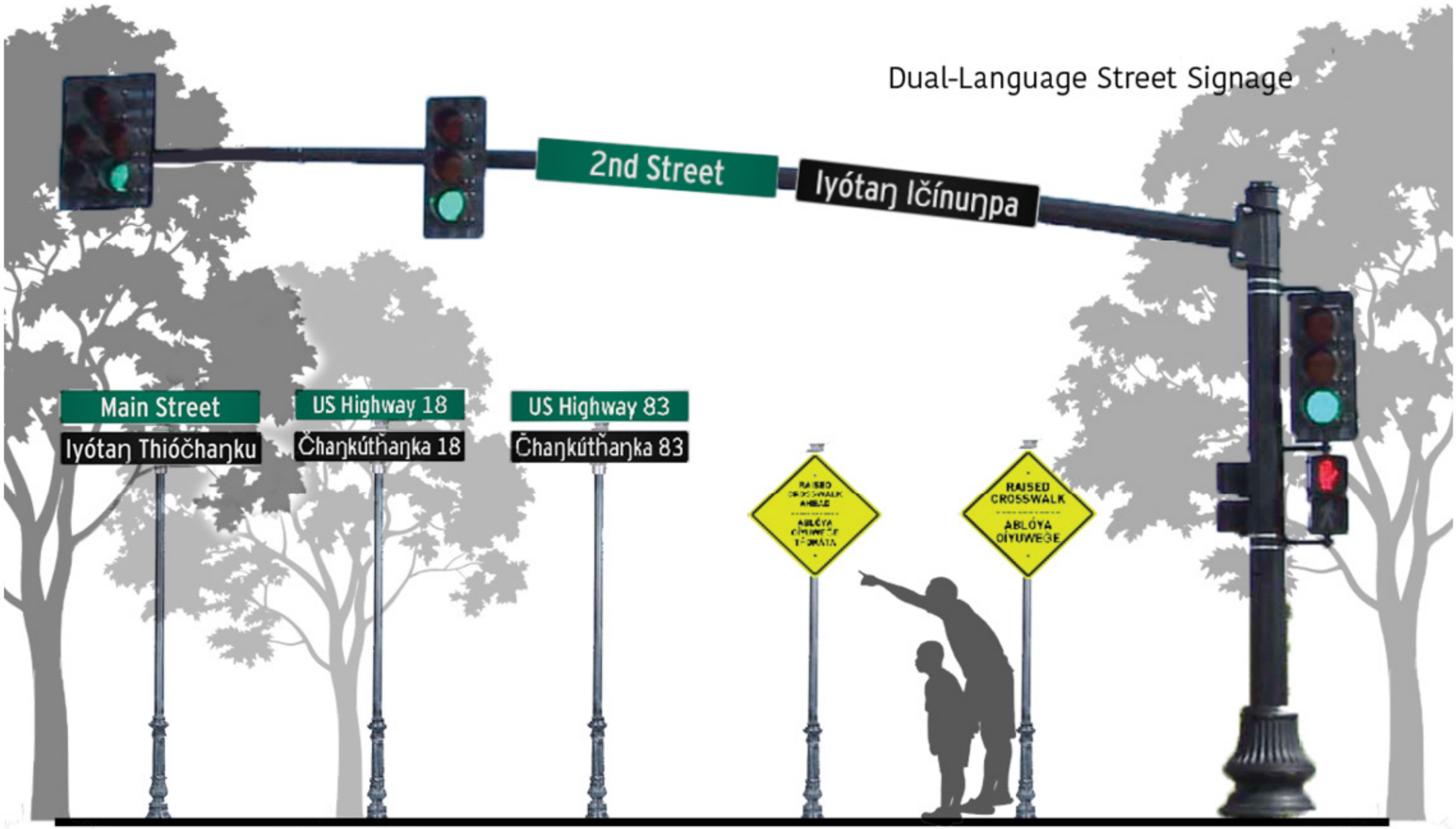

Figure 36: Dual-language street sign library

Streets

Currently, the communities of Mission and Antelope have minimal street signage, with the only prominent street signs being located at each of the three traffic signals in Mission. These few signs are only written in English. To satisfy the needs of more street identification and more bilingual signage through the area, it is recommended that the community install dual-language street signs at all intersections through the cities of Mission and Antelope.

Figure 37: English-Klallam street sign (Port Angeles, WA)

As a first priority, Lakota-language signs should be installed alongside the existing English-language signs on each of the traffic signals. In a second phase, new bilingual signs should be installed at the intersections of Highway 18 @ Roosevelt; Highway 18 @ Blanche; Avenue C @ Denver; Highway 83 @ Omaha; and Highway 83 @ Denver. Once these installations have been completed, dual-language signage should be installed at all remaining intersections along Highway 18 and Highway 83, and at other important intersections throughout Mission neighborhoods as finances allow.

Parks and Playgrounds

In addition to dual-language street signs, Mission will benefit from the installation of dual-language signs identifying each of the parks and playgrounds in the community. There are several playgrounds in the community, but many of them lack proper signage to indicate their name. Community members should be involved in naming these parks and creating artistic designs for their dual-language signs. Kimmel Park is the highest priority for a park sign, followed by other recreational facilities throughout the community.

Wayfinding

A third category of dual-language signage that will benefit Mission is wayfinding. Wayfinding is directional signage that helps a person navigate to locations of interest in a community. A few English-language wayfinding signs exist through Mission and Antelope, primarily in reference to Sinte Gleska University and its facilities. It is recommended that Mission and Antelope install dual-language signage to guide residents and visitors to other notable places in the area, including Kimmel Park, the Todd County School District facilities, the post office, grocery stores, and other places deemed important by community members.

Figure 38: Onondaga Nation boundary marker (New York State)

Plant Identification

A significant investment in native plants that have cultural importance has been recommended. Signage should be included along trails, in parks, and in other locations around the city. In this way, the public can be educated about the traditional uses to which native plants have been and can be put.

Dual-language signage has been successfully implemented across the country, including Port Angeles, WA (English and Klallam); Syracuse, NY (English and Onondaga); Bemidji, MN, (English and Ojibwe); and Sicangu Village (English and Lakota) (Hopper, 2016; Figura, 2016; Louwagie, 2014).

Mission and Antelope will benefit from having dual-language signage because it establishes a connection between Lakota culture and the built environment, improves wayfinding for visitors traveling through the region, and enhances the aesthetics and standard of living in each community.

Figure 39: Dual-language signage

Community Culture and Recreation

RECOMMENDATION 16: CELEBRATE LOCAL CULTURE THROUGH PUBLIC ART

Mission's community members, especially youth, need constructive ways to express their creativity. One way to accommodate this is to promote temporary cultural art installations in pocket parks. By allowing local artists to create these art exhibits, the artists can feel a sense of pride in their work while simultaneously contributing to a more positive environment in the community. Examples of these art installations include murals, sculptures, or any other art form that residents wanted to create.

In implementing this recommendation, the City should consider developing some guidelines for evaluating if a particular art piece is appropriate for public display, or more suited to a private residence. There would be little cost to the city aside from dedicating space in the parks for these public art installations and providing signage to identify the artist and the artwork title, materials, and description.

Figure 40: Pop-up art plaza installation (New York, NY)

Figure 41: Statue promoting reading (Stamford, CT)

Figure 42: Interactive play art (Boston, MA)

RECOMMENDATION 17: REVITALIZE BUILDING FACADES

Street art and murals can add a lot of community value to an area. Public artwork is beautiful and culturally significant, no matter where the art is found. Street art is often an expression of current social and cultural concerns and ideals and creates the appearance of a vibrant community. However, this art does not only create the appearance of a vibrant community, it encourages economic improvement and community connection. One street art collective reports that streets with murals and art can see an increase in business revenues by 5% to 10% (Altschuler 2020). Mission is already taking part in street art projects, and murals can be seen around the city, especially along Highways 83 and 18.

Figure 43: Wall mural example

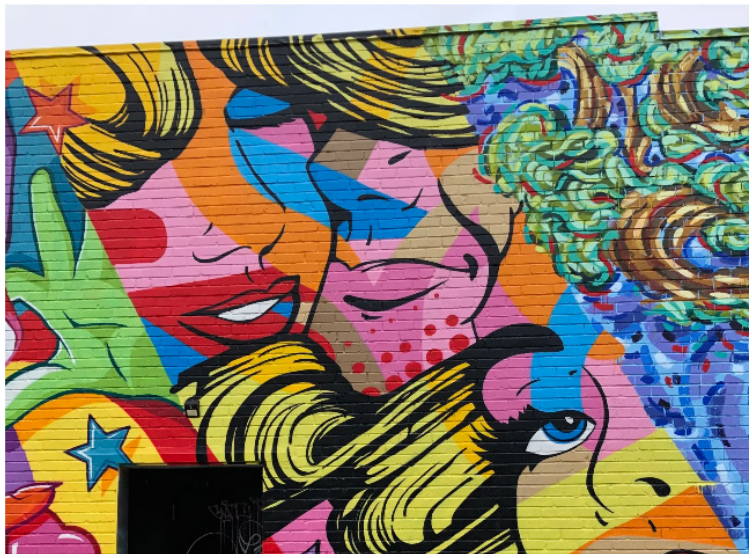

Figure 44: Street art

This recommendation will increase the presence of art in Mission. Art is a way to express cultural and personal identity and nurture a sense of community. The positive expression of cultural identity has been shown to "protect against mental health symptoms and buffer distress prompted by discrimination" (Hand and Golden). Nurturing a sense of cultural identity improves public health and a community's overall well-being.

Figure 45: Street art

Murals and street art, along with tuck-point repairs and hanging gardens (gardens affixed directly to building fronts) should be implemented along Highway 18, at the school grounds, and at Kimmel Park's old pool building. The murals should be created by community members, both as individual or small group efforts and as community-wide events. The South Dakota Arts Council has a promising series of grants to support this recommendation: the Artists Project Grant, the Traditional Art Apprenticeship Grant, and the Educator Grant.

Murals show expression, emotion, culture, and are visually appealing. Murals should also be used as a way to engage community members while reflecting on culture. Remodeling building facades should be achieved by including artistic, engaging signs, and creating various extended overhangs. This will improve walkability and entice more individuals to walk. The city of Franklin, Indiana recently finished a revitalization project that played a major role in improving public streetscapes and building facades. Improving old and bland building facades creates a more friendly walking environment for pedestrians (Kienle, 2012).

RECOMMENDATION 18: DEVELOP MORE FESTIVALS AND COMMUNITY EVENTS

Mission already hosts a multitude of events throughout the year, including sporting events at Todd County High School, events sponsored by the Boys and Girls Club and Sinte Gleska University, and traditional Lakota events held at various locations across the Rosebud Indian Reservation. Mission will benefit from hosting more of these events to engage community members to improve the city collectively.

Figure 46: Wacipi festival at Sinte Gleska University

Some examples of community events include:

- Town halls with elected officials to discuss issues facing the community
- Community festivals featuring local businesses, food trucks, inflatable bouncy houses, and carnival rides
- Street dances featuring prominent local artists like Oyate Teca Obmani (also known as Frank Waln).

RECOMMENDATION 19: CREATE A SYSTEM OF POCKET PARKS

Parks play a significant role in how a city feels and acts. Adequate, diverse and well-distributed recreational facilities ensure there is something constructive and fun for everyone. A simple solution to bolstering recreation in Mission is the development of small "pocket parks" on vacant lots throughout the city.

In Philadelphia, "a research team found that distressed neighborhoods where vacant lots have been converted into small parks and community green spaces are associated with a reduced crime rate when compared to neighborhoods with unimproved vacant lots. In some sections of the city, residents of neighborhoods with improved vacant lots also reported 'significantly less stress and more exercise', suggesting that the improvements affected residents' perceptions of safety outdoors" (Benfield 2017). Three pocket parks are recommended for Mission, in the following order of priority:

1. The southeast corner of Washington Street and Todd Street
2. The southwest corner of 1st Street and Grant Street
3. The southeast corner of Roosevelt Avenue and 2nd Street (Highway 18)

Prices will depend on the uses to which each park is put. Prefabricated playground equipment can cost from $10,000 to $35,000, depending on size and options. Raised garden beds for a community garden can be built for $500 to $2,500 each, depending on materials, sizes and construction methods. Playground surfacing can cost between $10,000 and $40,000, depending again on materials, warranty, and installation methods.

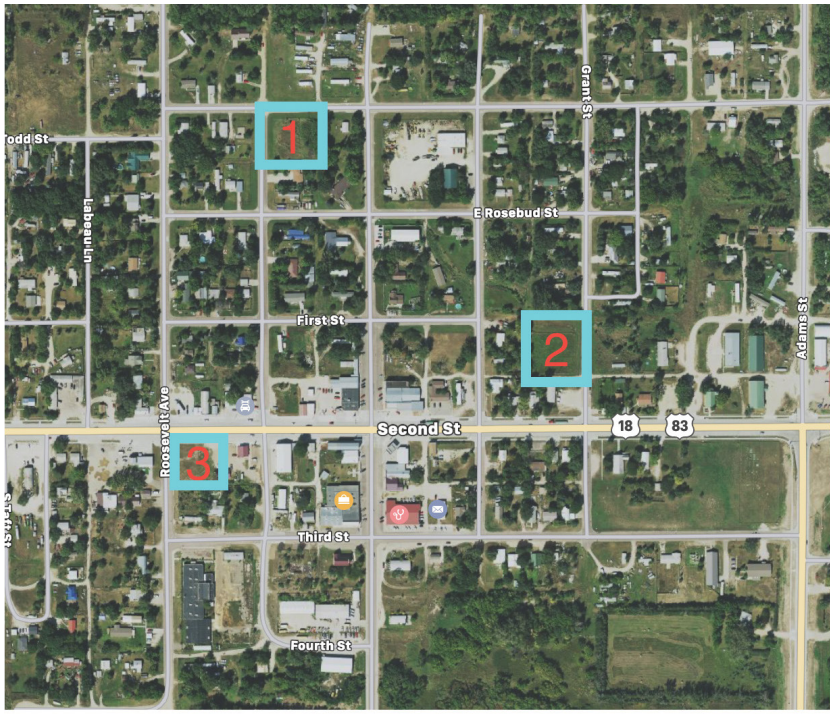

Figure 47: Pocket park system for Mission

Funding can be found through Trust for Public Land grants. Local businesses and the tribal council should also be approached with opportunities to sponsor and name a pocket park. Placing pocket parks across Mission will increase mental and physical health, improve community sociability, and reduce crime.

Figure 48: Pocket park sample design (Washington Street @ Todd Street)

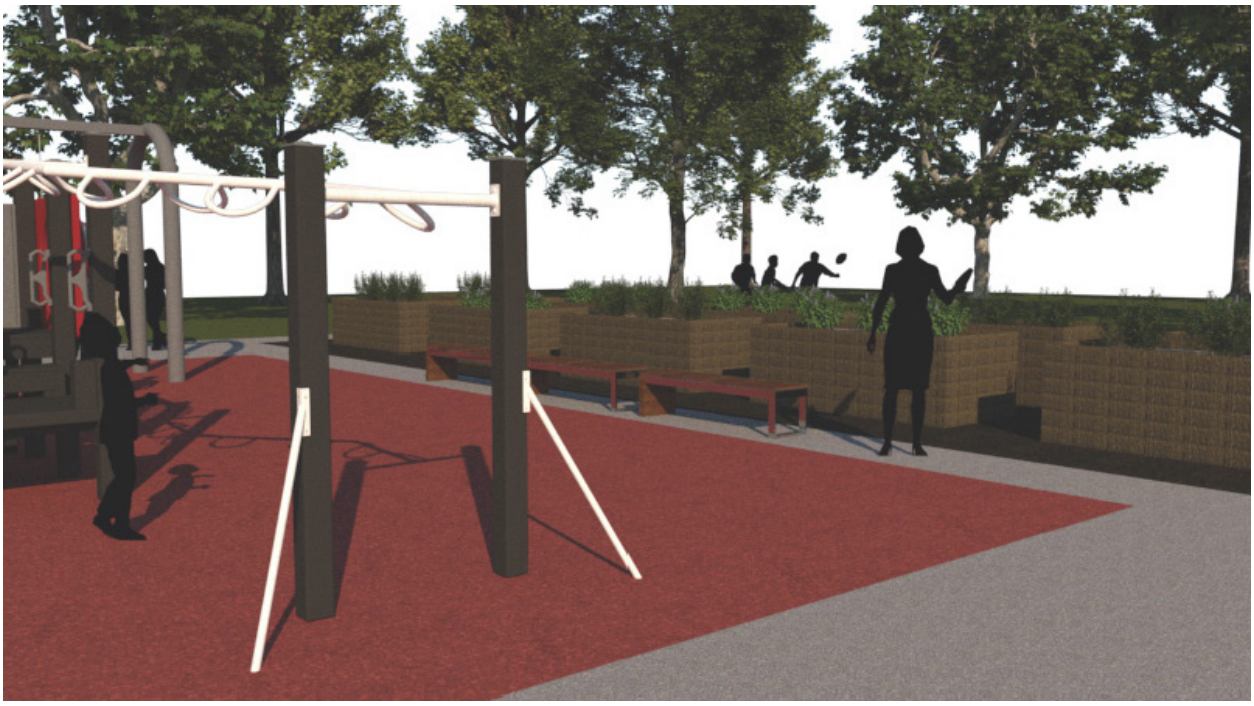

Figure 49: Pocket park sample design (1st Street @ Grant Street)

RECOMMENDATION 20: REINVEST IN KIMMEL PARK

Kimmel Park is an 8.58-acre park located on the southern side of Mission, SD. The park contains a nonfunctional pool, a softball field, a gravel parking lot, a few plantings, open green space, and two shelters. Kimmel Park suffers from vandalism as well as poor maintenance and is littered with trash. Few people visit the park because of the inaccessibility and the current condition. With a new master plan and these provided recommendations, the intent is to change the atmosphere of the park and create a clean, well-maintained park with a variety of activities that different age groups can enjoy. In turn, this should bring more people to the park and get the people of mission (especially the youth) into outdoor green space and create a sense of place in the community.

Lighting

Parks play an essential role in the social context of cities. They are where people meet and feel a sense of belonging (Why Lighting Is Important for Parks and Public Areas, 2020). Including lighting in parks is crucial to activating the space at night. Proper lighting helps parks feel inviting, welcoming and safe. Properly-illuminated parks can be used for longer periods of time, thus maximizing their positive impact on the community.

There is a lot of room for lighting to be added in Kimmel Park. It is proposed that 25 lights be incorporated throughout the park. LED lights are the best choice for lighting in parks. They are dependable and durable in harsh weather conditions. LED lights also perform better than traditional outdoor lighting as they produce minimal light spill and sky glow. These lights will create an enhanced pedestrian experience, provide safety and security for park users, and also reduce vandalism (Important Lighting Design Tips For Parks and Recreational Areas, 2020). Kimmel Park can also incorporate blue lighting to provide mental health benefits. For more information on blue lighting, see the blue lighting recommendation.

Seating

Kimmel Park currently has a limited selection of seating. Seating plays an essential role in parks as it encourages people to walk more, attracts people to parks, and provides a place to sit. Park benches are an asset to both our lives and communities. They allow people to take in their natural surroundings. Sitting outside in nature for 30 minutes a day can significantly reduce stress (Postles, 2015). By simply eating lunch on a park bench, people can increase their mood and productivity throughout the day.

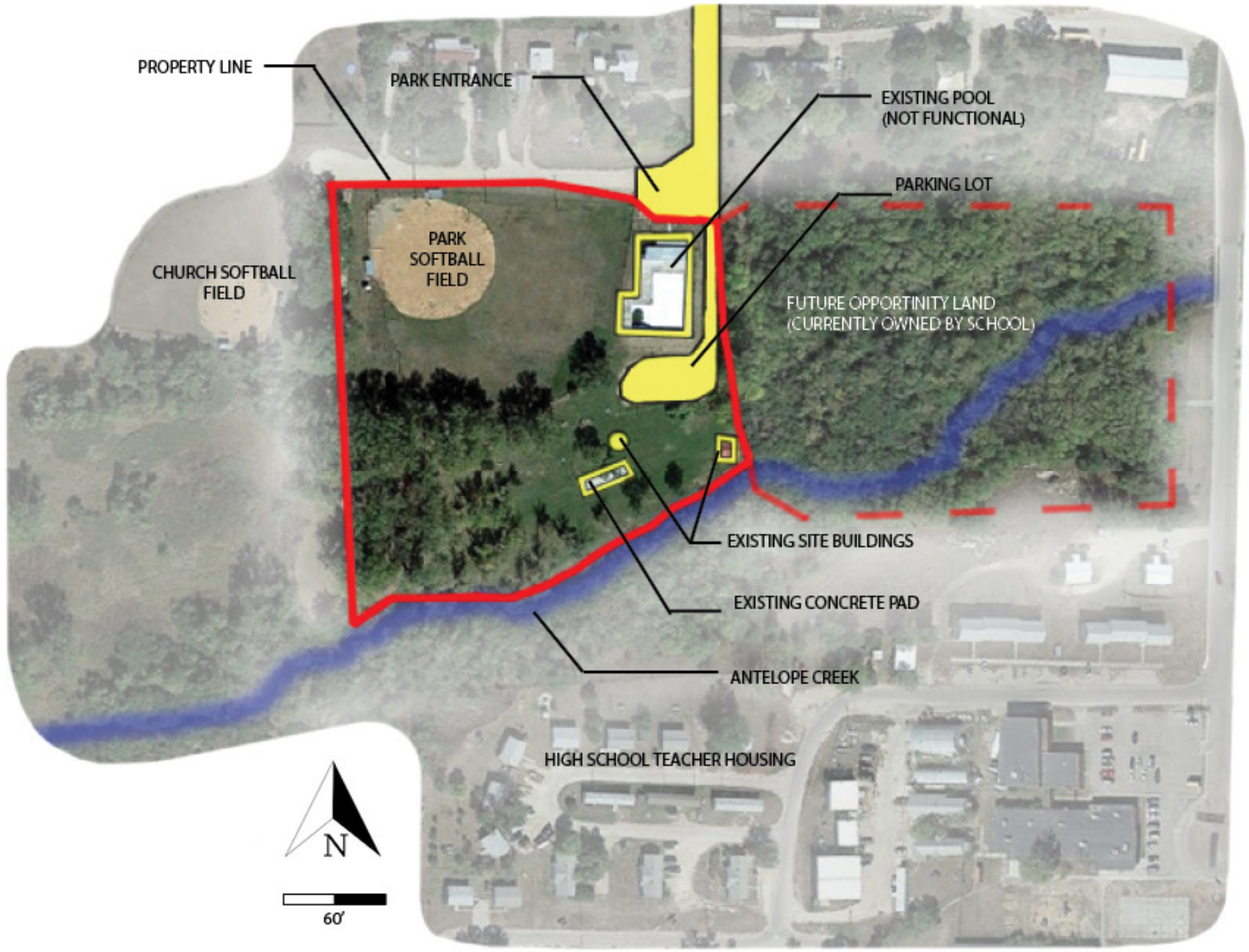

Figure 50: Kimmel Park analysis of current conditions

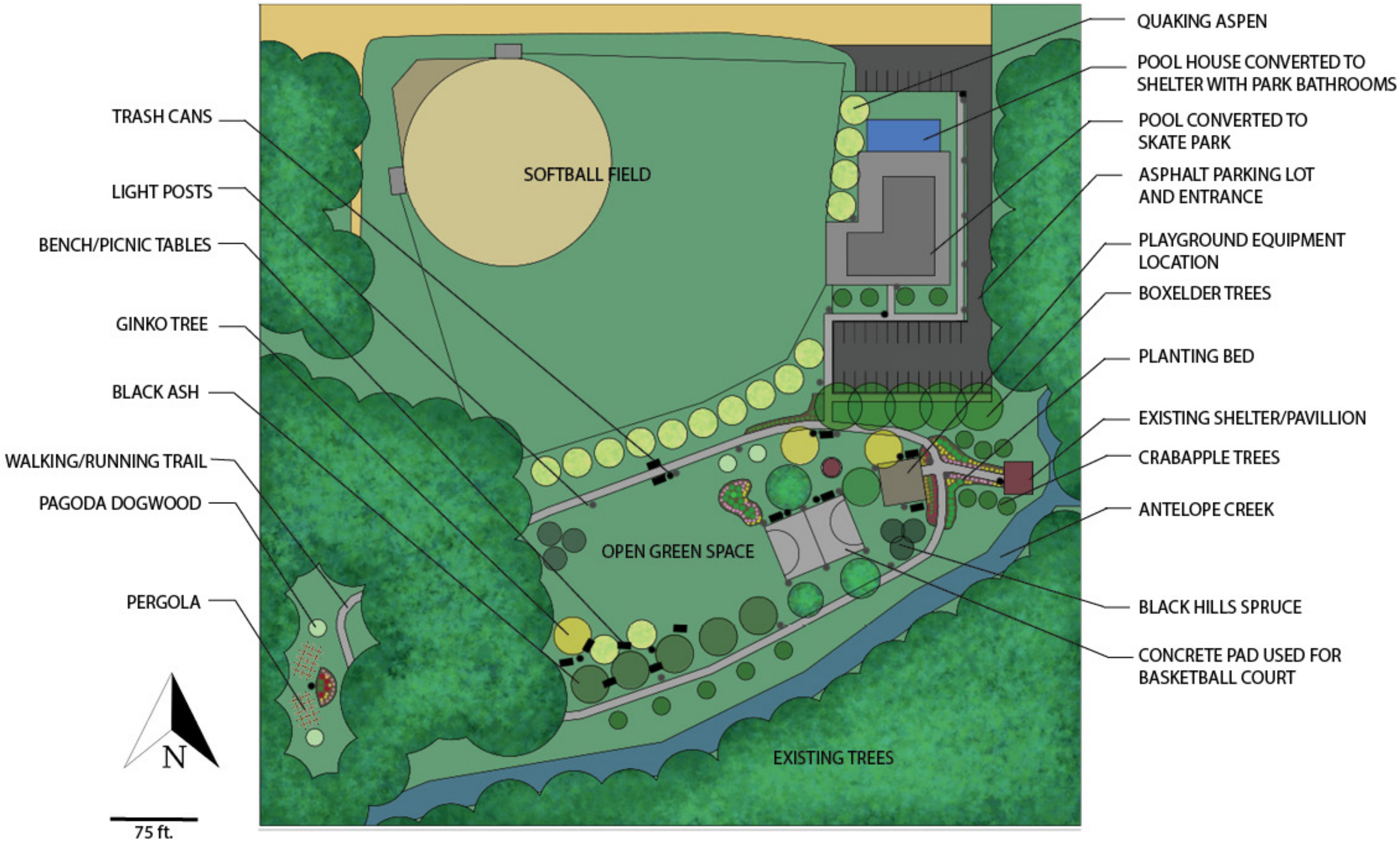

Figure 51: Proposed Kimmel Park comprehensive reinvestment plan

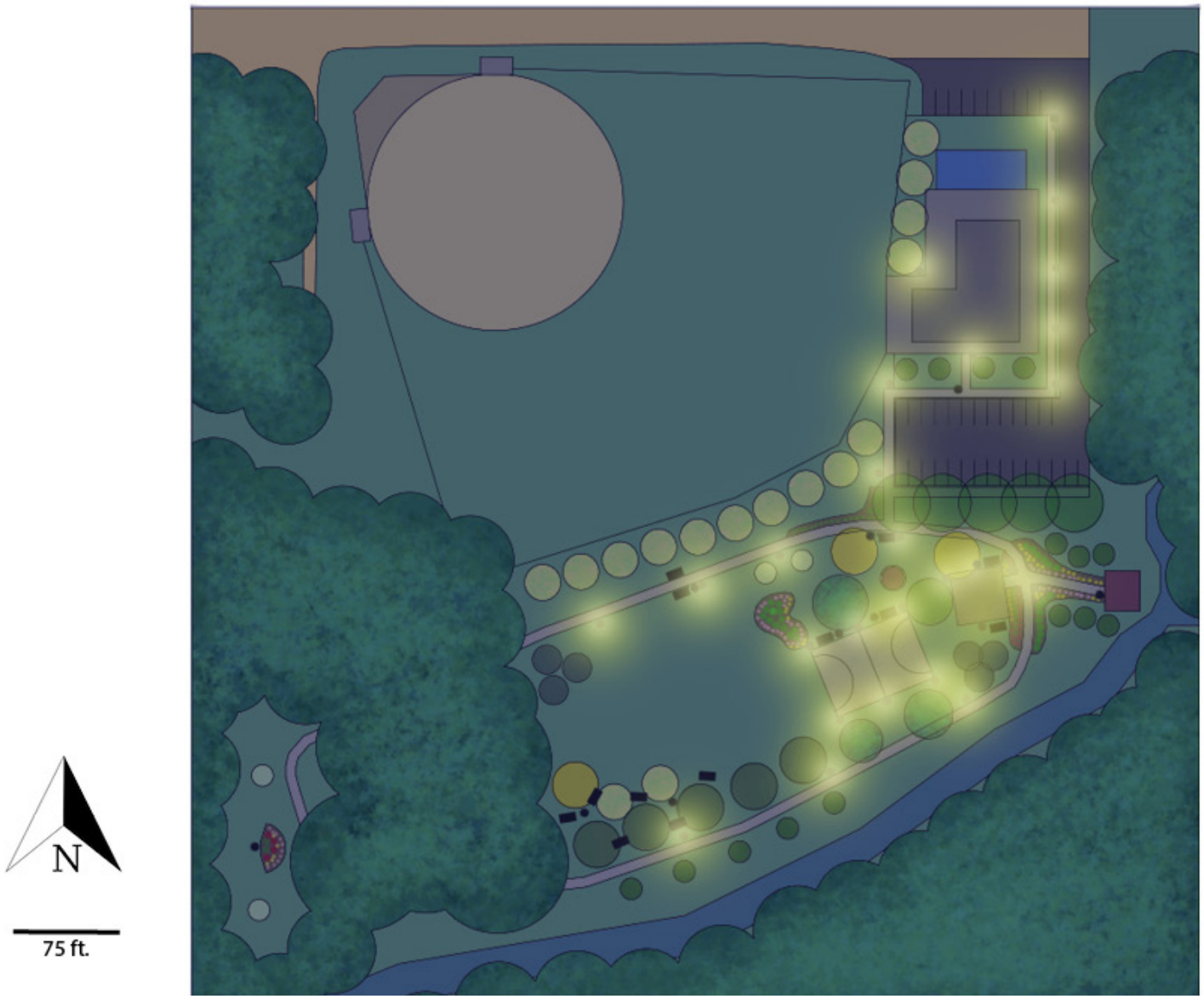

Figure 52: Kimmel Park lighting plan proposal

Since vandalism is a big issue in Kimmel Park, park benches must be able to tolerate abuse. The best option for park seating that can withstand heavy vandalism is gabions. Gabions are wire cages filled with rock. Wood can be attached to the top of the gabion to provide a smooth surface to sit on. Gabions provide a nice aesthetic throughout the park while also providing people a place to sit and take a load off. They can even be accented with plant material to give them a more natural look. Utilizing gabions as park bench seating will provide community-building activities. Community members can come together and build the gabions themselves. By building these benches together, people will experience a sense of ownership and care for them.

Figure 53: Gabion bench examples

Waste Receptacles

Waste receptacles are important features in a park. They increase overall cleanliness and improve the atmosphere of the park by reducing litter and helping park visitors take ownership of the park. It is critical that enough waste receptacles are provided, and in the correct locations. They should be placed in high-traffic locations, near any food or drink vendors, and at other locations where people tend to congregate. It is equally important that receptacles are emptied regularly to ensure overflow does not occur. Concrete receptacles are recommended for their durability. The comprehensive plan proposes 11 receptacles, at a total cost of $4,000.

Figure 54: Concrete waste receptacle

City Pool Skate Park

The city pool has historically been a highlight of Kimmel Park because it provides a place for community members to gather and socialize. Currently, the pool is unusable and would cost around $2,000,000 to fix, money the city does not have. To revitalize this part of the park, it is recommended that it be transformed into a skateboard and parkour park.

Skate parks add numerous health benefits to communities. Skate parks can revitalize struggling neighborhoods and communities by bringing in healthy human activity. Activity in a skate park can replace undesirable activities such as vandalism and drug use (The Skate park Platform, 2021). Skateboarding is also beneficial to youth. Studies have shown that active teenagers are physically healthier and perform better in school. Skate parks also provide benefits beyond physical activity. Skateboarders create friendships and establish a community with each other. This is the type of community that supports and encourages one another while building friendships that will last a lifetime. The diversity in these communities encourages youth skaters to respect adults. Adults can also offer wisdom and advice that some kids might not get at home (Alton, 2015).

The shape of the existing pool will make a great skate park. The pool should be split into two sections: the deep end and the shallow end. The walls of the deep end can be reshaped with concrete to form a steep slope down to the bottom of the pool, creating a half-pipe. The walls of the shallow end can also be reshaped to form a gentle slope down into the pool to create a large bowl. Ramps can be made on the concrete of the pool floor to add a variety of different options for skaters and parkour enthusiasts. Ramps can also be placed around the perimeter for beginner skaters who are still working on honing their skills. Community members can build these ramps to create a sense of ownership in the park. The city should consult a licensed design professional to ensure the new skate park is implemented according to best practices and safety guidelines.

Transforming the existing city pool into a skate park will breathe new life into Kimmel Park. The new skate park transforms a derelict space into something for the community to share. The new space will serve as a highlight of Mission's park and recreation offerings.

Former Pool Building

The pool building should be redeveloped as a recreational and educational building. Locker rooms can easily be converted into multi-stall restrooms, and remaining square footage can serve as a multipurpose room for parties and social gatherings. This will provide the residents of Mission a sheltered area to get together and host various gatherings.

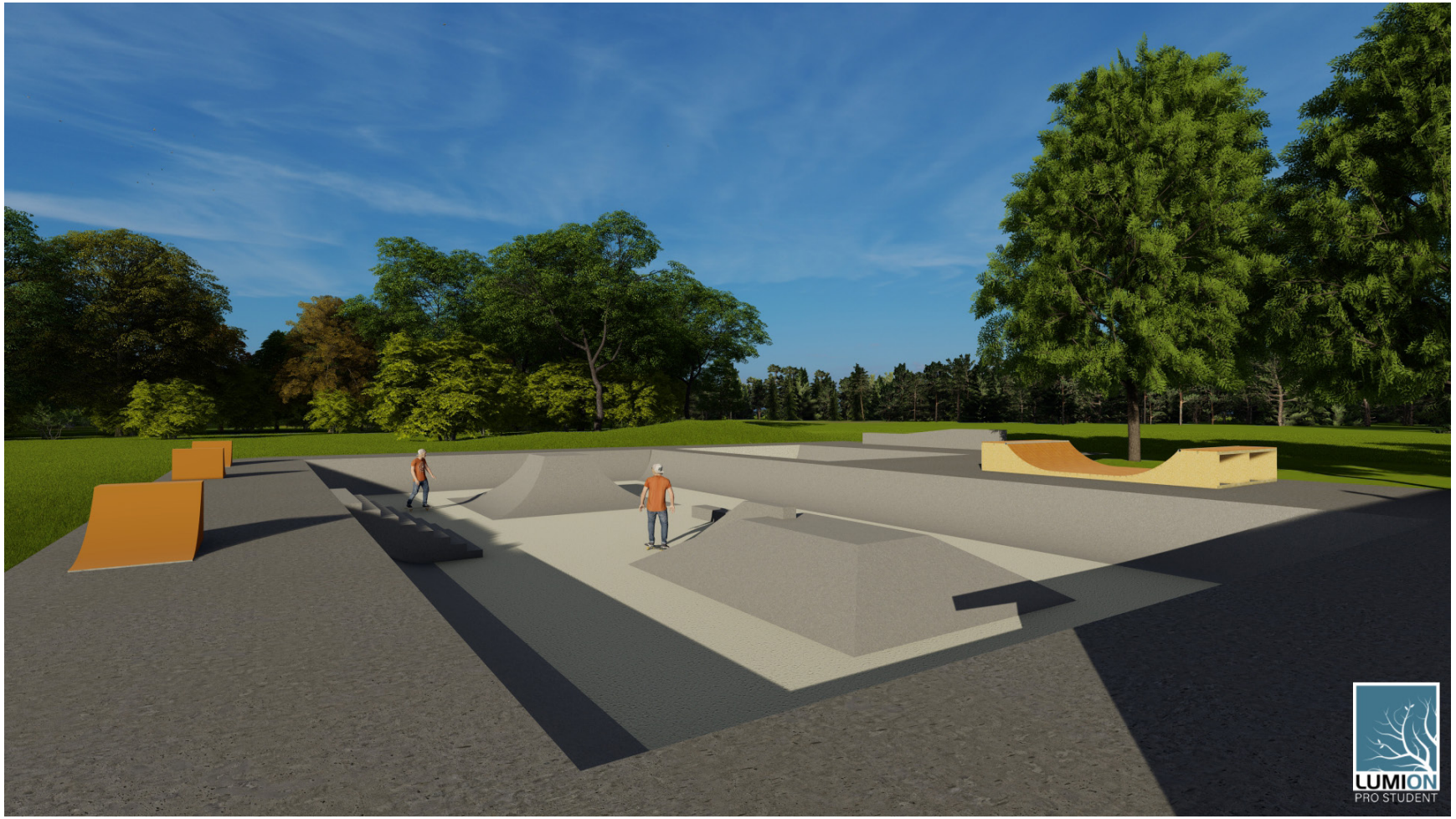

Figure 55: Kimmel Park skate park

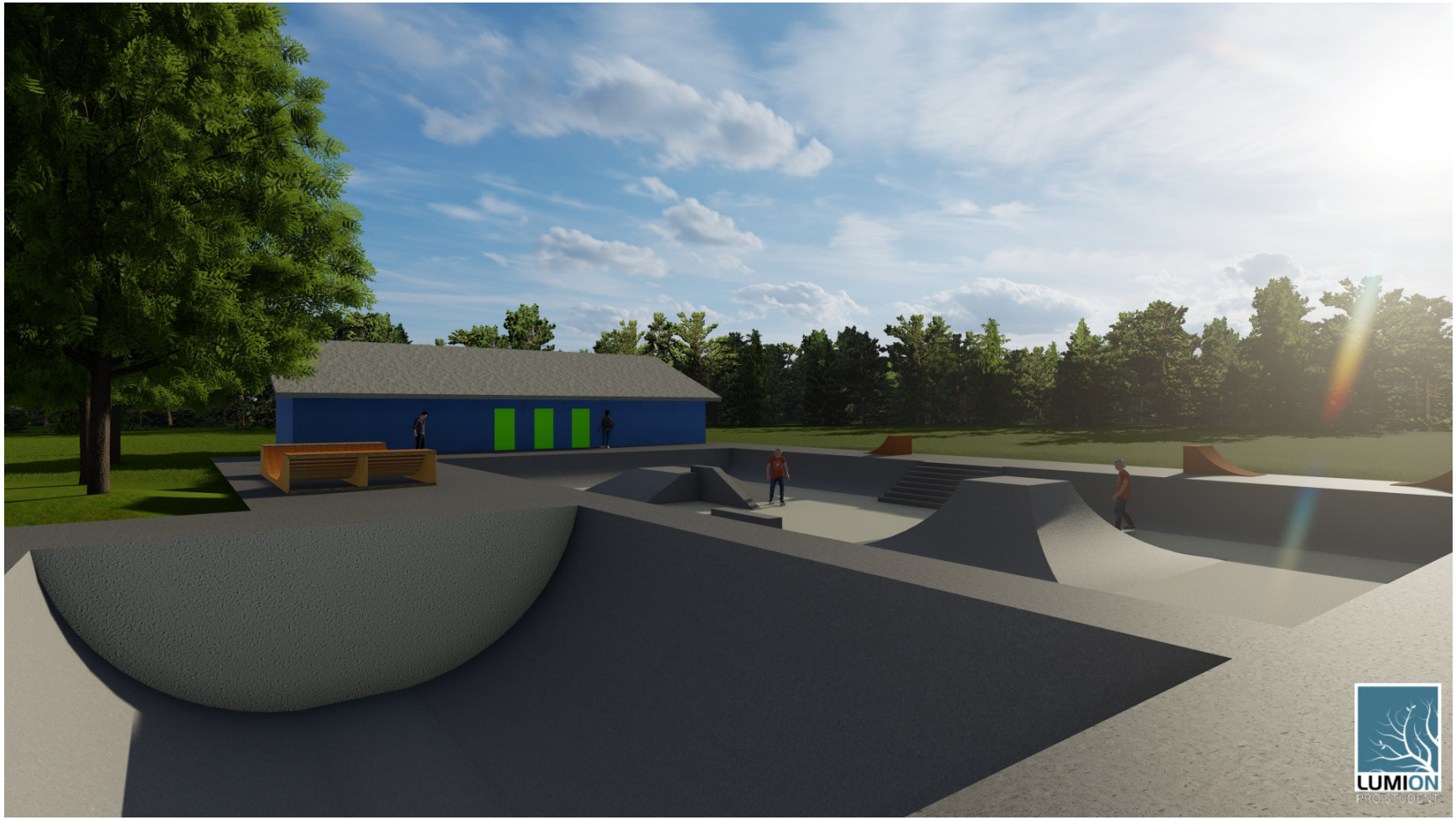

Figure 56: Kimmel Park skate park

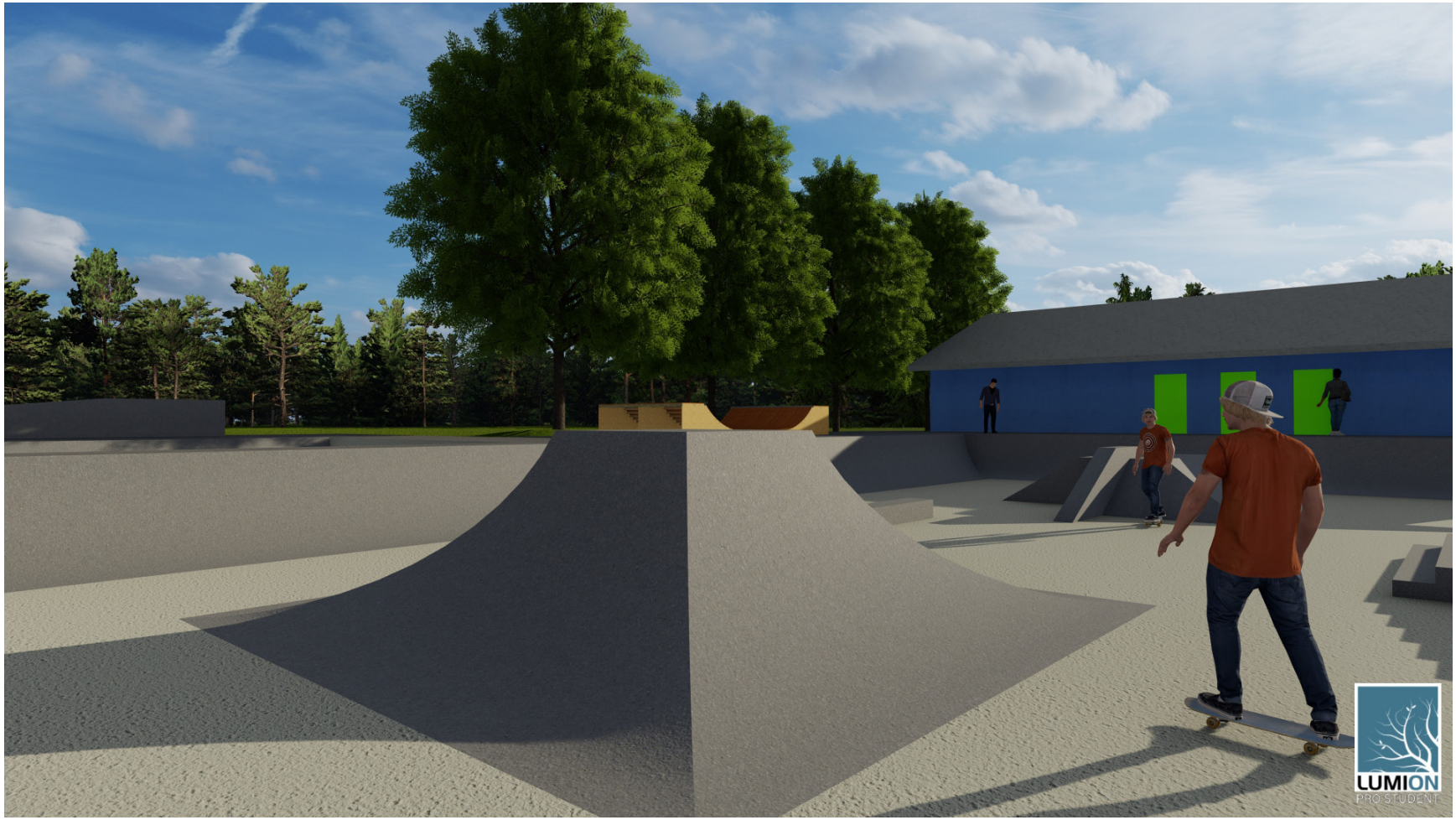

Figure 57: Kimmel Park skate park

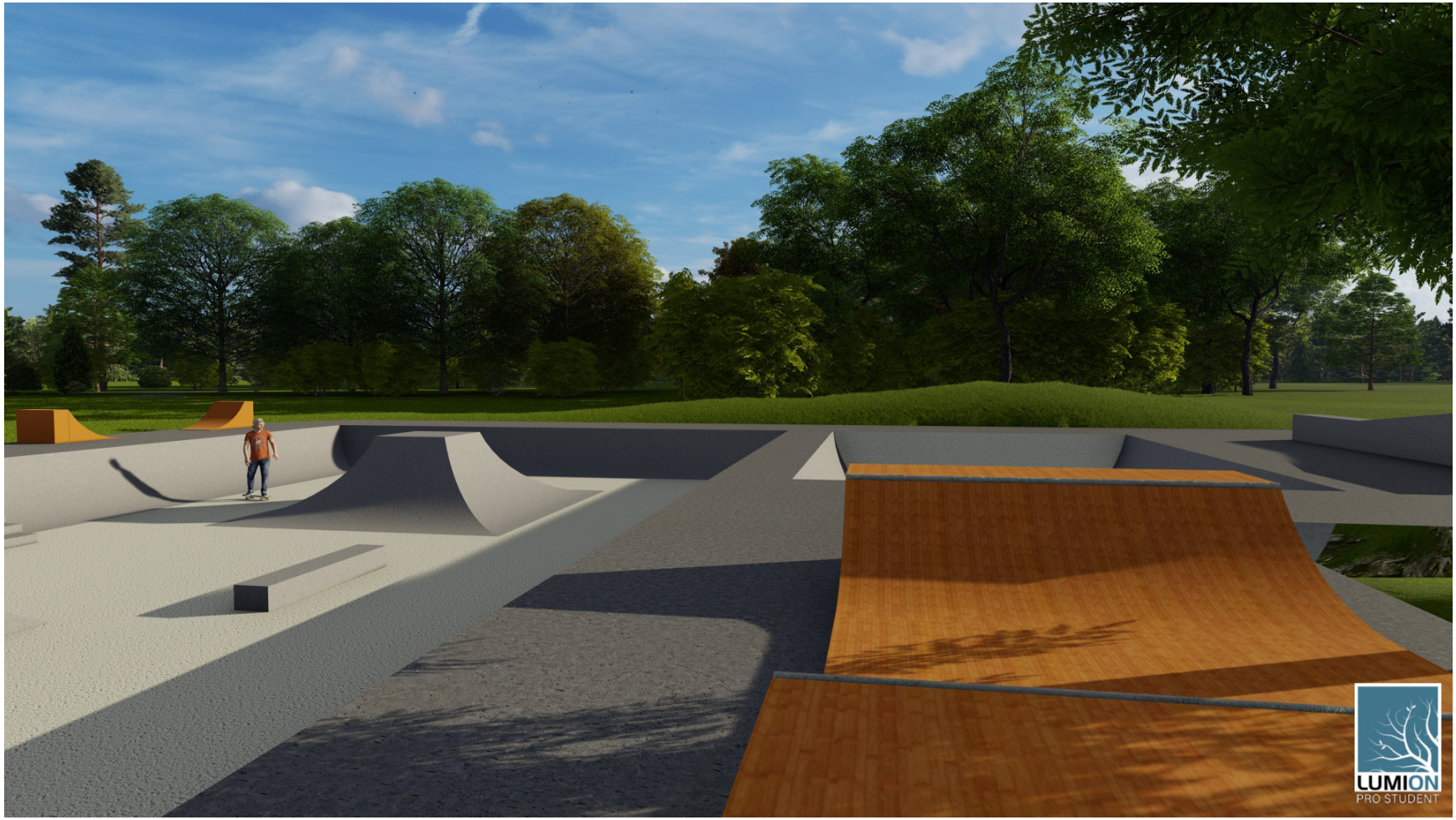

Figure 58: Kimmel Park skate park

Playground Equipment

New playground equipment has been purchased for Kimmel Park. This new equipment needs to find a location as well as a surface to go underneath it. The recommended surface material for the playground is wood mulch or poured-in-place rubber.

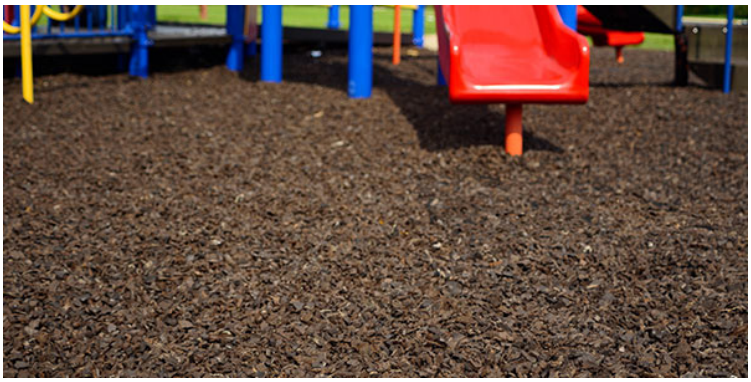

Figure 59: Wood mulch playground surfacing

The playground equipment should be located on the east side of the park, just south of the parking lot, ensuring easy access for children and their parents. There are several options for playground surfacing, including poured-in-place (PIP) rubber and wood mulch. Wood mulch is a cheap and safe option with a low upfront cost of approximately $1,000. However, mulch requires more maintenance and typically requires annual replenishment. PIP rubber has a large upfront cost of around $70,000 but requires far less maintenance, and unique color designs can also be created with this method. PIP surfacing also provides superior fall-zone protection.

The expected impact of this recommendation is primarily safety as this surface material will play a role in cushioning the impact of any children falling from the playground equipment onto the ground. However, as an added benefit, creating a safer environment to recreate in should attract more children and their parents to the park, increasing park use and allowing the youth to have fun at Kimmel Park.

Sports Court

There is a concrete pad near the park shelter in Kimmel Park. It currently serves little purpose and is unprogrammed. It is recommended that it be transformed into a sports court with basketball standards on both ends. To accomplish this, the pad should be enlarged by 13' in both directions. This will bring it closer to regulation size for a high school court. Free-throw, three-point, and foul lines should also be painted to make play easier. Standards should feature chain nets and should be installed using the direct-bury method.

This proposed court will increase attendance and physical activity. Adding more recreational options to parks is always a large benefit. Creating a wide variety of options for people to choose from will help create a healthy and diverse park. Adding the court will give the youth of the community a place to play basketball where they may not have had an opportunity to play anywhere else.

Including and attracting the youth to the park will create a sense of place as these youth will create memories of playing basketball when they were younger and take a sense of pride in the park as they grow older.

Figure 60: Direct-bury goose neck basketball standard

Pedestrian Circulation

Facilitating pedestrian circulation through Kimmel Park is important. Proper circulation helps to organize various park amenities, reduces wear on turf areas, and improves overall park access and entry experience. It also ensures that persons with disabilities have full access to park facilities.

A concrete oval sidewalk connecting primary park features is recommended. The walkway connects the park entrance, parking lot and softball field entrance before running along Antelope Creek to connect the sports court and playground. The expected outcome of implementing this walkway would be to increase accessibility, create boundaries, and tie park accessories together while giving people a track to run, walk, or bike on. This walkway will also increase the safety of pedestrians trying to access the park. Overall this will create an easier, better, and safer experience for all park users.

Vehicular Circulation

It is recommended that the parking lot be paved with asphalt. This will help to control erosion, and will provide a more structured parking experience for park users. It will also maximize the number of cars that can use the lot at any given time. The proposed paved lot includes 26 parking spaces, and features a curb on the west side to divert stormwater runoff and solve the current erosion problems. The curb also discourages most drivers from driving their vehicles into the park itself, thereby reducing unintentional damage. Paving the lot will also make the park more accessible during wet and cold times of the year.

Vegetation

Proper planting design is essential in parks because it can help provide shade and comfort, delineate subspaces within the park, and improve mental health. "Green space most strongly protects against mood disorders, depression, neurotic behavior, and stress-related issues, ...psychological restoration may be the strongest protective mechanism that green space offers" (Rocchio, 2019).

The planting proposal for Kimmel Park features a modified urban forest (including the thoughtful replacement of several existing trees in decline) and new ornamental planting beds. Specific plant species should follow recommendations already made for native and culturally-relevant plants. In addition to native plant species, Kimmel Park should feature ornamental trees to enhance its natural beauty: Ginkgo (*Ginkgo biloba*), Flowering Crabapple (*Malus sp.*), and Pagoda Dogwood (*Cornus alternifolia*). These trees should be used to provide shade and visual interest along the pathways, parking lot, playground, and seating areas. Planting beds along the walkway around the playground, pavilion, and basketball court will enhance the aesthetic structure and beauty of these heavily-used areas.

The anticipated outcome of redoing the planting design is to increase park attendance through aesthetics and cleanliness. A new and fresh-looking design can give people a new mindset about the park, and hopefully entice people to keep the park clean and take a sense of pride in the park. Another benefit of a new planting design it will create spaces for people to recreate, relax, and enjoy nature at their leisure in a beautiful environment while at the same time improve mental health and help reduce depression and vandalism.

Nature Park

The heavily wooded area just to the east of Kimmel Park, currently owned by the school district, should be transformed into a nature park, with areas designated for outdoor classrooms and landscape improvements. Nature parks are great resources for engaging and teaching the surrounding community. City leaders have already expressed the desire to re-purpose this land, and a cultural education center and nature park are a good fit.

Two different outdoor classrooms should be created along similar theme to the one proposed for the high school. Each should be approximately 1,000 square feet, with a 20' x 20' teaching platform surrounded by student seating. Trees left on the site will be used for aesthetics purposes and to allow for proper shading. Pathways will also be incorporated into the park to allow for easy circulation to the outdoor classrooms. Educational signage should be incorporated with raised garden beds, rainwater harvesting, and educational programming focused on riparian ecosystems. In addition to education, community events can be hosted here, including plays, shows, and other performances.

Figure 61: Proposed location of Kimmel Park outdoor classroom

Figure 62: Kimmel Park outdoor classroom

Figure 63: Kimmel Park outdoor classroom

Park Maintenance

With the budgetary and personnel limitations that the city faces, it is difficult to maintain Kimmel Park and other recreational facilities. Maintenance is an essential component of any park and recreation system. Vandalism breeds vandalism so keeping a clean park is crucial to reducing vandalism in the park. Promptly removing graffiti, replacing damaged fixtures, and removing garbage can significantly reduce the incentive to deface the park (What Role Can Maintenance and Operations Play in Creating Safer Parks?).

Maintenance planning will ensure efficiency with a small staff , ensuring the park will look aesthetically pleasing while also reducing vandalism. Daily tasks include policing for litter and vandalism, emptying and changing garbage can liners, and clearing sidewalks (in winter). Weekly activities include mowing, trimming shrubs and trees, and weeding. Monthly activities include fertilizing, dressing the softball field infield and replenishing supplies at the outdoor classrooms. High school and middle school students should be employed to help with park maintenance, either as city employees or as part of community service requirements. This has several benefits as it can keep them busy (while the town can pay for cheaper labor) and give them a sense of pride in what they work on, so they do not vandalize the park.

Not only will maintaining the park create a better environment at Kimmel Park, but it may also lead to community members wanting to clean up and mow other vacant properties. In Detroit, Michigan there is an organization called the Mower Gang. They are a group of volunteers that get together and mow abandoned properties all over Detroit. People bring whatever equipment they have, mow properties, and enjoy each other's company (MowerGang.com, 2021). This is a great community-building opportunity that could be implemented in Mission.

RECOMMENDATION 21: CREATE A NEW CITY PARK IN NORTH MISSION

Mission's Kimmel Park is a great destination for various community events, especially baseball and softball games. The park is located on the south side of Highway 18, opposite where most residents live. To provide more opportunities in under-served neighborhoods for recreation and gathering, it is proposed that a large, multi-use park be developed on the north side of Mission, at the northwest corner of Rosebud and Taft Streets. This is a large, underutilized area near public housing and the Boys and Girls Club of Rosebud.

This park would provide the community with a place for educational, physical activity, or sociability activities which will improve mental and social health within the community. "Access to nature in the form of parks and landscaped green spaces along plazas and sidewalks reduces stress and depression, promotes positive emotions, helps recover from mental fatigue, and facilitates cognitive functioning" (Theeuwes and Wen 2021). Within this park, unique features such as splash parks, outdoor classrooms, multi-use courts, sports fields, and educational gardens should be included.

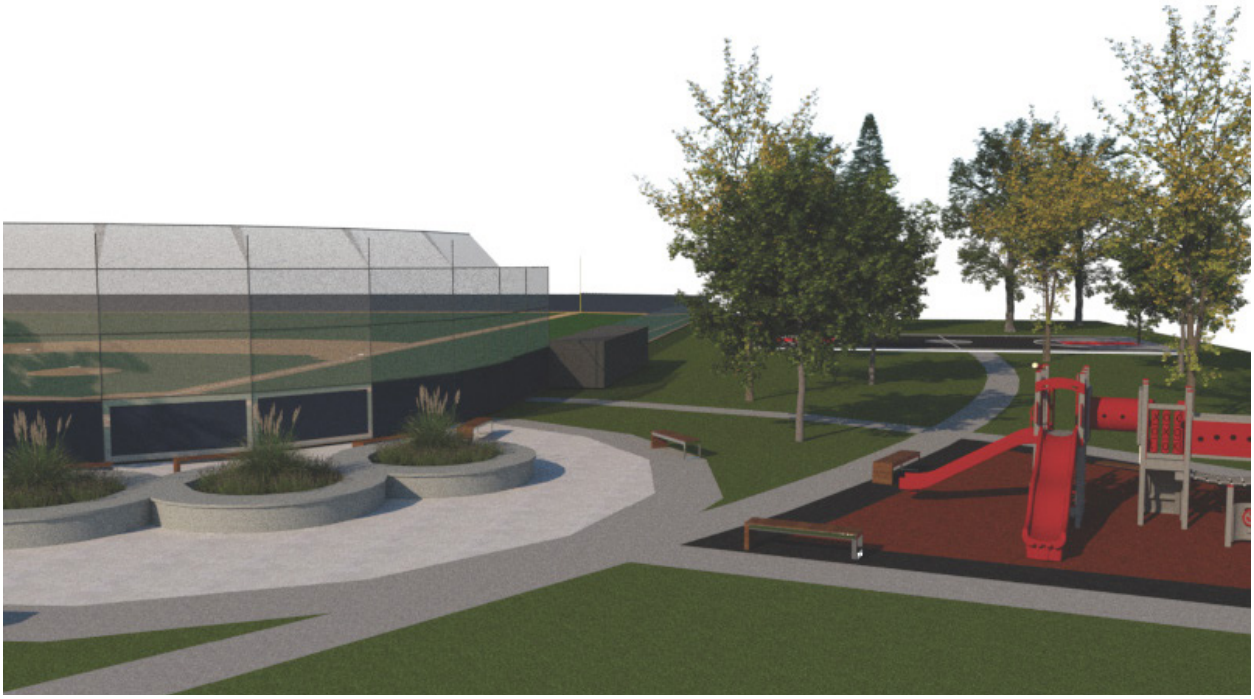

Figure 64: View into the proposed city park

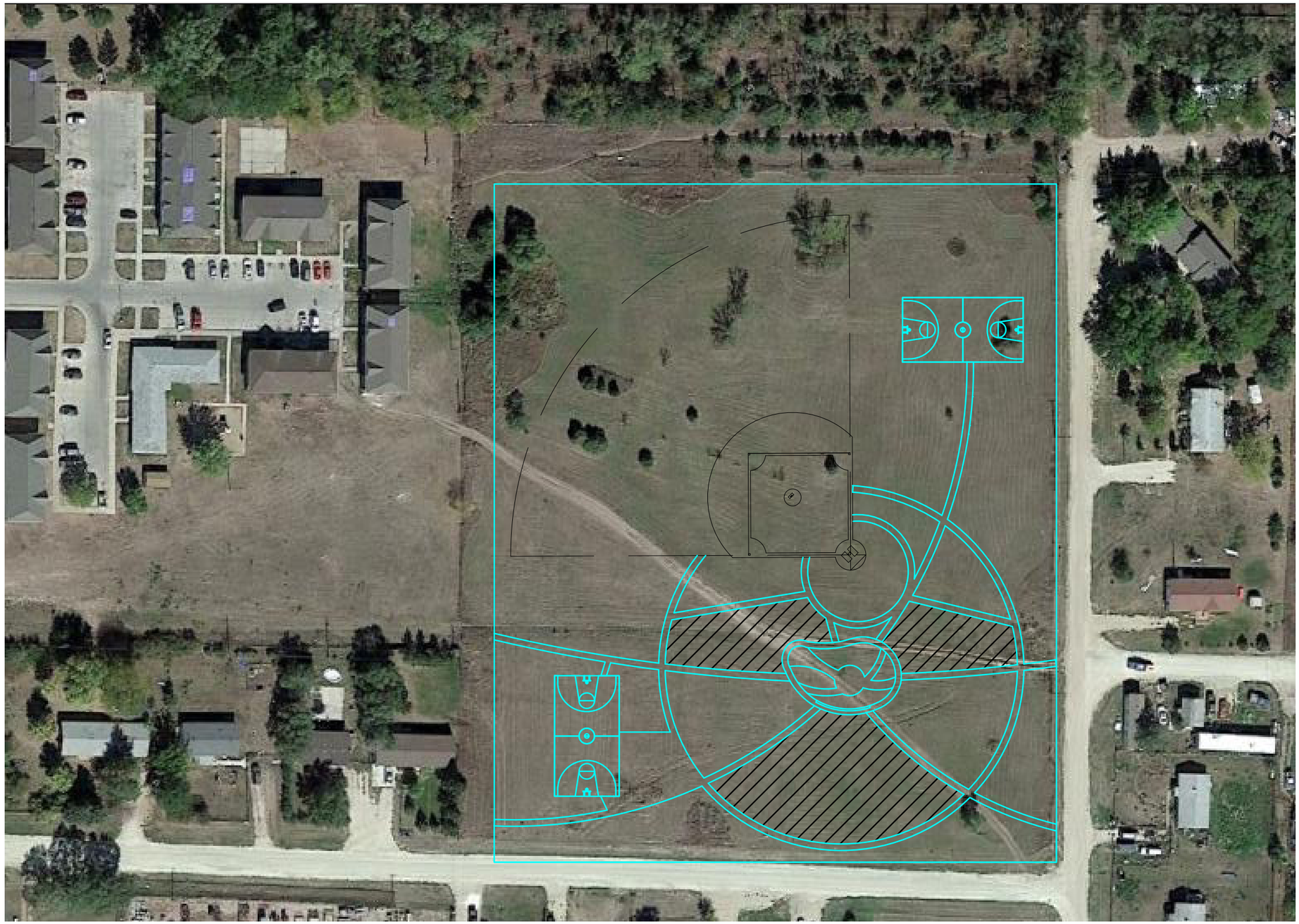

Figure 65: Location of proposed city plaza

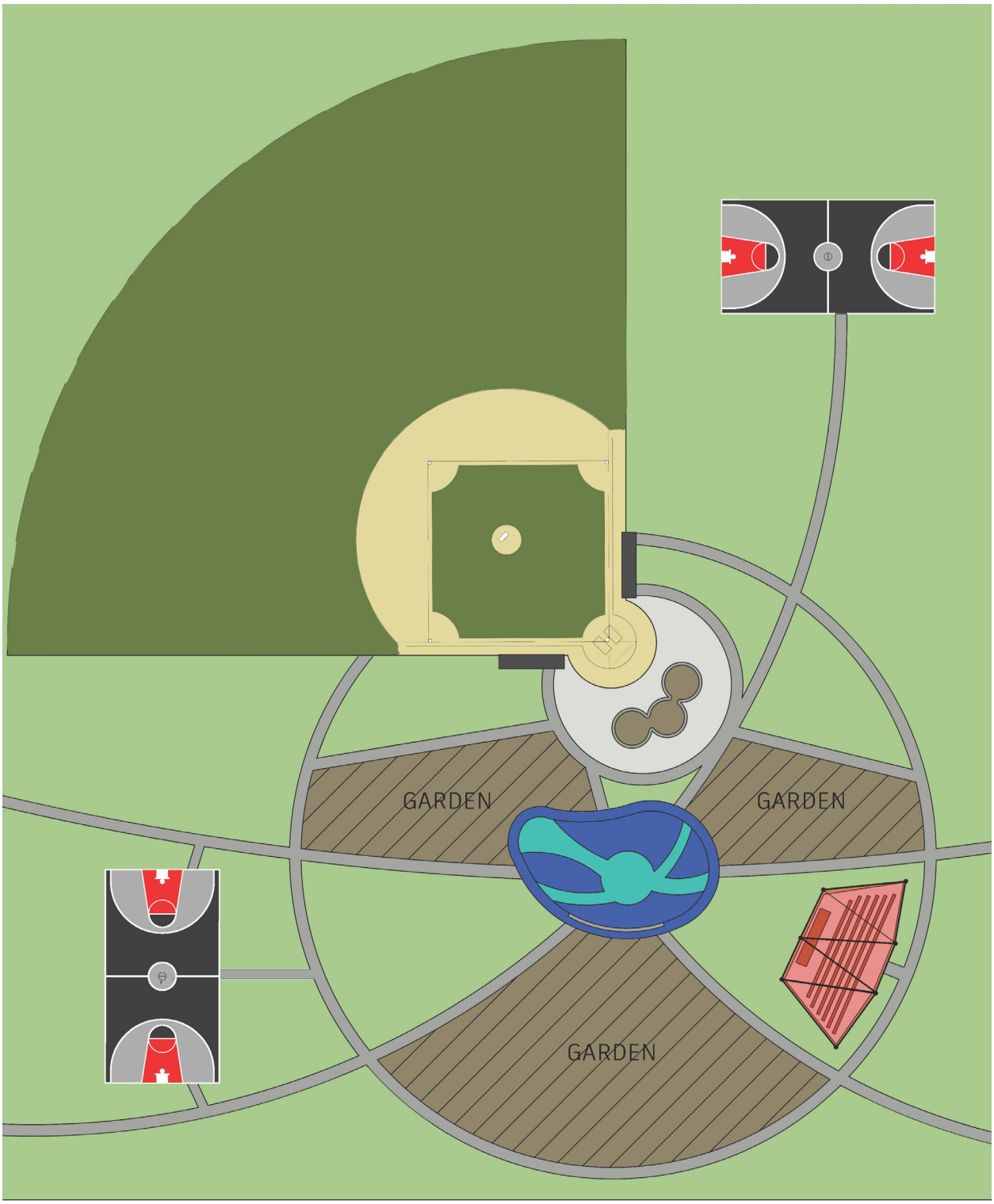

Figure 66: Proposed city park conceptual plan

The splash pad is designed for all users to enjoy and provides seating located around its perimeter. One long-term benefit of a splash pad is "the revenue that residents and non-residents bring into the community along with the added appeal of living in that area. Attracting people means attracting revenue sources and patronage to the community. Water play may be one of the only public areas that cater to all ages and abilities. Overall, splash pads can benefit a community both socially and economically" (Madson 2021).

Figure 67: Splash pad at the proposed city park

The outdoor classroom will provide enhanced learning opportunities for participants at The Boys and Girls Club located south of the site. A complementary classroom is proposed for the high school (see Recommendation 17). A variety of educational resources would be available, including nature and ecology, hands-on experimentation, and cultural education.

Figure 68: Outdoor classroom at the proposed city park

Outdoor classrooms provide various benefits. "When the students receive outdoor biology lessons, they [are] significantly more engaged in their next instructional period on all measures than if they receive biology lessons indoors. This [holds] true for different teachers, different times of day, and different times of year…Why would being in nature benefit kids at all? ...It reduces stress, restores depleted attention, and improved immune function" (Suttie 2018).

Tied in with the outdoor classroom are two community gardens and a pocket prairie. The pocket prairie will provide an abundance of color, texture, and fragrance, encouraging beneficial pollinators and a variety of bird species. The goal is to include native indigenous plantings, adding to a sense of connection between plants and culture. The culturally-focused planting palette incorporates blues, whites, yellows, blacks, and reds, featuring prairie wildflowers like Prairie Flax (*Linum lewisii*), Yarrow (*Achillea millefolium*), Virginia Stickseed (*Hackelia virginiana*), Bee Balm (*Monarda didyma*), Plains Coreopsis (*Coreopsis tinctoria*), and Swamp Milkweed (*Asclepias incarnata*) to create a vibrant and pleasing community amenity.

The community gardens should be designed as individual garden plots that the City can lease to community members for the full growing season. Lessees can use the garden plots to plant annual vegetables, flowers, and other produce to help solve food insecurities and provide beauty and joy. "Community gardens help improve air and soil quality, increase biodiversity of plants and animals, increase physical activity through maintenance activities, improve dietary habits through education, improve mental health and promote relaxation, and allow for the creation of social ties and build a greater feeling of community. These connections help reduce crime, empower residents and allow residents to feel safe in their neighborhoods" (DeMuro, 2013).

Plays, festivals, and community sporting events should also be implemented at this park. The park includes enough seating to accommodate 250 people, and a large staging area for various community productions. Wacipis and other cultural events can be held in partnership with Sinte Gleska University and the tribal council. The site will further accommodate another city baseball/softball field and two multi-use hard-surface courts. Multi-use courts can be used for basketball, tennis, pickle-ball, and more. By providing a space for the community to practice and increase their skills in their desired sport, the number of students getting accepted to play on high school teams may increase.

Funding for this park can partially be found through the National Recreation and Park Association, and should be augmented by local sponsorships and the tribal council. One approach to maintenance includes hiring homeless community members. These individuals can work with City staff to clean and maintain this and other parks in Mission in return for room, board and/or wages.

RECOMMENDATION 22: CREATE AN OUTDOOR CLASSROOM AT THE HIGH SCHOOL

Currently, Mission does not have any outdoor classroom programs, or spaces, where students are able to look into the native plants that surround them. It is recommended that an outdoor classroom be built at the high school to better facilitate this type of learning. During the initial meetings for this project, community members highlighted the importance that Mission's young people grow up knowing native plants and their cultural importance. With an outdoor classroom program, students will have a place to plant, care for, and learn about their natural resource heritage.

The outdoor classroom should be located in the courtyard area of the high school. The location is important. It should be close to the school to facilitate easy movement between indoor and outdoor instructional rooms throughout the school day. It should also be easy to see from the school for security. The high school outdoor classroom should be implemented in stages or phases in order of priority:

Phase 1: Raised planting beds will provide a location for students to learn planting techniques, plant maintenance and harvesting practices, and native plant identification and cultural uses. Building raised planter beds will help students of all abilities and ages to enjoy these activities. Construction should be implemented with durability and replacement costs in mind. Recycled pallets are a potential source of inexpensive materials. Alternately, recycled lumber or other materials salvaged from unused buildings could be used. Students should be involved in designing and building these beds, potentially through participation in high school shop classes. Cost: $100 to $500.

Phase 2: Vertical writing surfaces and an overhead shelter are an important next step. White boards or chalk boards are recommended for this phase, both for durability and for ease of construction (there are paint-on options for both types of writing surface). It is important that the outdoor classroom be useful and appealing to teachers. Writing surfaces should be placed under an overhead shelter, so that students and teachers have relief from the sun while a instruction is happening. Cost: $1,000 to $3,500.

Phase 3. Seating is the next important detail of constructing an outdoor classroom. Included in the proposal is seating that is light, sturdy, movable, and easy to store. An easy option would be five-gallon buckets or small plastic stools. Another option is tree stumps or wood rounds. The raised planter beds will also provide some fixed seating, but movable options are also desirable. Cost: $125 to $400.

Phase 4. A storage container for gardening and instructional supplies near the white board will facilitate efficiency and security. It should be large enough to contain hand tools like trowels and

watering cans, with shelves or cubbies for student notebooks and writing implements and teacher resources like chalk or markers. The container should be lockable for security, and weather-proof. Cost: $150 to $1,000.

Phase 5. Additional educational programming will help students learn about natural processes, the water cycle, biodiversity, and the physical sciences. These resources include a rain barrel and piping, bird houses, a weather station, a solar-powered pump, or horticultural therapy programs. Cost: $100 to $3,000.

The outdoor classroom should be installed by students, faculty and staff, in partnership with other community members. Fundraisers and other forms of community support will be necessary to make this facility a reality. Through introducing an outdoor classroom to the high school, the goal of youth having a greater awareness and appreciation for their own cultural heritage will be realized.

RECOMMENDATION 23: REHABILITATE THE MIDDLE SCHOOL TRACK FACILITY

Track and field events (running, jumping, and throwing) can be integral parts of Native culture and lifestyles. "Natives have always enjoyed games and sports, playing for cultural and spiritual reasons...Running has always been an athletic endeavor that Native Americans, north and south, excelled at. There is a spiritual element to running...that person runs for his family, clan, and tribe" (Jacobs, 2016).

The track and field facility at Todd County Middle School is damaged from periodic flooding and disuse. Middle schoolers and other athletes cannot use this facility due to its poor condition. In resurfacing the track and implementing culturally-relevant events and education, this facility can have a new life at the heart of Mission culture. If opened to the public for use, it can also contribute to improved public health and sociability.

To resurface the track with polyurethane would require approximately 8 weeks at a cost of $60,000 (Competition Athletic Surfaces, 2021). This process would grant the track an additional 15 to 20 years of life, depending on maintenance practices. If complete reconstruction were necessary, a total cost of $150,000 is anticipated. This investment will bring new life and opportunities to Mission's most vulnerable population: young teenagers.

RECOMMENDATION 24: IMPLEMENT DISC GOLF AND POCKET PRAIRIES ALONG THE ANTELOPE CREEK TRAIL

This three-mile trail will provide a needed connection between the two communities, away from the highways and fast-moving traffic. To add interest and fun, a disc golf course should be incorporated. Disc golf is a low-cost option that is easy and flexible to install. A tee box with a route map and a disc basket are needed for each hole. Tee boxes can be a 3' x 3' concrete pad, or more simply a marker with the hole number on one side and the route diagram on the other. Each complete hole costs between $350 and $500. Holes can be added as funds are made available, and alignments can be adjusted periodically as warranted or desired.

Pocket prairies should be designed and planted at various locations along the Antelope Creek Trail. These prairies complement the disc golf course already proposed, and enhance the educational and recreational opportunities along this three-mile route.

"Pocket prairies are intended to be a mix of indigenous grasses and wildflowers. Many different flowering species will lend shape, color, and texture to a landscape and attract many different pollinating species. Pocket prairies reduce compaction and erosion as well as help with infiltration by filtering out pollutants carried by runoff." (Knutson, 2017)

Pocket prairies add beauty and environmental benefits to the built environment. Plant selection is vital from both an ecological and a cultural standpoint. Adopting the color theme of blue, white, yellow, and red, possible plants include Prairie Flax (*Linum lewisii*), Cornflower (*Echinacea sp.*), Yarrow (*Achillea millefolium*), Prairie Sage (*Artemisia ludoviciana*), Plains Coreopsis (*Coreopsis tinctoria*), Prairie Parsley (*Polytaenia nuttallii*), Swamp Milkweed (*Asclepias incarnata*), and Prairie Smoke (*Geum triflorum*), among others. Scattered trees should also be planted along the trail as a way to add privacy and shade. This process will create pockets of shade along the path, opening and closing views to the prairies, the creek, and the surrounding landscape.

The Antelope Creek Trail and associated pocket prairies and disc golf course should be implemented using a phased approach. Qualified professionals should be consulted to develop the final trail alignment and construction plans and cost estimate. This is an important project that will require significant investment and buy-in from all community members, including land owners and government officials.

With this added trail system, people will be able to safely travel between Mission and Antelope. It will provide improved access to fishing and other recreational activities, enhance local ecology, and provide opportunities for informal and formal educational events focused on culture and nature.

Figure 69: Proposed alignment for the Antelope Creek trail

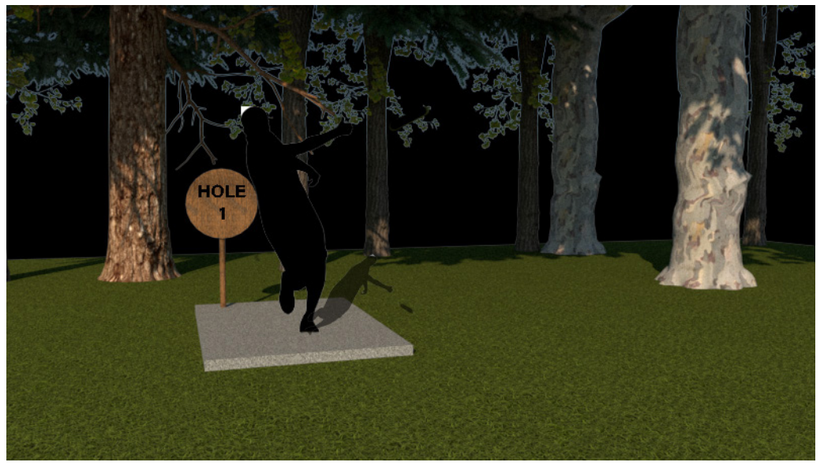

Figure 70: Disc golf tee box

Figure 71: Disc golf basket

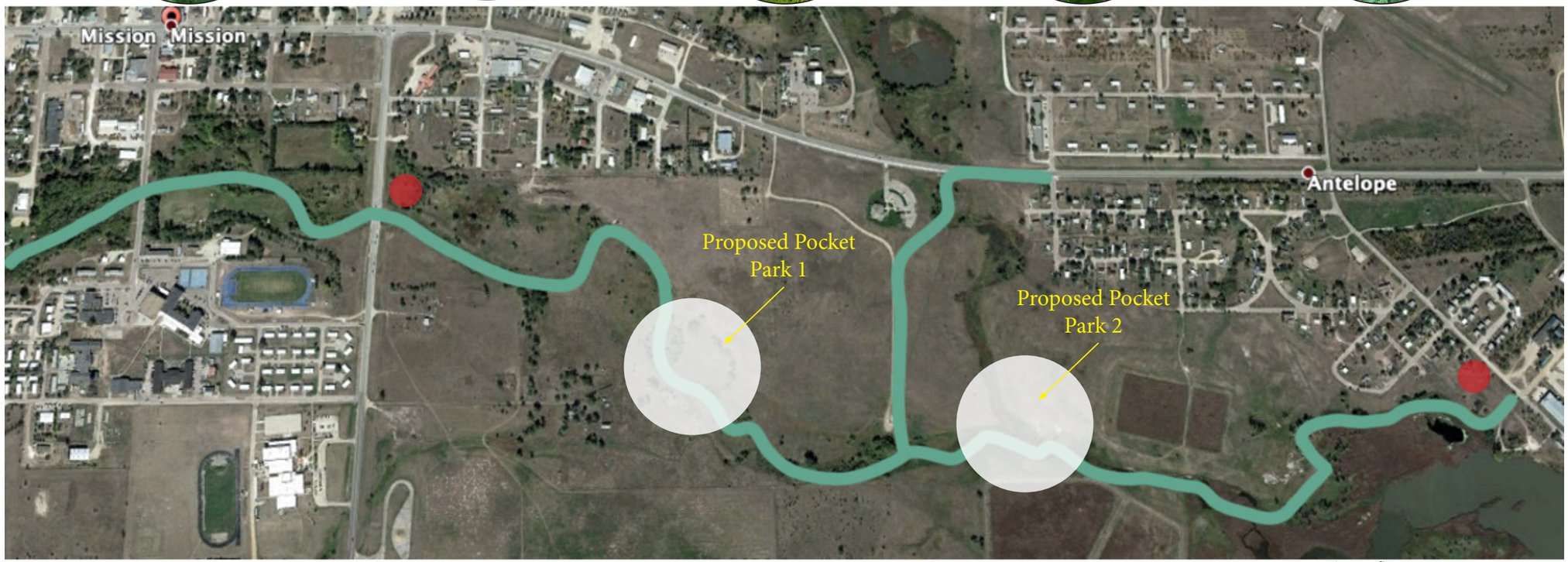

Figure 72: Proposed pocket prairie parks along the Antelope Creek trail

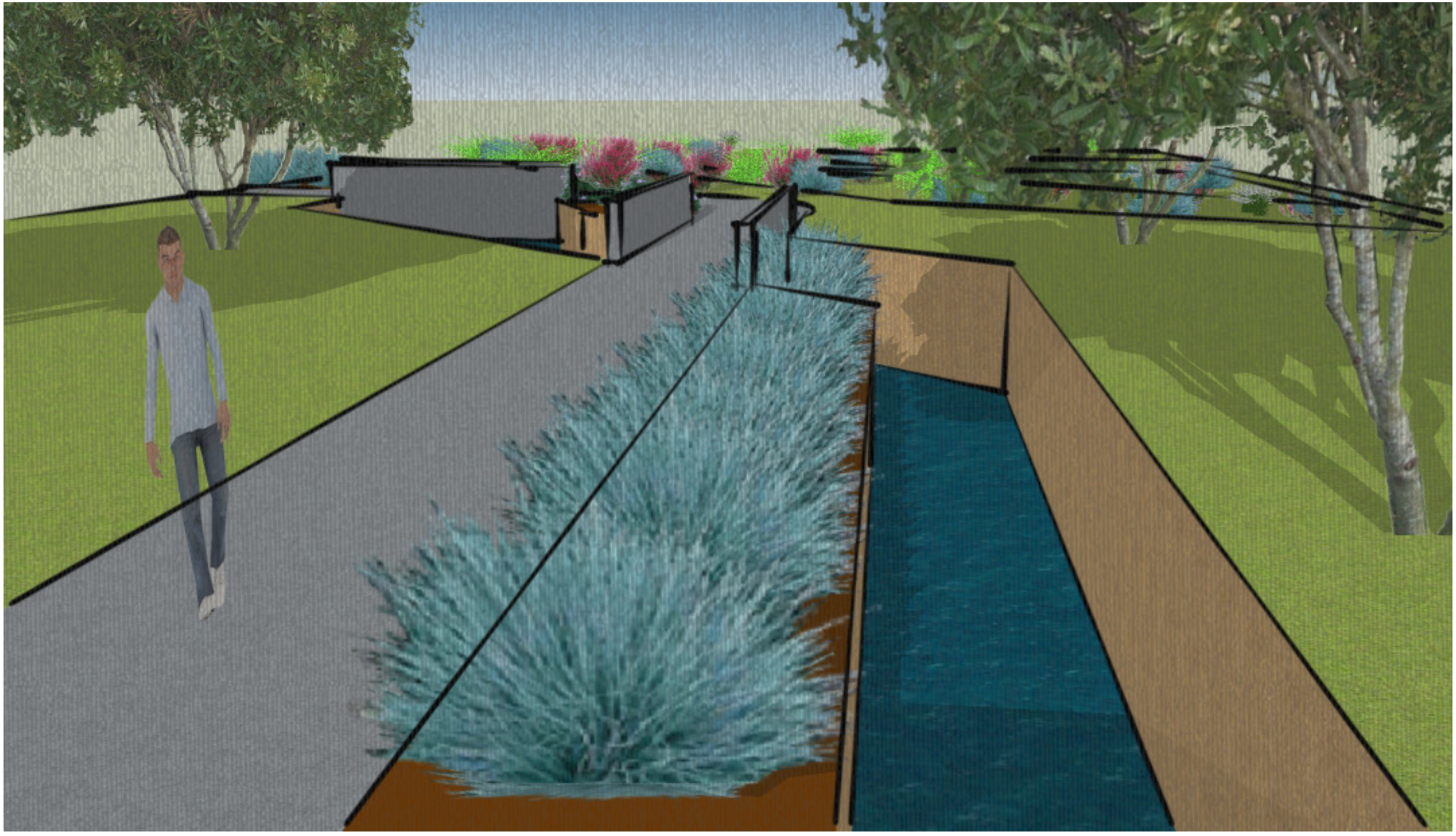

Figure 73: Pocket prairie and pathway

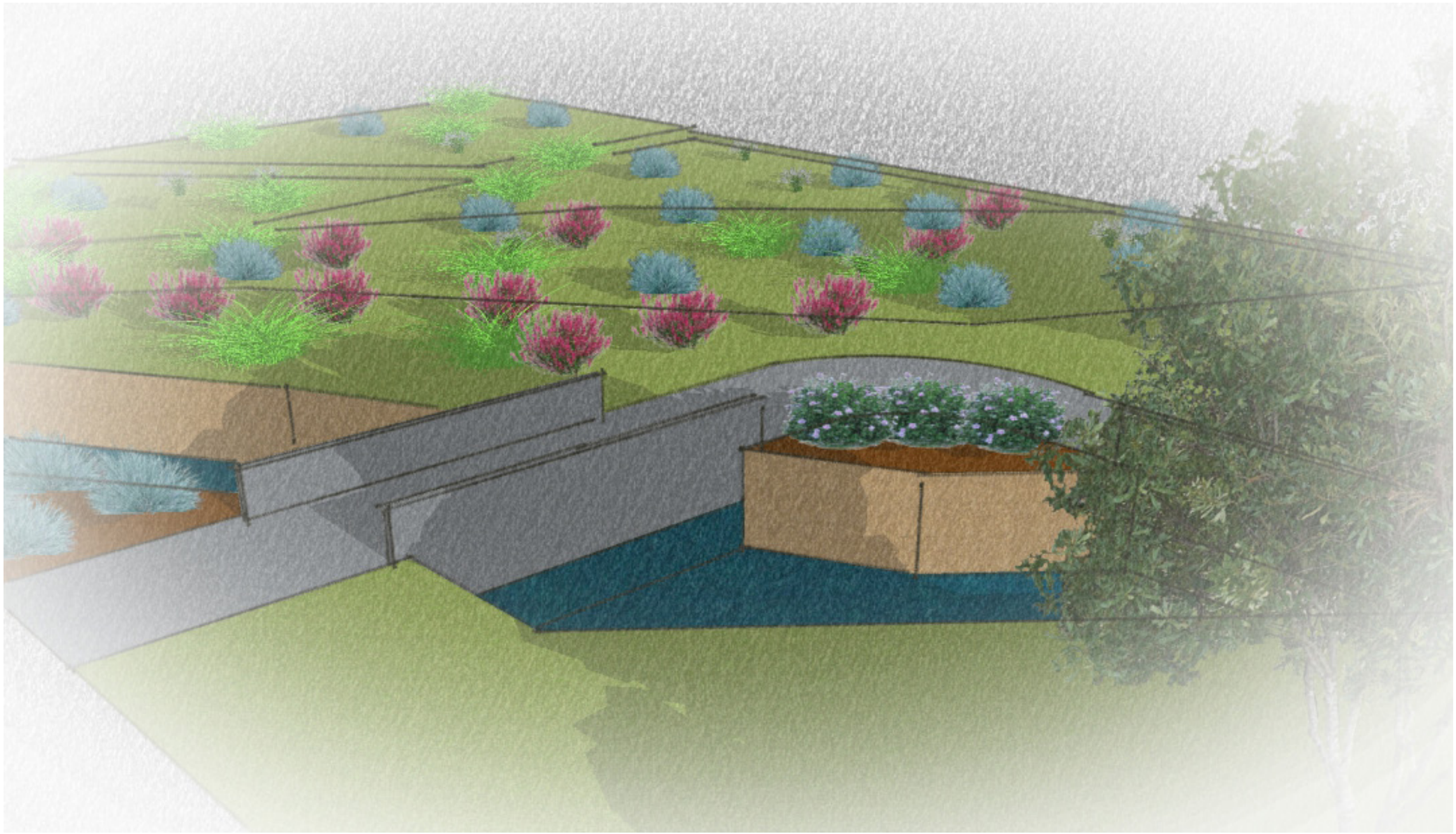

Figure 74: Pocket prairie along the creek

RECOMMENDATION 25: CREATE A COMMUNITY THERAPY GARDEN

Horticultural therapy programs provide a sense of health and wellness in a community. Gardens featuring this type of programming are common among a variety of populations, but most particularly the elderly. It is recommended that a therapy garden be developed on the southeast corner of Adams Street and Highway 18, adjacent to the assisted living center. Residents at the assisted living center will be the primary audience for this garden, but programming should extend into the community to link youth with their elders.

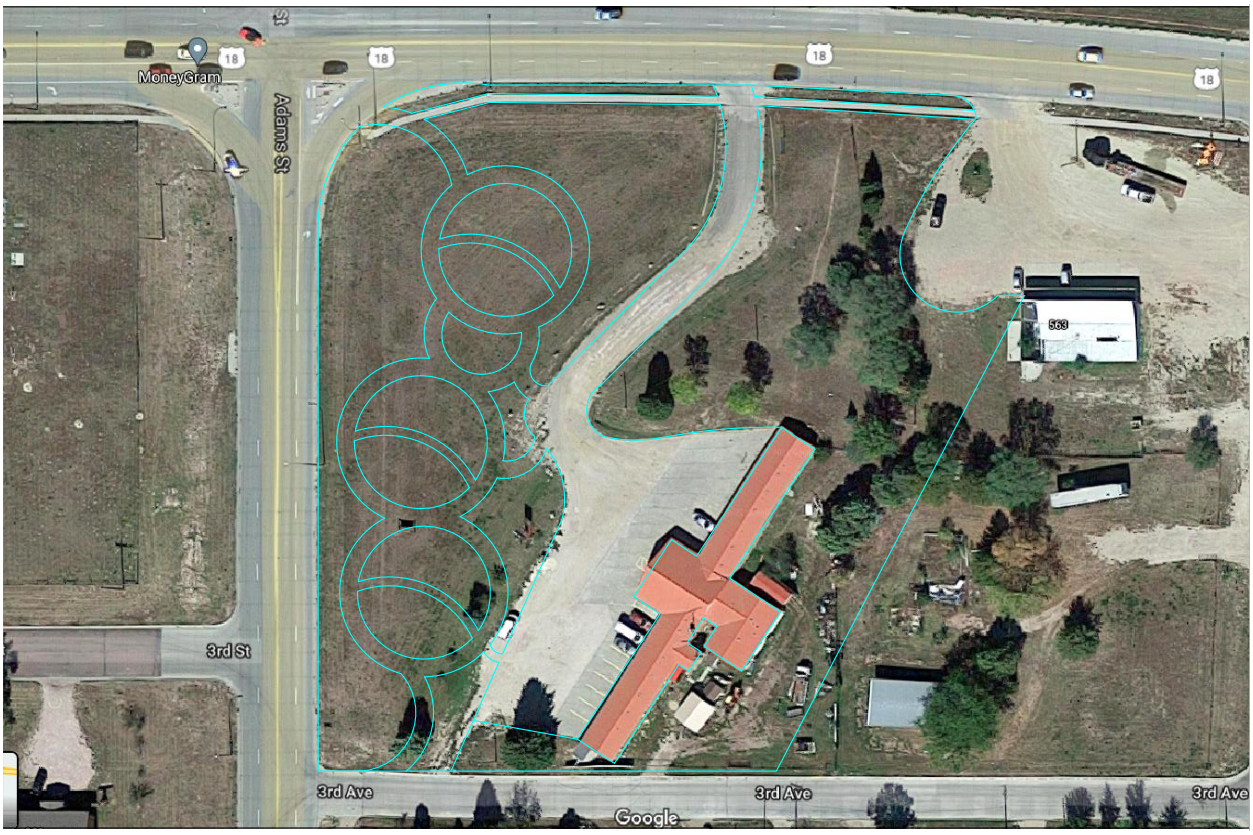

Figure 75: Site of proposed therapy garden

The therapy garden features interlocking looped pathways. These provide easy circulation throughout the garden with broad curved paths, and eliminates the necessity of retracing one's steps. Primary entrance and exit locations are located on the northwest and southwest sides of the property, along with a central connection point to the

Figure 76: Fall-resilient rubber pathway

parking lot. The pathways should be constructed of fall-resilient surfacing. These pathways "are made from recycled rubber and have flexibility and 'give' to them, making them more safe and comfortable for walking on than concrete and asphalt" while also having a "high coefficient of friction, making them non-slip. They also provide rapid drainage which makes them dry quickly" (Rubberway). A variety of colors can be selected based on community needs. Warmer colors reduce glare from the sun and absorb less heat, making them cooler than typical concrete or paver sidewalks.

Figure 77: Therapy garden in United Kingdom

Canopy trees provide pockets of shade along the path, and benches are positioned to take advantage of views, shade and other amenities. Seating should be no shorter than 24 inches, and the bench surface should be tilted forward 5 degrees to assist in standing and sitting. Plants that stimulate the senses are included, helping garden users to feel textures, smell fragrances, hear the leaves rustling in the breeze, and to see the vibrant colors of the various garden beds. Landscape berms should be constructed around the perimeter of the site and planted with trees to provide a break between the busy road and the garden. Recycled or re-purposed materials can also be used in the garden. Benches can be made from salvaged lumber, and crushed concrete can be used as mulch in at-grade planting beds.

Figure 78: Therapy garden in Pittsburgh, PA

Therapeutic gardens provide a sense of health and support to a community. Elders that participate in horticultural therapy programs experience less pain and stress and a greater a sense of freedom and independence. Therapeutic gardens are "safe havens" that "aim to facilitate interaction between the residents and the healing elements of nature," (Better Homes & Gardens, 2019). They encourage sociability between different generations in a community, facilitating intergenerational learning and respect.

Figure 79: Mission therapy garden perspective

Plant List for Sensory Garden Beds

Plant	Sensory Description / Benefits
Bleeding Heart *Lamprocapnos sp.*	Known for its striking form and color, the flowers look like downward-facing hearts that grow on gently arching horizontal stems. These red flowers will provide a great visual for the therapeutic garden.
Cockscomb *Celosia cristata*	Known for its exotic beauty, Cockscomb produces feather-like, showy flower spikes. These flowers attract many pollinators.
Sunflower *Helianthus sp.*	Known for its bright, large yellow flowers, Sunflowers give that sense of dominance with great height variation. The flowers also attract bees, butterflies, and birds.
Anise Hyssop *Agastache foeniculum*	Known for its smell, they give off a black-licorice-like scent when the leaves are rubbed between the fingers. The bluish-purple flowers are very attractive to bees, butterflies, and hummingbirds. The young leaves and shoots can be used as a flavoring for teas as well.
Catmint *Nepeta racemosa*	Also known for its smell, Catmint give off a minty fragrance when leaves are rubbed between fingers.
Daffodil *Narcissus pseudonarcissus*	Daffodil flowers are very fragrant, and they are great with sight given their bright yellow or white color.
Lily of the Valley *Convallaria majalis*	A great groundcover, Lilly of the Valley has showy white scented flowers that give off a sweet aroma.
Balloon Flower *Platycodon grandiflorus*	Appealing to the sense of hearing, the inflated buds from the Balloon Flower makes a popping sound when squeezed. They also produce purple, showy flowers.
False Indigo *Baptisia australis*	Appealing to the sense of hearing too, the produced brown seed pods create a rattling sound when shook. False Indigo is also highly drought tolerant one established.
Lamb's Ear *Stachys byzantina*	Appealing to touch, Lamb's Ear has a fuzzy, furry foliage and stems. They also give off a settle, yet striking, white color from the fuzzy texture that helps identify the plant.

Trees should include Northern Red Oak (*Quercus rubra*), American Elm (*Ulmus americana*), River Birch (*Betula nigra*), Paper Birch (*Betula papyrifera*), Quaking Aspen (*Populus tremuloides*), Black Hills Spruce (*Picea glauca*), and Eastern Red Cedar (*Juniperus virginiana*). These trees species should also be incorporated in other parks and facilities highlighted in this document.

"Plants are the foundational raw materials for life on earth. As the plants and humans developed and grew together, a cultural relationship between plants and humans began to evolve. Because of the complete dependence on the plants, herbs, and flowers around them, humans have innate love for nature" (Jain, 2013).

Policies

RECOMMENDATION 26: INTEGRATE LAW ENFORCEMENT AND NEIGHBORHOOD WATCH PROGRAMS

Police jurisdiction in Mission is currently a complex relationship between separate law enforcement agencies, including tribal authorities, city police, county sheriffs and state highway patrol officers. A specific policy that gives full coverage of the city as separate jurisdictions needs to be implemented. This policy should include overlapping boundaries between different police units to provide comprehensive law enforcement coverage. Alongside police jurisdiction, a neighborhood watch program should be developed among community members.

Figure 80: Rosebud Sioux Tribe highway patrol vehicle

Figure 81: South Dakota state trooper

A study by the US Department of Justice shows a 16 percent decrease in crime when areas include a watch program (Wihbey, 2020). A neighborhood watch can include a few community members that cover a single neighborhood or a large group that covers the city. One of the most important aspects of a neighborhood watch includes communication among citizens. Increased communication deters crime. Neighborhood watch programs should be specifically incorporated to report suspicious activities in under-policed areas.

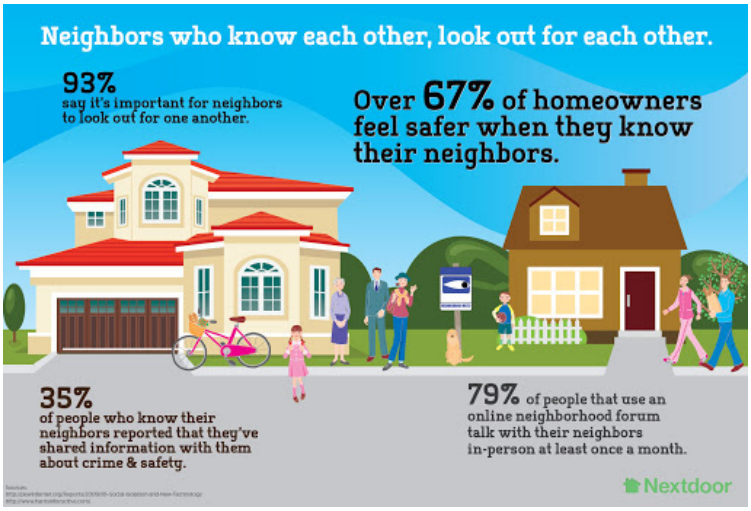

Figure 82: Benefits of a neighborhood watch program

Policing is extremely important when it comes to the safety of citizens, but the police themselves are not always required to improve safety. Police units should gain an extensive appreciation and understanding of the community and people within their jurisdiction, but neighborhood watch programs should be incorporated to take charge in under-policed areas. An understanding of police jurisdiction will prove to be easier on the law enforcement units and neighborhood watch programs will build connections and trust between community members. If both of these are put into place, crime will decrease in Mission.

RECOMMENDATION 27: IMPLEMENT ANNUAL CITY CLEANUP PROGRAM

Clean cities, in comparison to "littered" cities, provide health benefits and more community connection (SERVPRO, 2016). A program that engages all community members should be developed to begin cleaning the city.

Figure 83: Community involvement in city cleanup

A program related to cleaning the city and parks should be implemented in small-scale stages for Mission. The first location in which it should be initiated is Kimmel Park because it will engage the community in the larger picture. Alongside cleaning litter, maintenance on overgrown plants should be included in improving visual aesthetics. Next, the program should include cleaning some of the primary pedestrian traffic locations.

Following a community cleaning program should be a specific policy about litter and trash. This policy should include incentives for community members to benefit from recycling more. It should also be strict enough to deter littering to any extent. Keep America Beautiful is an organization that focuses on taking action to improve and beautify the environment (Keep America Beautiful, 2020). It is also a non-profit organization that has shown how much cleaning and recycling can improve a city.

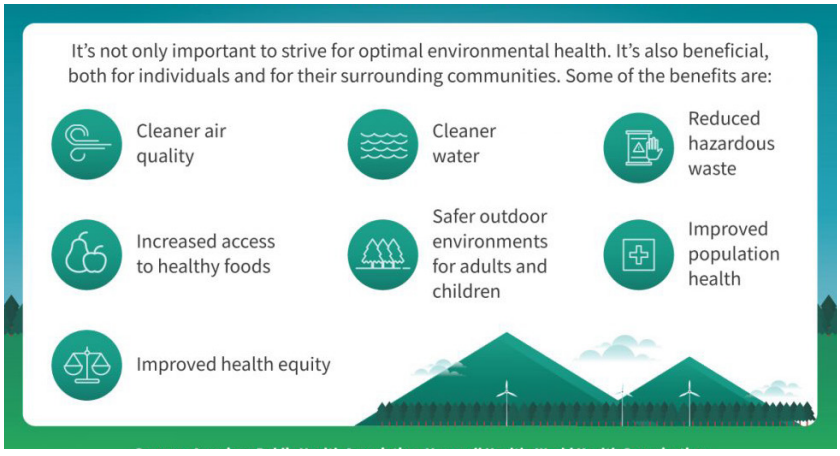

Figure 84: Benefits of a community cleanup program

RECOMMENDATION 28: ADOPT NUISANCE ANIMAL POLICY

A wild dog problem is currently causing harm to the city of Mission, especially for pedestrians. This problem has recently resulted in the death of two community members: a woman and a child. Feral dogs should be removed to increase the safety of pedestrians and the community.

Figure 85: Feral animals are a threat to safety

A policy regarding wild dogs should be adopted for the safety of pedestrians in Mission. One policy should be the adoption of the same or similar South Dakota laws in which threatening and aggressive dogs would be removed (South Dakota, 2021). An additional policy includes green infrastructure that reduces the capability of aggressive dogs to see and hear pedestrians. Using plants will work as an alternative to rigid fences because they create natural barriers rather than those that trap dogs in yards. Natural plant barriers also have an acoustic effect that reduces the sound that pedestrians make while walking or biking near off-street yards. Another addition to these policies includes creating a shelter to house wild or aggressive dogs. This policy will reduce the number of wild and aggressive dogs in and around the town, while also creating potential job opportunities, if not at least activities for homeless individuals, by allowing them to train, foster, and domesticate the dogs to possibly integrate them into the community.

Figure 86: Feral dogs on tribal lands

Figure 87: Dog's are attentive to outside noises

A nuisance animal policy will positively impact Mission because it will reduce the number of wild and aggressive dogs, create a better sense of safety for pedestrians, and potentially create an activity for homeless individuals.

RECOMMENDATION 29: ADOPT SUICIDE PREVENTION PROGRAM

Mission is currently dealing with an alarming suicide rate that plagues the youth and the community as a whole. The most at-risk individuals include males around 14 to 24 years old but that does not mean anybody else is not at risk. Any number of suicides is too many, so reducing the total even by just one is a positive outcome. Todd County currently shows twice as many suicides per 100,000 people as the national average for people identifying as Native American/Native Alaskan.

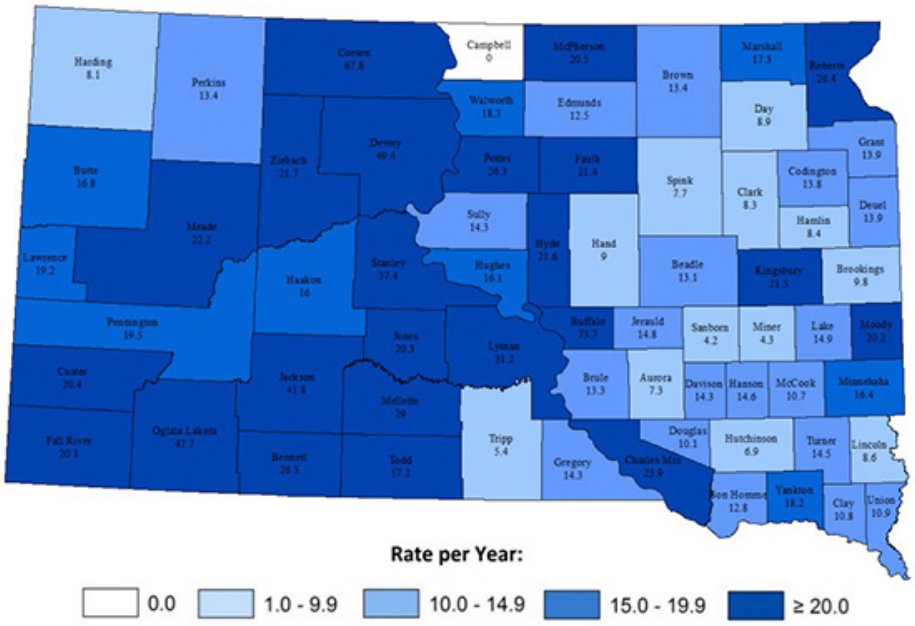

Figure 88: South Dakota suicide rates by county (deaths per 100,000 population, 2008-2017)

A suicide prevention program is one of the most important policies to adopt. The main idea is to foster a sense of self-identity for Lakota youth and help them find purpose and value in their contribution to the community at large. Specific programs include A-C-E (detailed below). The most important place for a specific program should be the high school. The data indicate that those at the highest risk are in the age range of those in or recently out of high school. The school district should ensure that a professional social worker trained to recognize signs of depression is on staff and is connected with students. Bringing overall awareness to the minds of students, teachers, and the community will provide personal connections to people who can help.

A-C-E stands for "Ask, Care, Escort." It is a simple but effective program that empowers all individuals to help at-risk youth through everyday interactions. This should not be used as a suicide prevention program by itself but in correlation with a larger program as a whole.

A number of tribal communities have dealt with similar problems in the past, including a Shoshone-Bannock tribe that was facing 98 suicides for every 100,000 people. "Epidemiological research during the early part of this program identified acute alcohol intoxication, arrest for minor infraction, and high family disruption as risk factors for suicide" (Goldsmith, 2002). The programs designed by these services included economic and social improvements, mental health services, and traditional Native American cultural enhancements. Another tribe, the Jicarilla Apache of New Mexico, faced even higher suicide rates than Mission does among 15 to 24-year-olds. A program was created to reduce substance abuse and promote awareness of the symptoms of depression in the local high school (Goldsmith, 2002). Both of these tribes partnered with the NIMH and IHS in creating facilities for at-risk individuals and for mental health programs. Refer to (blue lights) (engage and connect families, students, and the community), and (police policy) for additional ideas.

A suicide prevention program can play an important role in improving the overall mental health and self-image of youth and other community members in Mission. Acting to mitigate high-risk activities like substance abuse will reduce overall suicide rates and help Mission take a step forward in becoming a happier and more connected community.

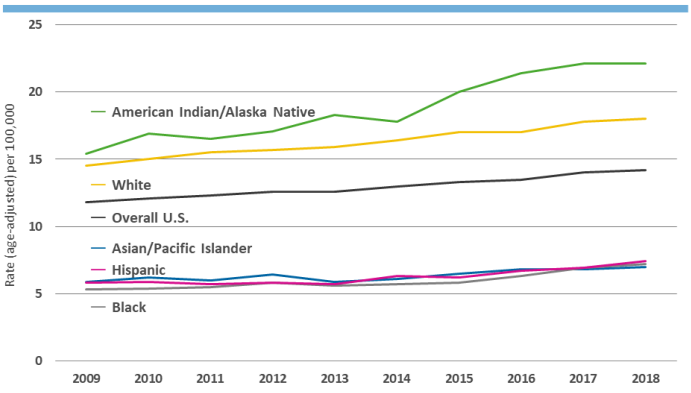

Figure 89: US national suicide rate by race/ethnicity, 2009-2018 (CDC)

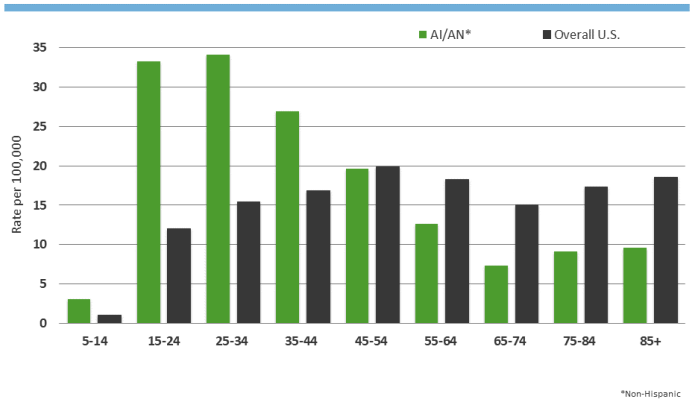

Figure 90: US suicide rate by age for Native Americans, 2009-2018

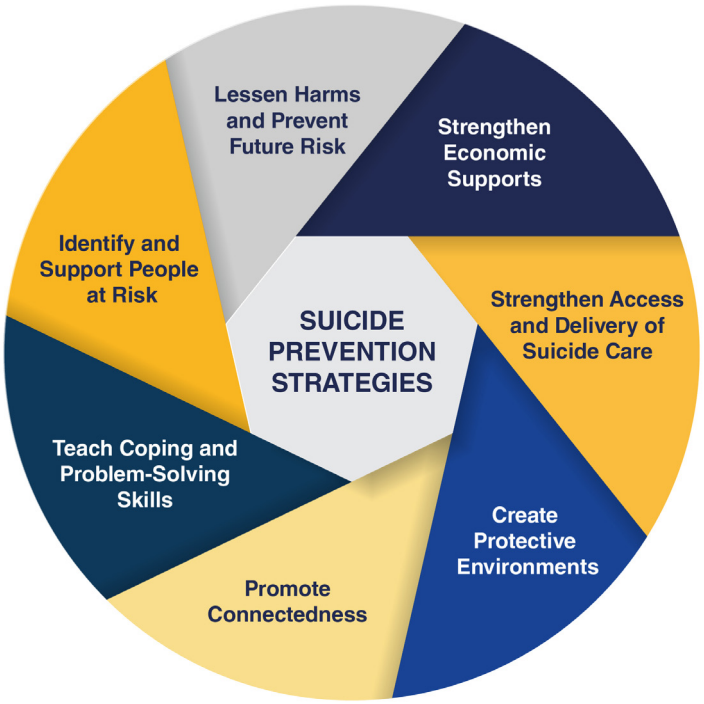

Figure 91: Suicide prevention strategies

RECOMMENDATION 30: CONNECT STUDENTS, FAMILIES AND THE COMMUNITY

Compared to other schools in South Dakota, the school in Mission currently has problems with students skipping class and under-performing in academics among other things. Under-performing in school can lead to a lack of self-autonomy. There is a lack of intergenerational connectedness in Mission. Suicide rates tend to rise when individuals feel alone, so connecting students, families, and the entire community will play a role in the overall health and well-being of every person in Mission.

Figure 92: Community connectedness

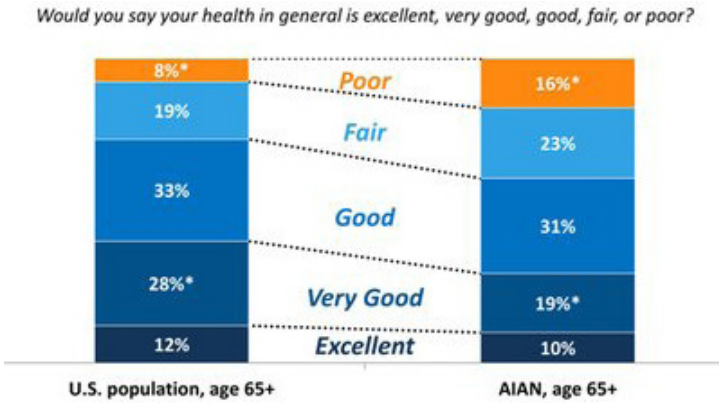

Figure 93: Elderly AI/AN report poorer health compared to US overall

Programs that create interactions between people of all ages should be implemented. These programs include activities that allow elders to teach younger generations about life skills and culture, allow youth to interact and help elders, and bridge the generational divide. These programs should be both school-based and community-based. Parents are less likely to be involved with schooling as their students grow older, which correlates with the age range of most suicide victims. A program that creates more interaction between parents and the school will result in better family connections and higher academic achievement, attendance, and behavior of students (Hanover, 2018). Connecting the generations in the community will play a major role in improving overall mental health, well-being, and quality of life. Interaction builds community.

Figure 94: Teacher-student mentoring

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