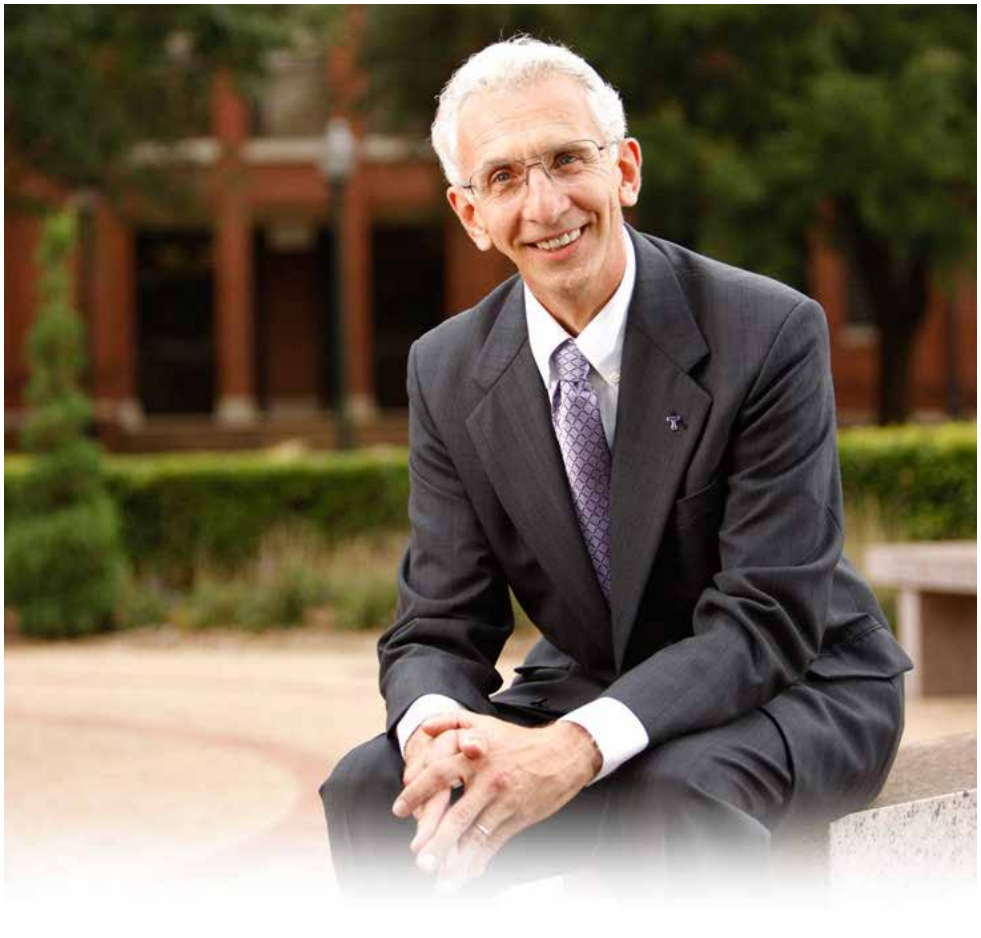
# Tarleton State University

## Fort Worth Campus Master Plan

February 2017



TARLETON
STATE UNIVERSITY
Member of The Texas A&M University System

February 2017

I am pleased to present this Master Plan as a vision for a campus that will someday create a vibrant, life-long learning environment for the citizens of Fort Worth and surrounding communities.

This new campus will one day become a reality because of a generous donation of 80 acres of land along the new Chisholm Trail Parkway by the Walton Group, coupled with strong support from the City of Fort Worth, North Texas Tollway Authority, The Texas A&M University System, community and business leaders, and state legislators. These groups, together with the community at large, are looking to Tarleton to meet a growing need for public higher education in the Southwest Metroplex.

Tarleton has had a presence in Fort Worth for many years. Using leased facilities up to this point, we have seen an annual growth rate of 10-20% in enrollment over the last decade. We have expanded our degree offerings and added new programs, established new student services, and developed new partnerships with area community colleges, health care providers, and businesses. Tarleton is the only public university offering bachelor's level degrees as well as many master's degrees and a doctoral degree in the city.

This Master Plan for Tarleton State University's Fort Worth Campus has been prepared with the help of Broaddus Planning and input gathered from stakeholder representatives, steering committees, advisory committees, and workshops. Extensive research was done to understand the current and future needs of learning landscapes, anticipated enrollment growth, student demographics and educational needs, landscape and building requirements, transportation access, and fit with the surrounding community's planned development. I am grateful to the many participants that truly made a difference in conceptualizing the plan while being mindful of Tarleton's culture and its aspirations.

This document will guide future decisions on a new, permanent campus for buildings and facilities for academics, student life, recreation, research, parking, open spaces, and general infrastructure. It will accommodate the consolidation of all Fort Worth-based academic programs at one location.

A few years from today when people ask for directions to Tarleton State University's Fort Worth Campus they may be told to "hit the trail," that is the Chisholm Trail, and they won't have to go far to find us.

F. Dominic Dottavio, Ph.D.

President

# Acknowledgements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# Tarleton State University

## Fort Worth Campus Master Plan

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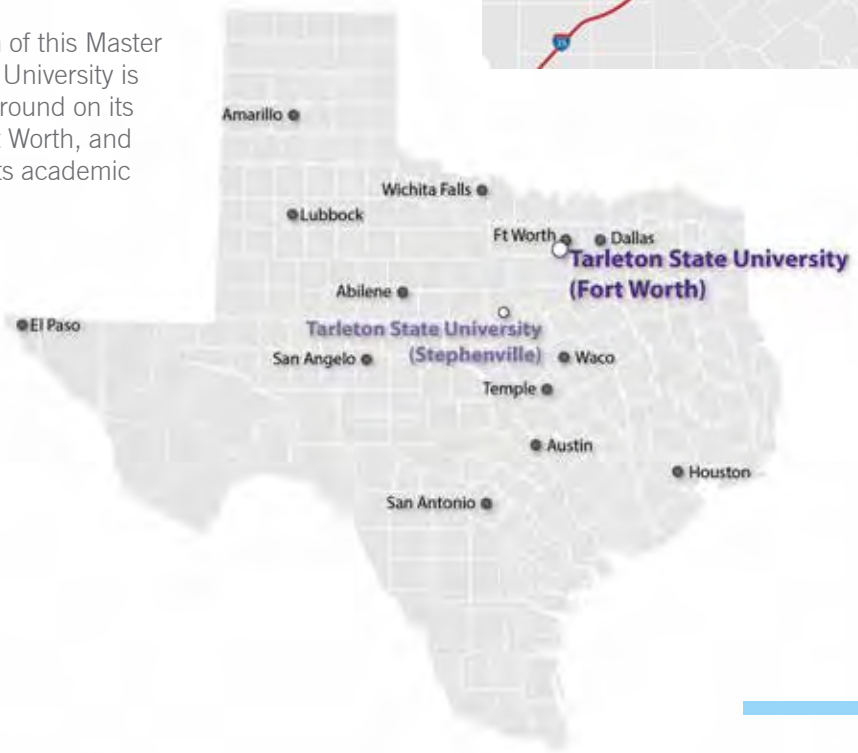
# 1 introduction

# Tarleton State University

The Master Plan found in the following pages has been crafted for a parcel of land on the outskirts of Fort Worth, Texas, but the story begins 70 miles further to the southwest of downtown. Founded in 1899 as John Tarleton College, the original campus in Stephenville began as a gift of farmland for the creation of this institution. From its Stephenville headquarters, John Tarleton College became a member of the Texas A&M System in 1917 and grew into Tarleton State University. The university has grown its enrollment to over 13,000 and developed a wide array of undergraduate and graduate degree programs.

Now, with another donation of land, Tarleton State University is poised to embark on a similar journey in establishing a new campus, this time in southwestern Fort Worth. This is a new venture for the university, but the territory is familiar; as far back as the 1970s, the university has offered courses in Fort Worth, beginning with the medical lab sciences program. In 2006, the university began offering courses out of leased office space in a building 7 miles southwest of downtown, and has expanded programs in nursing, criminal justice, and more. The current office space is no longer adequate to accommodate the university. Since its inception, enrollment in Fort Worth has grown by an average of 16.5% per year, growing from 434 in the fall of 2006 to 1,722 in the fall of 2015.


With the completion of this Master Plan, Tarleton State University is prepared to break ground on its own campus in Fort Worth, and put down roots for its academic mission to flourish.



## Project Background

The impetus for this Campus Master Plan is the need to chart the course for a brand new campus for Tarleton State University in Fort Worth. In the fall of 2014, Tarleton State University was offered a donation of an 80-acre parcel of land located west of the Chisholm Trail Parkway in south Fort Worth. The new campus will serve as a new location for Tarleton State University's Fort Worth-based academic programs.

This Master Plan is the culmination of a series of integrated planning and programming projects undertaken by Tarleton State University to envision its new campus. Two documents were completed in 2015 which established the initial vision for this consolidated presence: a Concept Master Plan for the new campus and a Preliminary Facility Program for the first building (the "Multi-purpose Academic Building").

After the completion and approval of these two documents by the university, the planning team was re-engaged in a more detailed and comprehensive effort to define the Facility Program of Requirements (POR) and Master Plan. The POR was approved by the Texas A&M University System in April 2016 and was used as the basis for a Request for Proposals for Architectural & Engineering Services for the design of this facility.

This Master Plan builds on each of these previous efforts to guide the development for the Fort Worth campus. It echoes the main themes and key elements established in the Concept Plan and POR, while adding further detail, rigor, and refinement.

In this new endeavor for Tarleton State University, the campus in Fort Worth is expected to embody the same Core Values of the institution in both its academic mission and outward appearance. These values should be re-inforced through design and made evident throughout the campus. The Core Values are included below:

### Tarleton State University Core Values:

**Tradition.**
**Integrity.**
**Civility.**
**Leadership.**
**Excellence.**
**Service.**

## Project Description

This scope of this project encompasses a master plan for the Tarleton State Fort Worth campus, with a particular focus on the first building and supporting roads, parking, and infrastructure. The master plan presents a vision for the future of the campus, laying out spaces in a way that will allow the university to grow coherently, and comprehensively. As such, it provides a "framework" for growth, organizing buildings with particular attention to topography and views, and lays out a structure of open spaces and circulation around which the campus is designed. All of this structure starts with the first building - a multipurpose education building containing learning environments, common gathering space, faculty and staff areas, student support and all other necessary functions to serve the campus until further buildings are constructed.

This plan has been based on enrollment projections and goals established by the President's Cabinet and Master Plan Steering Committee, however there are many unknowns around how fast enrollment will grow, if funding will be available to undertake projects, and which projects and programs will become priorities as the campus matures. Regardless of these unknowns, the framework provided herein serves the university well to guide discussions and make sound decisions in future planning efforts.

## Program of Requirements

A summary of the building program of requirements can be found later in this document, while a more detailed facility program has been prepared as a separate, companion document (Program of Requirements April 2016).


*President Dottavio announces the partnership with Walton Development in Sundance Square along with Texas A&M University System Chancellor John Sharp, Mayor of Fort Worth Betsy Price, Fort Worth City Councilman Jungus Jordan, State Representative Craig Goldman, Walton International CEO Bill Doherty, Walton West USA President John Vick and Tarleton Vice President Kyle McGregor.*

*President Dottavio opens the two day charrette process*

## Planning Process

The engagement process for this master plan was carried out in conjunction with the POR for the first academic building. These processes intertwined and complemented each other, allowing for the master plan to closely align with, complement, and support the planning, programming, and implementation of the first building.

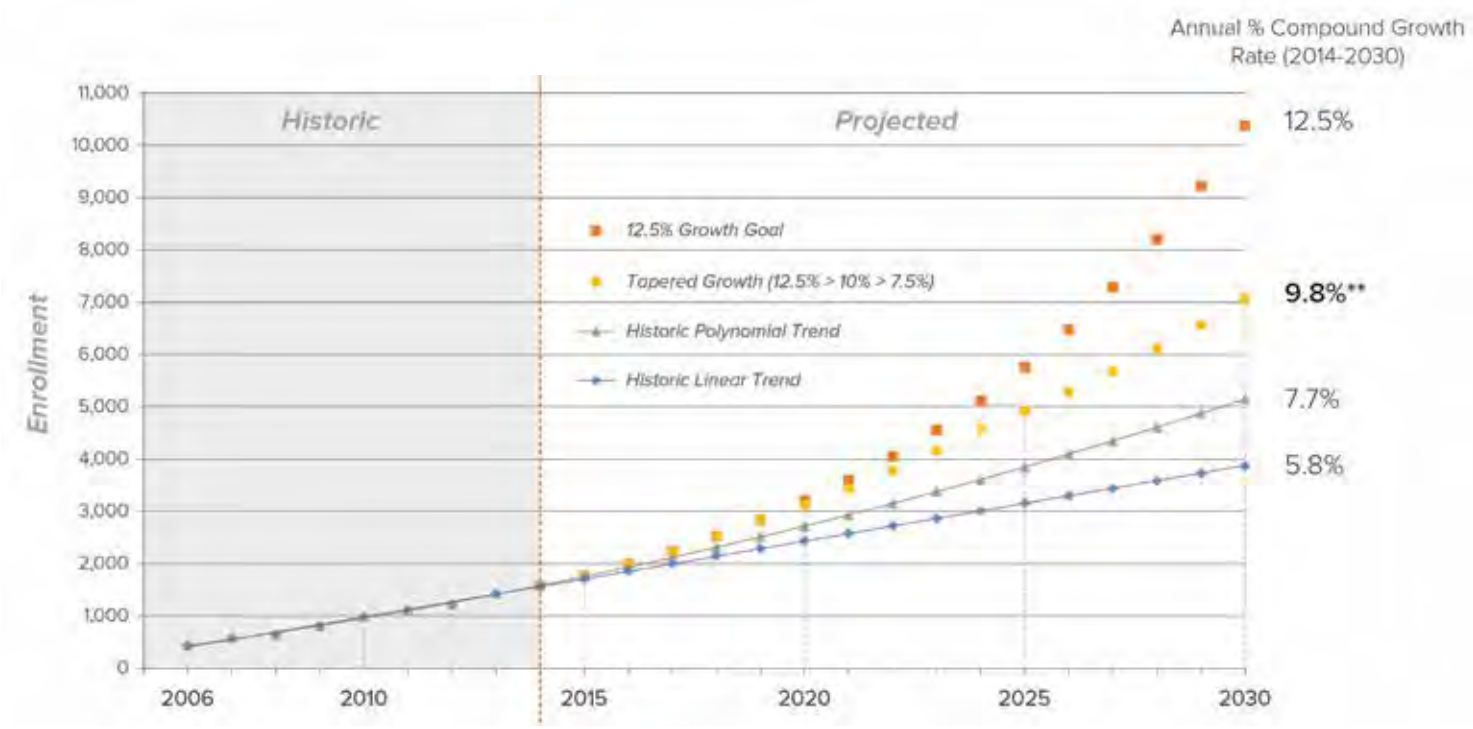
Building from the Conceptual Master Plan and Program process that preceded this master plan, the planning team held a series of interactive workshops and meetings, including a 2-day charrette held at Tarleton State's existing lease space in the Hickman building in Fort Worth. Sessions ranged from interactive visioning exercises with student and faculty groups, focused sessions on space programming, coordination with the City of Fort Worth and Walton International (the master developer for Rock Creek Ranch), and production of design concepts with members of different specialties across the consultant team.


*Vision words captured during the student engagement session*

## Planning for Growth

### Enrollment Projections

The chart on this page represent a set of growth projections considered for the Fort Worth Campus to a horizon at the year 2030. During the planning process, the team conducted stakeholder interviews and gathered demographic information to produce a set of projections for the purposes of the plan. Based on a combination of university goals, historic enrollment growth, and local demographic trends, the President's cabinet selected the "tapered growth" model for planning purposes which represents a 9.8% annual compound enrollment growth rate out to the 2030 horizon. True enrollment will depend on a number of factors, including not only the aspirations of the university and its success in attracting students, but also its ability to achieve funding and execute building projects.




| | Actual | Projected | | | |
|---|---|---|---|---|---|
| | 2014 | 2020 | 2025 | 2030 | Compound Growth |
| *12.5% Growth Goal* | 1,576 | 3,195 | 5,758 | 10,375 | *12.5%* |
| *Tapered Growth Model* | 1,576 | 3,124 | 4,917 | 7,059 | *9.8%* |
| *Historic Polynomial Trend* | 1,576 | 2,719 | 3,850 | 5,148 | *7.7%* |
| *Historic Linear Trend* | 1,576 | 2,435 | 3,152 | 3,868 | *5.8%* |

## Existing Limitations

Tarleton State's growth ambitions are currently limited by its existing facilities. At present, the university leases space in two buildings: 1) the Hickman Building, which is an office building the university leases a portion of for general academic instruction (31,900 gsf); 2) the Schaffer Building, which is a 19,700 gsf, 2-story building the university leases for its Medical Lab Sciences program. The university renewed its lease at the Schaffer Building through 2019 and the Medical Lab Sciences program will remain in use at the facility beyond the opening of the new campus.

The university's Fort Worth programs are growing rapidly (10-20% per year on average) as a result of the university's popular niche in serving upper-level undergraduate and graduate students looking for an affordable and accessible 4-year, public university experience while living and working in the DFW area. It attracts a high number of low-income, first-generation college students as well as non-traditional adult students. Currently, the university offers 43 degree programs ranging from accounting to criminal justice within four colleges (Business, Education, Science and Technology, Liberal and Fine Arts). The headcount enrollment for Fall 2016 was 1,720. With a concerted effort and resource allocation, the new campus could host as many as 5,000 enrolled students by 2025.

## An Ambitious Growth Target

The following points provide support for the enrollment growth target agreed to by the President's Cabinet:

- Tarleton is the only 4-year public university in Fort Worth.
- The Dallas-Fort Worth Metro Area is one of the fastest growing urban areas in the country.
- Tarleton offers a cost-competitive education in an age of rising higher education costs.
- Tarleton is currently capturing an under-served market in the DFW area (price- conscious students, non-traditional students, place-bound students, first generation college students, Hispanic students), and will continue to do so as well as attracting more traditional students at the new campus.
- Tarleton's programs are being tailored to suit students seeking to obtain a bachelor's degree upon completion of an associate degree at a community college such as TCCD, which is one of the fastest growing community colleges in the country.
- Tarleton's programs are being built to meet regional market demand.
- Tarleton can leverage its presence in an urban area to: 1) recruit talent; 2) offer executive education/professional development and advanced degrees; 3) connect to alumni living in the area. All of these elements can contribute to enrollment growth.

- Assumes campus will grow by 12.5% per year for every year through 2030
- Assumes campus will grow by 12.5% per year until 2020, then 10% per year through 2025 and 7.5% per year through 2030**
- Describes historic enrollment projected into the future by creating a line of best fit (one option)
- Describes historic enrollment projected into the future by creating a line of best fit (another option)

# site analysis 2


**Campus Context**

Tarleton State University's 80 acre site is located roughly 15 miles south-southwest of downtown Fort Worth on the Chisholm Trail Parkway. The greenfield site was a donation from Walton International, and is planned as an anchor at the heart of a larger, approximately 1,750 acre multi-use development called Rock Creek Ranch. This development is intended to include a mix of commercial, mixed-use, and residential uses. Because it sits at a major access point into the development, the campus is intended to be adjacent to higher density uses including commercial, multi-family, office, and mixed use areas, with lower density single family housing and neighborhood scale uses farther away from the parkway.

The planned development is at the fringe of the City of Fort Worth, where suburban residential development meets agricultural land and rural housing dotted with oil and gas drilling pads. In May of 2016, Th City of Fort Worth agreed to annex the entierty of the Rock Creek Ranch development including the 80-acre university parcel. This annexation came with zoning approvals as well as the ability to enable future infrastructure improvements including roads and wet utilities (water, sewer, etc.).

To the northwest of the development is Benbrook Lake and Rocky Creek Park which provide recreational opportunities, while down FM 1187 to the east are the towns of


Crowley and Burleson. Moving north along the Chisholm Trail Parkway one quickly enters suburban Fort Worth, while traveling south, the land becomes more rural.

The City is attempting to shape development in south Fort Worth and extending into its extraterritorial jurisdiction through both its comprehensive plan and thoroughfare master plan. The comprehensive plan identifies a mix of land uses ranging from single and multi-family residential to general commercial within the vicinity of the 80-acre parcel, including a "Community Mixed-Use Center." This type of land use, which focuses on concentrating jobs and housing while providing access to transit and public facilities, could be an excellent amenity supporting the future campus, potentially creating a town-center destination along the campus' western edge.

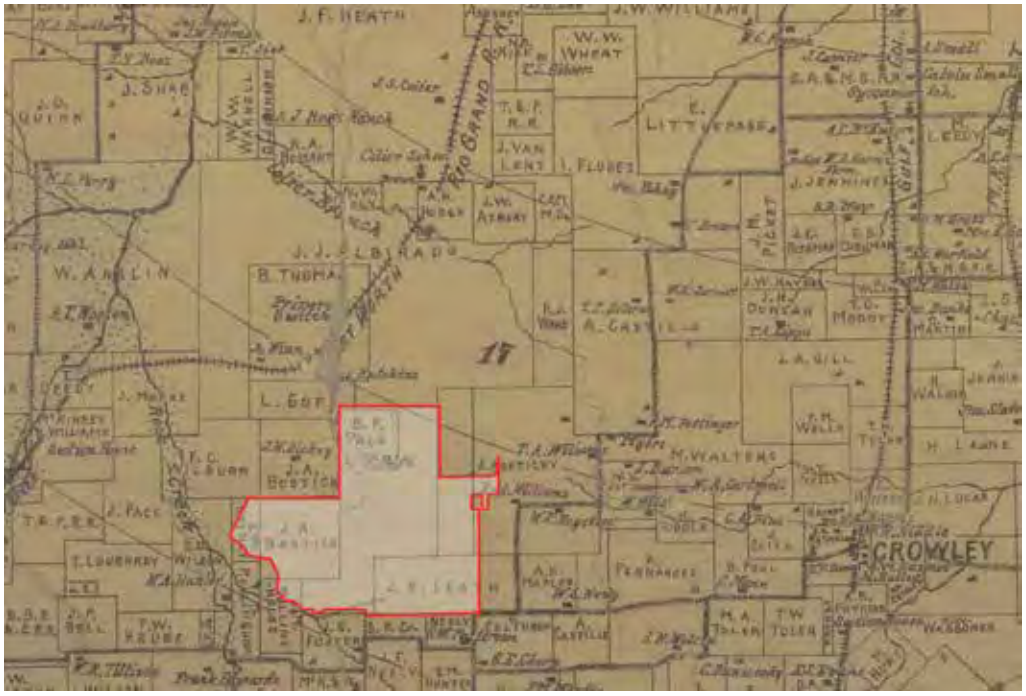
While the City of Fort Worth is working on updating its thoroughfare master plan currently, the City's past plan indicated a primary east-west arterial approximately aligning with the northern edge of the 80-acre parcel and a primary north-south arterial roughly paralleling Chisholm Trail Parkway to the west of the 80-acre parcel called Brewer Road. The thoroughfare master plan is conceptual at this point, but future transportation infrastructure to serve the new campus is essential.

When the first building opens in the fall of 2019, it is anticipated that the Brewer Road surface street will serve the campus from both the north and south.

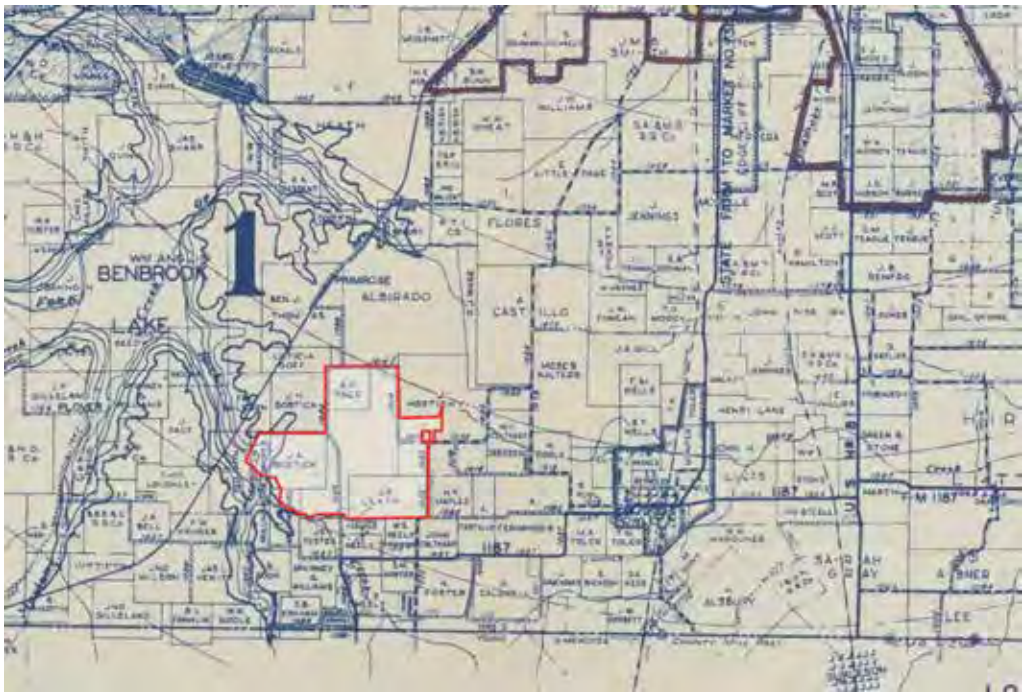
**Historical Context**

The Rock Creek Ranch development can be seen in red outline on the two historical maps found here, one from 1895, the other from 1958. The 1895 map shows property ownership, Rock Creek along the southwestern edge, and the Fort Worth Rio Grande Railroad skirting the parcel to the west. By 1958, there have been several major changes; the City of Fort Worth's boundary is evident to the north, Benbrook lake has been formed by damming the Trinity River's Clear Fork, and the Railroad appears to have relocated slightly eastward to accommodate this new body of water.

As Fort Worth continues to change and grow, it is important to keep an eye on history, and have an understanding of this land prior to its transformation into a university campus. The new Chisholm Trail Parkway that skirts the eastern edge of the Tarleton State Property is named for the historic cattle driving route. Dating back to the 1860s, feeder trails that fanned out across the southern portion of Texas began to bottleneck here, and at this convergence shot northward to Kansas along a more defined corridor.




Fort Worth Context (1895)- Rock Creek Ranch development boundary outlined in red




Fort Worth Context (1958) - Rock Creek Ranch property boundary outlined in red



**Site Analysis**

The 80 acre parcel donated to Tarleton State is located at the southwest corner of the intersection of Chisholm Trail Parkway and Old Granbury Road. The Chisholm Trail Parkway is a limited access toll road traveling north-south and into downtown Fort Worth. While Old Granbury Road is now interrupted by the toll road at this junction and no longer connects to the other side of the development, a new overpass and toll road on and off ramps are planned at this junction to provide access to the site and connectivity to the other side of the development.

Tarleton State's property has its long edge bordering on the toll road, which provides good visibility and access for motorists, but limits connectivity along this eastern boundary.

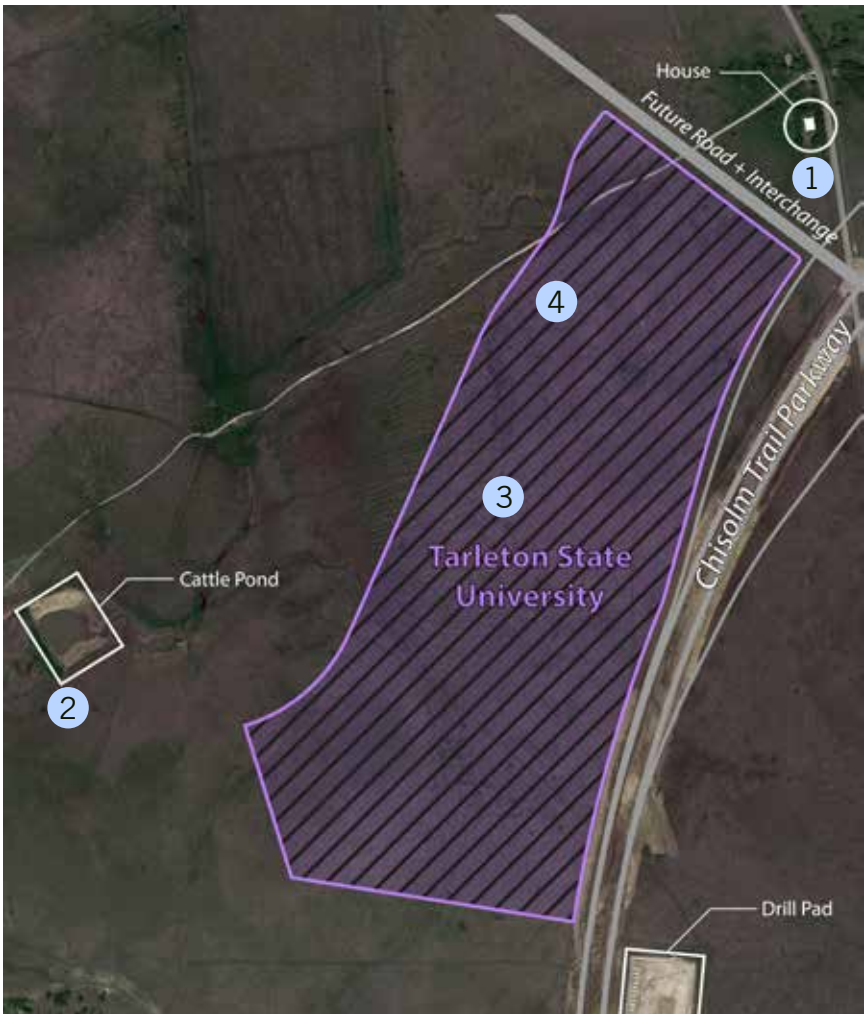
Currently, the entire site and the area immediately adjacent is unimproved agricultural land, mostly open grassland sporadically dotted with mesquite trees. The terrain is gently sloping and rolling, with wide open views to the countryside and the limited development nearby. The highest point on the site is at a small cluster of mesquite trees in the northern portion, with the site sloping away towards the south and west providing views in both of these directions.

The site drains south and west towards Rocky Creek. The northern half of the site flows toward a drainage that feeds a small cattle pond before joining the creek further south. Land around this drainage and Rocky Creek is included in the FEMA 100 year flood plain, as shown on the adjacent diagram, however no portion of the Tarleton State parcel is included in this flood plain area.

## Site Character

The images on these pages, as well as others found throughout the document, provide an idea of the existing state of the property donated to Tarleton State University. Numbered items below correspond to images on the facing page.

*Looking southeast at the intersection of Old Granbury Road and Chisholm Trail Parkway. Tarleton State property is to the right in the foreground. This will be the rough location of the future exit / interchange.*


*The existing "cow pond" just off the edge of the property. While not on the university property, this pond is notable as it occurs along the main drainage leading out of the property toward Rocky Creek.*


*View back toward the high point of the site looking north, with Chisholm Trail Parkway at right (east).*


*Existing gravel road leading into the Tarleton State property, looking south.*

# master plan 3

## From Concept to Master Plan

In December 2014, an initial Concept Plan was developed for the 80-acre site. This Master Plan builds on that early phase of work, adding detail and refining early concepts into well-considered designs. A major element of the first phase of the work was to hold a three day planning charrette, during which the university agreed upon a set of principles that would guide the design of the conceptual campus master plan. These principles helped determine how the plan design interacts with the natural features of the site, how buildings and roads are oriented, and what type of character the campus would take on. The discussion brought up many ideas, opportunities, and visions for the new campus, which were then distilled into the following guiding principles:

# Guiding Principles

1. **Design with site topography to enhance views and orient built elements.**
2. **Integrate sustainable design and local landscape character into the campus plan.**
3. **Define campus edges, entrances, gateways to promote university identity.**
4. **Design parking to limit its impact on the visual, pedestrian, and natural environment.**
5. **Build on tradition and quality of Tarleton's campus in Stephenville.**

The charrette process tested several initial layouts and then developed the most successful of these schemes to publish in a preliminary Concept Master Plan document in June 2015. The Master Plan presented in these pages builds on that Concept Plan, but provides a more thorough and detailed scheme that more accurately represents the specific long and short term needs of the University.

*Concept Master Plan from December 2014 Charrette*

**Physical Plant**

**Campus Entrance**

**Formal Quad**

**Multipurpose Education Building 1**

**Chisholm Quad**

**Long Term Campus Development**

**Long Term Parking**

**Future Rec Fields**

*Formal Quad Rendering,*
*looking east from University Drive*

## Master Plan Structure

### The Heart of Campus

The Master Plan is designed to capitalize on the unique attributes of its site. As noted in the previous section, the site benefits from a gentle slope towards the south and southwest, providing splendid views in both directions.

The first building has been set at the highest point of the site facing out on to two quadrangles that open out to these views. The buildings in immediate proximity frame these views flanking the two quads and conform to the gently sloping topography radiating from this local high point. These buildings comprise the academic core and "heart" of campus.

At the southernmost portion of the campus heart, the Master Plan envisions a feature building with major student life functions, such as a student union, dining, or library / learning commons. This building will serve as a hub and distinctive transition point between the northern and southern portions of campus. The architecture of the building is expected to be reflective of this purpose, acting as a landmark and guidepost, leading campus users into and out of the different area of the campus.

### South Campus Transition

The southern portion of the campus transitions into an area where spaces are smaller scale and buildings and future uses are more flexible, and could accommodate additional academic, student life, administrative, or housing uses. Because development in this area is likely well beyond 20 years out, providing flexibility is key to accommodating the unknown needs of the university at that time. This portion of campus is perforated by streets in more locations, providing additional access and connectivity, contrasting slightly with the academic core where access is limited to the perimeter. Buildings address both these internal and external streets to provide strong and coherent frontages, shape spaces and create clear building frontage rhythm.

### Site Access

The University's property is inaccessible from the north and east: the Chisholm Trail Parkway is a limited access tollway and an entrance cannot be created off this eastern boundary, while access is not possible from the northern edge as TxDOT also requires a minimum distance of 1,000 feet from a highway off-ramp before the reaching an intersection. Due to these constraints, all access points to the campus will occur from a north-south street that forms the university's western edge. This street has notionally been referred to as "University Drive" during the planning process. As the university presents its public face to the city along this street, buildings have been positioned along it with a comfortable setback for landscaping and signage to allow the university to establish its identity along this edge.

### Vehicle / Pedestrian Separation

Several interior campus streets connect to University Drive to allow access to parking and internal circulation. Parking has been pushed to the east of the site towards the Chisholm Trail Parkway. This allows for vehicles to be kept out of the core of the campus, which is focused on pedestrian circulation. The lots are also intended to follow the contours of the site as it slopes away to the south, allowing for terraced bays of parking where appropriate. The bays are intended to employ bioswales to capture stormwater runoff and promote a low impact design. Additionally these terraced bays are intended to minimize the visual impact of the parking requirements for the site through both topography and appropriate tree planting and landscape treatment.

*Potential relationship of campus to future surrounding land uses*


Entrance 1
Plant
Long View
Protected View Cone
Long View
Shared Use Path
Entrance 2
Held Long Term Development Potential
Long Term Parking Stuctures
Entrance 3
Plant
Recreation Fields
Focal Building
Gateway
Shared Use/Pedestrian Path
Quad Landscape
Campus Views
Building 1 Protected View
Long Term Parking
Held Long Term Development Potential

## Urban Design

### Pedestrian Network

Using the site's natural topography, pedestrian routes are designed to align with contours to allow movement along terraces connecting between buildings. Wide pedestrian walks leading up the gentle increase in site level of both the major quads will be a minimum of 20 feet in width to afford generous space for students, staff and faculty to stroll under the shade of trees or linger to carry out informal conversations.

### Landmarks

The arrangement of buildings on campus has been carefully configured to take full advantage of the natural topography of the site and to create a gentle terracing of buildings within the landscape, and aligned to frame and define campus open spaces. The campus has been designed to capture long views to natural features in the surrounding landscape, including an area of natural creek intended as a part of a future trails network and green space. Building landmarks and focal points are notionally identified in prominent locations within the campus where they would aid legibility for pedestrians and cyclists. Consideration for these focal buildings should be for them to incorporate higher elements, or be taller than less prominent uses or functions on campus, this way they reinforce their landmark status.

### Enclosure

Across the campus enclosure of spaces is created which is befitting the academic character of the campus with long processional spaces. Smaller enclosed spaces which allow for outdoor collaboration and incidental meeting are provided of 1:1 building height to width of space. Internal quads between buildings have the opportunity to perform event functions for the specific department or program in that building with a ratio of 1:2.  Nodes of activity are formed around these focal buildings, and at transition points, when arriving on the campus, and traversing from the campus heart to the south. Natural notes are also intended to be coordinated with more active building uses and public or visitor uses to aid with first time visit legibility.

### Views

The exceptional location of the campus site sitting across gently undulating prairie landscape with views across the south Fort Worth Landscape is a highly important aspect of the site which should guide future decision making for building, roads, planting and other features on the site. Views both to buildings and from them should be key design components. Several structural views are identified in the master Plan including key views along each campus quad. In addition an area to the east of the first building is identified as important for keeping open to maintain views of the first building in the long term development of the campus. This is identified as a Protected View Cone. In addition there are supplementary views from the south of the campus to long term development on the southern edge. This view will be enhanced by its location adjacent to the Recreation Fields.

**Community Interface**

Key locations on University Drive create connections to future surrounding development. These are critical components to the campus design and they are hallmarks of many great campuses. These connections between the campus and the university add character to the surrounding development, build walkable and healthy connections to off-campus shops and restaurants, and often become the memorable location which is chosen for graduation photos and class reunions. The following three spaces are identified:

- ***The market place:*** located as a continuation from the formal quad, the market place will be a vibrant location for food and drink venues, food trucks, and coffee shops. There is potential for student accommodation above ground floor retail to ensure that this location develops an 18 hour vitality.


- ***Chisholm Green connection***: Extending from the informal quad and water features is a natural water course which continues into the wider drainage for hillside. This connection could form part of a wide district trail network connected to the campus at this important node. A natural location for neighborhood scale retail or coffee shop, this location would prove idea for making a pit stop before reentering campus or an incredibly scenic and convenient place to live.


- ***University Drive Gateway:*** At the northern corner of the site the university meets one of the principal thoroughfares through the Rock Creek Ranch development. This location is likely to provide opportunities for adjacent district or regional scale retail. In addition to vehicle access, there is a need to ensure that this intersection accommodates pedestrian and cyclists approaching the university from within the district. The university meets this corner with a lawn and an avenue of shade trees, on the opposite side of university drive private development has the opportunity to front this high profile corner with medium to high rise development signifying the gateway into University Drive.

## Street Types

The following street characters area identified by the concept plan providing a hierarchy of streets within and around the campus removing potential conflicts between pedestrians and vehicles.:

1. College town street "University Drive" forms the relationship with the surrounding development.

2. Campus street (two way, with turn lane and median), minimizing travel land widths, reducing view lengths to naturally slow speeds and create safe crossing points for pedestrians, along side the vehicle lanes this street type will have a wide shared use path on one side of up to 20' across and a standard sidewalk (6') on the other side ensuring a very high quality of pedestrian and bike service. Crossing points will be raised tables to ensure consistent level access for pedestrian with mobility difficulties and wheelchair users.

3. Campus connectors (two-way street): Similar to campus streets these will be designed to maintain slow 20 mph speeds. They will have standard sidewalk provision on each side. Bikes will share the lane with vehicles. Consideration may also be given to finishing these streets in a brick surface to further reduce traffic speeds. These streets provide service access to buildings and parking locations.

4. Active connection spine. Within the heart of the campus pedestrian routes are the principle connectors. Bikes will be permitted on these shared use paths which have sufficient width (20') to accommodate multiple user modes.

5. A running trail is incorporated into the movement network on the campus allowing it to form part of daily exercise or an alternative means of connecting north and south on campus.


*Campus Street Hierarchy*

*Cross Section of Campus Street*

**Parking and Servicing**

Parking for the campus has been arranged to align with the toll-way reducing its visibility from the "college town" street to the west of the campus. In particular, the parking will not be visible when approaching the campus from the formal or informal quad spaces. Additionally, parking is separated from the main core of the campus, keeping a large portion of the campus "car-free". Terracing of the parking lots and generous rainwater swales between rows of parking will soften the appearance and storm water impact of the parking lots.

Servicing for buildings is arranged to be convenient yet discrete. Small service areas for each building are principally located either with direct access to the internal street network or through a surface parking lot. These service areas are located away from main pedestrian routes to avoid conflict between service vehicles and pedestrians. In addition, the natural topography of the site allows for service access to occur below grade for some of the building sites.  This minimizes the impact of service access on the campus spaces.


*Building entrances and loading/servicing*

*Plan of Campus Street and Pedestrian Crossing*

## Building Frontages

The frontage diagram is intended to provide guidance for the siting and orientation of buildings within the master plan layout. The idea is not to prescribe building footprints, as future drivers of building design are unknown, especially beyond the early phases. Instead, the plan identifies key frontages where buildings should align, delineates areas that should be reserved for wider landscape elements, and leaves other areas flexible to accommodate unknown building needs. In doing so, the master plan is able to develop strong presence around fundamental spaces and streets, while allowing creativity and flexibility in building design.

### Primary Building Frontages

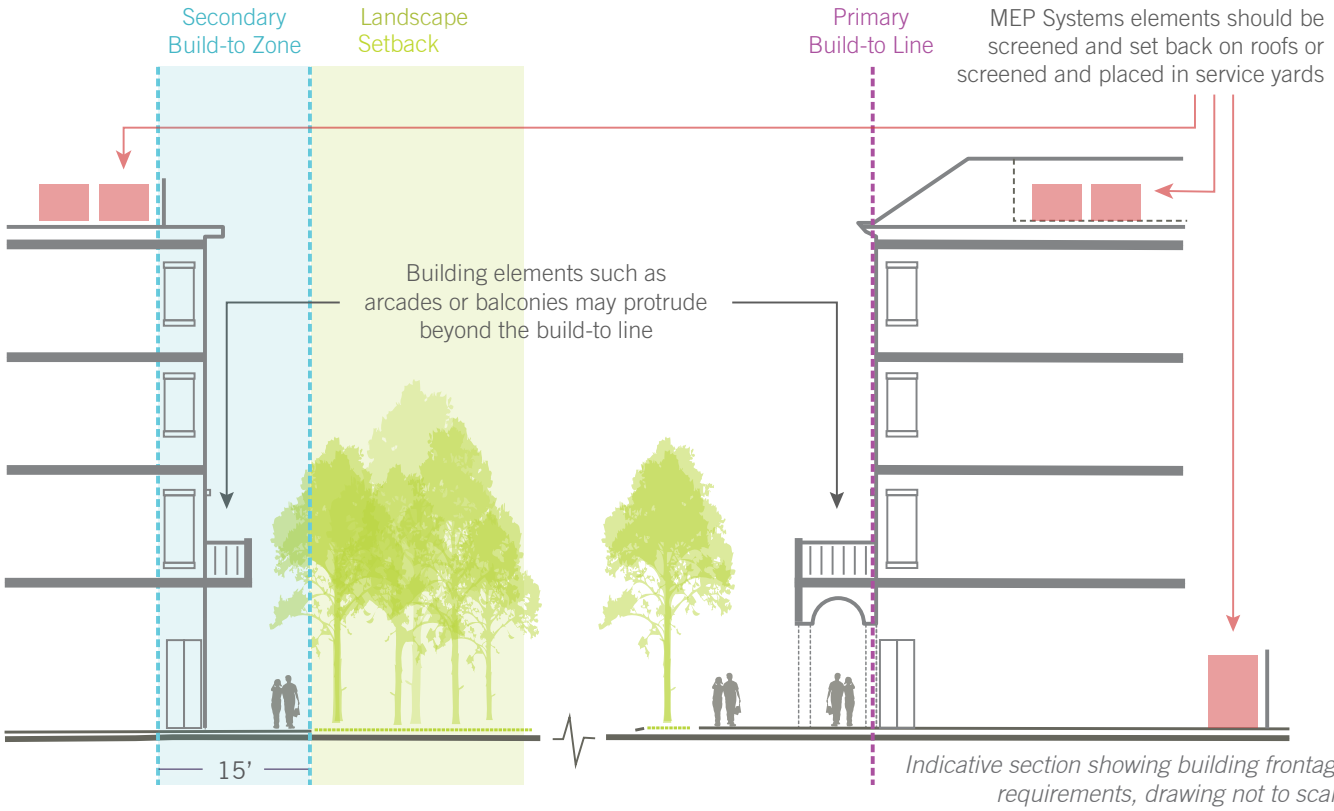
Buildings indicated with a primary frontage on the adjacent frontage diagram have the most strict requirements and should align precisely along the indicated build-to line, and with other buildings which share that line. These primary frontages are intended to frame the fundamental public spaces on campus, where a strong building or street wall is meant to enhance the structure and feel of the space and create a sense of rhythm. For each building set along a Primary Frontage, 80% of the façade should be built at this line, allowing for recesses as necessary. Building elements such as arcades and balconies may protrude beyond the line, with the main building mass still in alignment with the build-to line.

### Secondary Building Frontages

Buildings indicated with a secondary frontage have more relaxed requirements for building alignment, but still have important role in supporting the experience of public spaces and streets. In order to achieve this, the master plan indicates a build-to zone, a 15' wide band where 80% of the building frontage should align. This provides for less rigidity than the primary frontage and a less formal appearance, while still orienting buildings in a manner that creates well-proportioned spaces and a sense of enclosure.

### Landscape Setbacks

Along campus edges and interior streets there are a number of landscape setbacks indicated on the master plan. These areas are intended to provide area for plantings and lawns along streets enhance the visual identity of the university. The setbacks indicated on the plan are generally 30' wide between the sidewalk and the building. These areas should be kept free of buildings, but are appropriate for benches, gates, low walls, signage, etc.




*Indicative section showing building frontage requirements, drawing not to scale*


*Frontage Diagram overlaid on Illustrative Plan*

*Bird's eye view rendering, looking southwest from northeast corner of the propertty*

## Landscape Character

The landscape character of the new campus will draw from the native plants and species occurring in this part of Texas. Planting for the new campus will reinforce this by using species appropriate to the climate, soil and character of the south Fort Worth area. This does not mean that the campus should attempt to replicate the existing landscape, but rather that it ought to use a palette of species to the region to provide the campus with beauty, shade, comfort, character, and ecological sustainability. It will be critical to introduce tree plantings as early as possible along identified public spaces and walkways to encourage pedestrian comfort, as the site currently lacks mature trees and appropriate shade.

Within this over-arching approach there is potential to create distinctive areas of zones of landscape character. The two principal zones identified in the master plan are a formal quad landscape befitting an established university and a more natural arrangement within an informal quad.

### Landscape Master Plan Purpose

The Landscape Master Plan for Tarleton State University Fort Worth builds on the identity, tradition and quality of the campus in Stephenville. The recommendations in this section are designed to promote a learning environment that enhances and supports campus life by creating exterior spaces that provide a sense of permanence and a setting for a variety of academic, social, recreational and cultural experiences. These goals align with the notion of fostering community and a sense of "ownership" among faculty, staff, and students.

### Landscape Zones:

- Respond to the region's aesthetic context, history and the local landscape character of the heritage grasslands and pastoral past
- Lay out circulation, open space and buffers with special attention to topography, views to and from the campus that limit visual impact to pedestrian and natural environments
- Integrate sustainable strategies and Low Impact Development (LID)
- Define campus edges, entrances, and gateways to promote university identity

### Landscape Qualities and Signage:

- Emphasize the campus as a destination
- Highlight key attractions
- Enhance the user's experience
- Improve mobility
- Reinforce links
- Reinforce community identity and character
- Enhance campus design
- Develop a system that can be implemented
- Explore integrating a range of navigation tools

The Landscape Master Plan intent is to provide adequate design direction to facilities staff in developing and prioritizing landscape projects as well as guidance in implementing projects over time with flexibility and adaptability. The Landcape Master Plan is organized into five zones, each of which is defined according to the commonality of design goals and objectives for the zone. Each zone has distinct requirements that are specific to location and context but integrated into the campus as a whole. The following narrative provides a description of the overall character proposed for the four zones. It defines each zone, landscape qualities, signage and describes the intellectual basis and the framework for applying each concept. Further detail on recommended plant palettes, site furnishings, lighting, etc. can be found in the landscape appendices found at the end of this document.


*Landscape Zones*

**Formal Quad**

This zone should convey a sense of place and meaning unique to the Tarleton brand and should communicate the University's values and mission in the design and execution of the project. The Formal Quad should incorporate information or details in the landscape to convey historical and cultural context; it provides a setting to develop campus landmarks that echo those of the Stephenville campus. Because the zone exemplifies the founding of the institution and the importance of education to the greater community, the area should be highly formalized highlighting the built environment as well as what will become a historical campus view. The design and development of the landscape adjacent to the College town street should emphasize the Academic building's prominence and the campus' physical and ceremonial center as it interfaces with the city. Great care should be taken to preserve the quads role as a symbolic place for observing graduations, institutional milestones, and special events that bring the campus and community together.

This zone requires the highest level of maintenance, attention to aesthetics and the installation of special plant species. Plant beds although limited to the edges of the main axis along the walkways and gateways should provide bright and uniform color and lush foliage that require regular care, time, effort and irrigation. Tree planting should frame walks leading to the Academic building and help create gathering spaces shaded by canopy trees and specimen oak trees. Because this zone is the heart of the campus, the planting palette should provide a textural and multi-sensory experience—with the use elm trees, which have exfoliating tree, bark and through fragrant shrub and groundcover selections. The expansive lawn in this area should be manicured by mowing and irrigating regularly. Plantings will be predominantly evergreen groundcovers, perennials, shrubs, and ornamental trees for year round foliage.

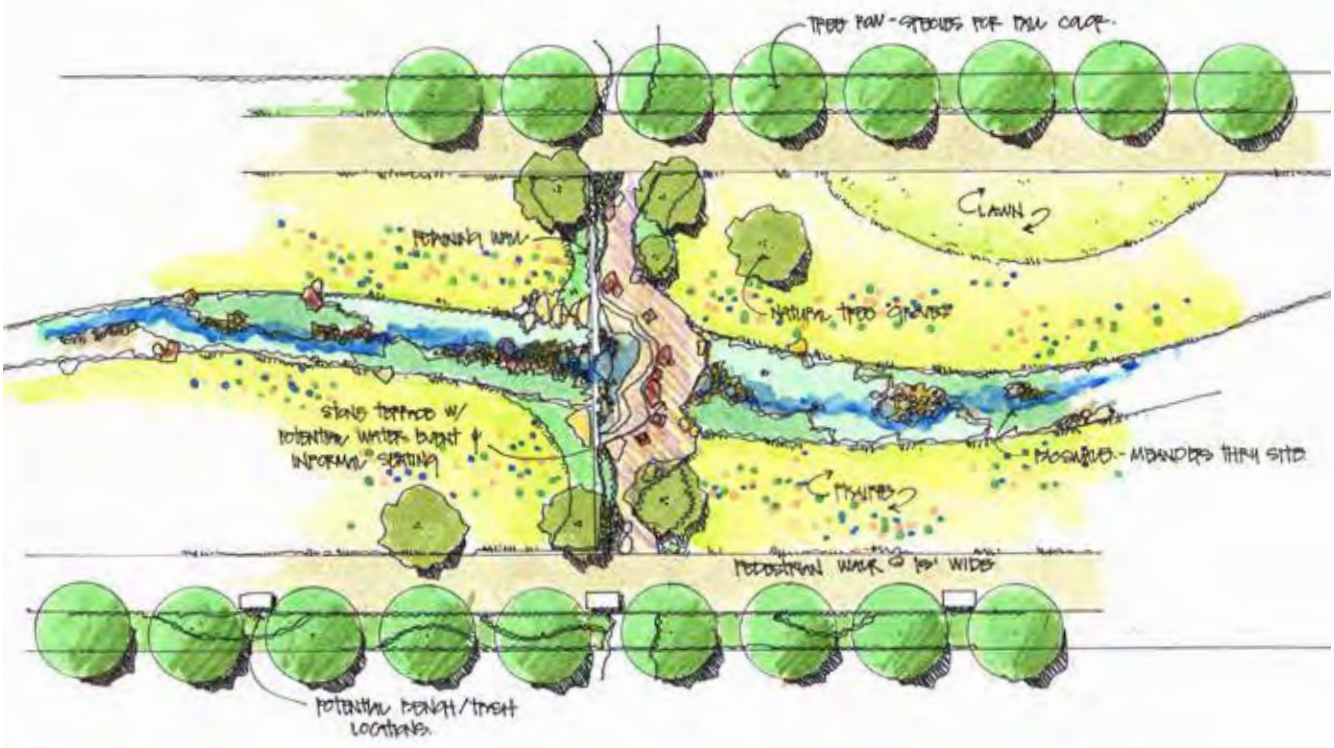
The first building's eastern façade faces out onto what is envisioned as a formal campus quad, leading down to the campus entrance and future interface with the city. This quad is lined by future academic buildings laid out in an orderly and regular pattern, framing a traditional lawn indicative of academic campus design. Two sets of gates at the bottom of the quad echo those found on Tarleton State's Stephenville campus and help define the university's presence where it meets the city. The master plan indicates a building-to-builing dimension of 200' with 20' sidewalks on either side, and 20' building setbacks.

*Example Images (TBG)*

**Chisholm Green**

This landscape zone marks the major pedestrian crossroads of campus where outdoor social interaction takes place. This is the area where organizations and clubs will set up tables during mild weather and will be the primary location on campus for promoting activities and encouraging engagement among students as they move through campus. The zone is designed to provide the most dramatic views on campus and should accommodate both planned activities and impromptu gatherings. The quad's less formal character, use of native grasses, wildflowers, and trees that create a more natural feel is a response to the regional flavor, aesthetic context, and provides design sensibilities to the areas heritage grasslands and pastoral past.

The quad will use low impact development (LID) to help manage storm water as it travels from the top of the site towards Rocky Creek to the south and west. These strategies mimic the pre-development hydrology of the site using a combination of site planning and structural design strategies to control runoff rate and volumes. These include (1) structural methods such as infiltration planters, vegetated swales, rain gardens, rainwater collection, and pervious pavement and (2) non-structural methods such as reducing lawn areas, avoiding soil compaction, and minimizing impervious space. Because of the inherent natural qualities of LID practices, the level of maintenance for this zone is less intense than Zone 1. It will however still require regular care, time, effort and irrigation. The Informal Quad will include rolling topography and plantings that will consist of ornamental grasses, native shrubs and groundcovers, aquatic plants at the detention pond and very limited lawn areas. The area should be designed as a four-season landscape; with alternating colors and trees should be installed in natural groupings that create or accentuate views into campus from the street and of the pond from the campus. The first building's southwestern façade, set slightly off-axis from the building's rectilinear pattern, is aligned to take advantage of the most dramatic view on the site. This façade faces out on another quadrangle that is intended to take on a an informal character. The quad is still defined by buildings framing the space while also stepping down the contours of the topography. The quad takes advantage of native grasses, wildflowers, and trees to create a natural feel. This quad creates integration of principles of low impact design (LID) with a central dry creek to manage stormwater as it travels from the top of the site towards Rocky Creek to the south and west. At the southern end of the quad, where it meets University Drive a permanent water features feeds into this water management system. The Master Plan shows Chisolm Green with a 155' building-to-building dimension, with 20' sidewalks on either side, and minimal, if any building setbacks.



**Courtyards**

Courtyards distributed throughout buildings and arcades create exterior rooms that provide collaborative settings for small groups. Generous plantings and a diverse materials palette are characteristics that will draw users to these courtyards. These elements help activate the space and provide visual interest, while their detail can be appreciated when the spaces are used for intimate gatherings and respite. Courtyards have the potential of becoming "anchors" of community life, facilitate, and foster broader, more creative interaction. Because these areas will be highly accessible and proximate for students, staff and faculty that will habitually congregate there these must be welcoming and comfortable.

Courtyards should be regularly maintained due to their importance in community building even if they fall at the inner sections away from the public edges of the campus. These community anchors should be shaded by canopy and specimen ornamental trees and lawn in these areas should be limited, mowed and irrigated regularly. Plantings will be a balanced mix of deciduous and evergreen groundcovers, perennials, shrubs, with textural foliage.






**Parking/ Ring Road**

The landscape in this zone should enhance pedestrian and vehicular circulation on campus. The design of Ring Road provides openness to the campus to the west side of the road, while the east side consists of planting, fencing and earthwork buffers that screen parking. Ring Road will be a tree lined complete street, with bike lanes and sidewalks, limiting view lengths to naturally slow speeds and create safe crossing points for pedestrians. These pedestrian crosswalks will meet with buffered pedestrian "connections" designed to channel users from parking lots directing them uphill to face the campus and not parking. These landscape buffers will integrate LID such as vegetated swales, filter strips, and rain gardens that will help create a pleasant, memorable campus pedestrian dominated space and limit the visual impact of parking.

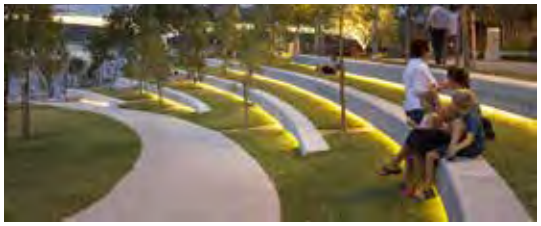
Landscape in this zone will conserve natural resources and promote functionality, incorporate native planting, and will be easy to maintain. Trees and sidewalk to the west of the road must be installed to maintain access to underground utilities. Large canopy trees that will be planted along Ring Road should be deciduous trees with textured foliage that will help mark the changing cool and hot seasons. Planting beds will contain a mix of ornamental grasses and evergreen groundcovers, perennials, shrubs, ornamental trees and canopy trees, with much more evergreen to balance deciduous grass plantings. Grasses will provide a unique sensory experience through grass texture and its movement in the wind. In this area, all plants should be selected for their lower maintenance than those in Zone 1 and 2 areas.




## Recreation / Athletics

This zone will be similar to the "Purple Streak" zone in the Stephenville campus. It will consist of colorful plantings in predominantly purple shades along campus edges walks and plazas. Because the landscape will be centered on athletics and student recreation facilities, the landscape in this location should be conducive to active living. Pockets of small greens or lawns should be integrated in the design of public spaces to encourage pick-up games of soccer, football and Frisbee. Planting beds should be naturalistic with swaths of color from evergreen ground-covers, perennials, shrubs, ornamental trees and canopy trees. In this area, all plants should be selected for their lower maintenance such that they require very little time, effort or irrigation. Land in the Athletic and Parking Zones that will not be developed can have an interim use, serving as a functional landscape for growing trees that will be planted in future phases of campus development.



## Low Impact Development

The following low impact development strategies should be considered for integrate into future building projects on the campus at the design stage:

- Flow through/infiltration planters
- Vegetated swales / grassy
- Rain Gardens / vegetated infiltration basins
- Pervious pavers
- Canopy tree and planting for rain capture






**Landscape Qualities**

The following Landscape Qualities are intended to ensure the quality and character of the campus outdoor environment. The Qualities that will be covered in this plan are comprised of elements related to the campus landscape, each with a set of recommendations. These are: a) Pavements b) Site Furniture and c) Lighting. These recommendations are based on stakeholder input and the overriding principles of site appropriateness and context, functionality, economy, quality and sustainability.

*Pavements*

In addition to cast-in-place concrete, two other types of pavement materials are indicated on the development plans. These materials have been recommended in order to add a deeper level of detail to the place-making aspects of proposed campus walkways. Both are described in more detail below.

- Concrete Unit Pavers. Concrete unit pavers offer the look of natural stone or clay brick pavers but hold up well to uses that are required on campus including maintenance and emergency vehicles. Concrete unit pavers are often utilized to create a visual change in the pavement through the use of multiple colors, textures and patterns. This will be accomplished throughout the campus in courtyard spaces and crosswalks.

- Colored Concrete. Colored concrete offers the opportunity to delineate the pattern along the two Quads and pedestrian corridors.

*Site Furniture*

Site furniture that is installed on campus must be well built, durable, easy and inexpensive to maintain. It must be consistent throughout the campus with little variation. These furnishings include benches, trash receptacles and bike racks. Many manufacturers offer cohesive furniture lines. Design continuity is best achieved when site furniture styles match.

*Lighting*

Parking, pedestrian and special area lighting should be provided throughout the campus. Lighting should be designed in order to provide a safe and secure area for drivers and pedestrians and to blend with the campus environment. Lighting fixtures should be placed to avoid becoming obstructions to the overall aesthetic and function of the campus outdoor spaces. Lighting should be installed around the perimeter of the parking areas in order to avoid them being obstacles for drivers. Additional accent lighting for special features can be added as budget allows.

## Signage

Developing a comprehensive messaging and signage program that unifies the campus environment and reinforces a sense of place will help build identity and communicate to visitors that they are entering the campus. A comprehensive design guidelines package will make the campus easy to navigate by working with the existing successful Tarleton brand to orient students, staff, faculty and visitors.

The signage recommendations in the Master Plan will outline the overall information and wayfinding strategy while providing detailed design guidelines for future implementation of the signage program. The sign family recommendations are based around the dynamics of the visitor experience as people approach the campus, orient themselves at entrances and find their destinations.

| The Experience | The Sign Type |
|---|---|
| A visitor typically approaches by car or bus | • Gateway,<br>• Vehicular Directional,<br>• Parking ID, Street ID |
| A visitor orients at entrance, then goes by foot or by shuttle | • Map Display, Pedestrian Directional, Walk ID |
| A visitor finds a destination | • Building ID |


*Building level signage on the Welcome Center at the Main Campus in Stephenville*


*Key wayfinding points within the campus framework*

*Stephenville Stone Gates*

**Gateway Signage**

The new campus in Fort Worth is part of Tarleton State University. With this important lineage comes a recognition of existing Tarleton traditions and identity which will be as ingrained within the new campus as it is within the Main Campus at Stephenville. In order to strengthen this relationship the concept plan suggests the inclusion of key features within the campus which draw from those at Stephenville, such as drawing on the red brick buildings with limestone accents while allowing for more contemporary design in new construction.

Another tie back to Tarleton tradition is the inclusion of stone gates at the entrance to the university on the formal quad. These gates both signify the main entrance to the campus creating a strong and positive relationship with future development to the west, but also form part of the wider Tarleton motif which links this new campus with Tarleton traditions. There are also locations within the campus, for example to the east of the first building, where Tarleton's embrace of public art and sculpture could be used to create a highly prominent land mark, visible form the toll way and in view within the campus in the future.

*Rendering of new pedestrian gateway to formal quad*

## Design Guidelines

To guide the future development of the campus to reflect the aspiration of the university leadership several key architectural guidelines are identified here which all future building projects should address as a means of bringing unity and character to the campus, as well as unity across the institution as a whole..

*Howell Building, Stephenville Campus*

**Over-arching Guidance**'

- Create a building with a sense of history and timelessness
- Not too much of an architectural statement, not Modern
- Ensure that space designs are multipurpose and shared wherever possible
- Take some elements from the Stephenville Campus, especially the Howell Building
- Create a building with architecture styles relevant to history but not reminiscent of a 'cowboy school

**Site Design Strategies**

Ensure that individual building and site design projects adhere to master plan design principles (As described above)

- Build on the Hill
- Align Quads to Views
- Align Roads to Topography
- Responsive Campus Edge
- Protective Campus Buffer

In addition, considerations should be given to:

- Orient buildings so that the main entrances face green open spaces
- Plan buildings so that they take advantage of the topography and have multi-level entrance and exit points as the buildings terrace down the hillside

**Architectural Elements**

Encourage the use of transitional elements that blur the lines between indoor and outdoor space.

- Purposeful placement of glass curtain wall at entry points or on ground floor where indoor-outdoor visibility is preferred

Provide pleasant and comfortable outdoor areas without excess sun or glare.

- Use brise soliel, pergolas, canopies etc. to provide sun shading
- Use arcades or loggias to provide shade-covering for outdoor walkways

Environmental branding of this type can also emphasize core values

*Solar Shading Techniques*

**Use of Materials**

Brick

- Use Tarleton Blend mix for red brick (E.g. Acme Brick Co. based in Fort Worth)

Stone

- Preference for Ashlar stone, which is a rectangular cut stone with size and texture variations

Metal

- Use metal accents for sun shading, room elements to provide vernacular character

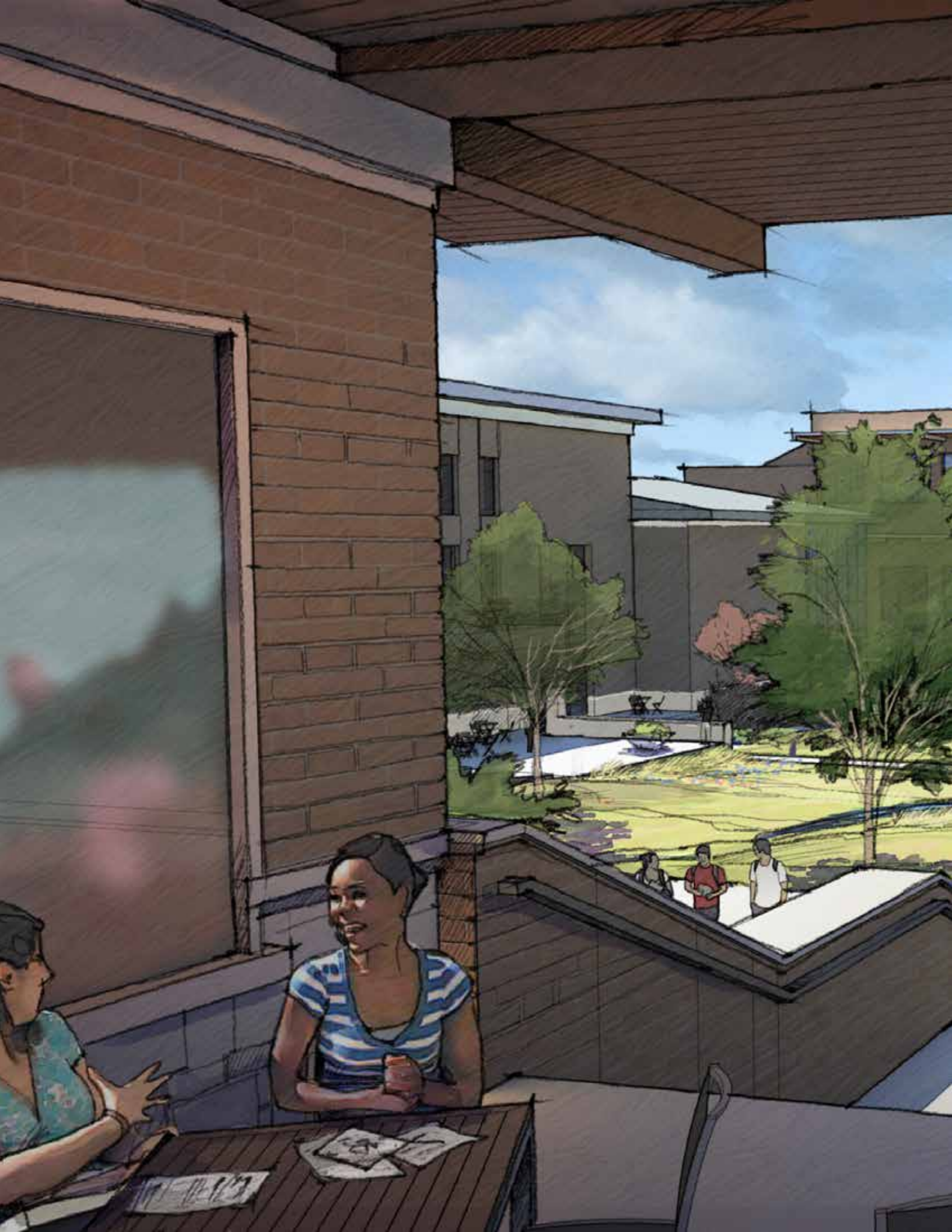
Glass

- Select a glass temperature that is neutral, fits historic buildings well
- Earth tones or warm grey
- Use high performance glazing for sun control

*Architectural Branding Examples*

*Architectural Material Examples*


*Annotated 3D Rendering identifying key Architectural Guideline Principles*



*Chisholm Green Rendering,*
*facing southwest from the first building*

## Phase One Master Plan

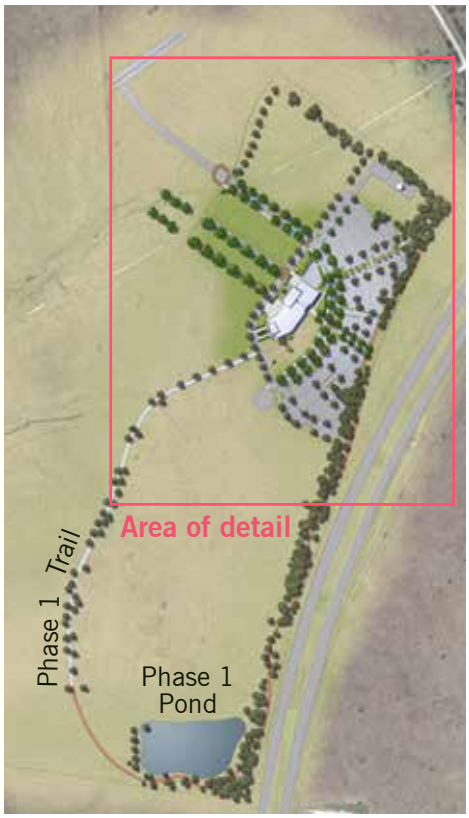
The first phase of the plan includes provision for the first building along with its associated parking, landscaping, and infrastructure. As noted in the previous section, this building is intended as a multipurpose space that will need to serve many functions until additional buildings come on line.

In order to serve this building, phase one will have to include an interior road to provide access to the buildings and parking. This road is intended to terminate just beyond the first building. This roadway will also contain major utilities sized for future expansion (for further detail please refer to Appendix A).

For emergency use, there will be a need for secondary vehicular ingress and egress. This is intended to be achieved along the northern edge of the formal (northern) quad. This road would serve initially as emergency vehicular access, and be converted in a future phase to a pedestrian only walkway along this formal greenspace as the campus grows and matures.

Also included in phase one are several parking lots with provision for roughly 650 parking spaces. These lots were identified as necessary to serve the 3,100 users of this building when it is at full utilization capacity. More distant lots included within the phase one outline could potentially be constructed later to save up-front building costs, and be brought on line when enrollment makes them necessary.

Finally, the phase one concept includes small landscaped and hardscaped areas outside of both entrances to the first building. The landscaped area on the east side of the building will become a part of the formal quad as the campus is built out, while the hardscaped area to the west will serve as plaza like entrance from the parking area. While the natural quad to the southwest will not come until a later phase, external circulation and landscaping in the immediate area of the building should be completed at this time.




A running trail will be created in phase one which connects from the first building to the east along the campus boundary and then back through the center of the campus. This route will gradually evolve over the life of the campus in to the main central pedestrian mall running north south on the campus.

To the south of the campus an area is identified for storm water detention. This area will be likely to remain dry, except during storm events. When it is dry, this area could serve as an amphitheater.

**Physical Plant**

**Campus Entrance**

**Near Term Development Sites**

**Phase 1 Parking**

**Formal Quad**

**Multipurpose Education Building 1**

**Chisholm Quad (Future)**

**Phase 1 Trail**

**Long Term Campus Development**

## Building From Here: The Next Phases

### Phase 2

As the campus grows, the next academic buildings are anticipated to be built adjacent to the first building along either side of the Formal Quad. These buildings are intended to create a sense of enclosure around this important campus space and establish a university feel even while the campus is early on in its development. Once this quad is completed, the next building to be added will be to the southwest of the First Building, beginning to frame the Chisholm Green. This second phase of growth is planned to accommodate an enrollment of 5,850 (headcount) bringing the campus to a total of approximately 360,000 gsf through the year 2026.

The Central Plant, located near the Chisholm Trail Parkway overpass intersection, will be significantly expanded in this phase of development as well.

The parking area grows to accommodate these additional buildings. The internal campus street is connected to University Drive at the center of the campus in this phase allowing the emergency access within the quad to become a dedicated pedestrian route.

To the south of the campus, to add to the recreation options at the campus, two soccer fields with supporting parking area is created. These fields tie into the trail route established in the first phase.

**Phase 3**

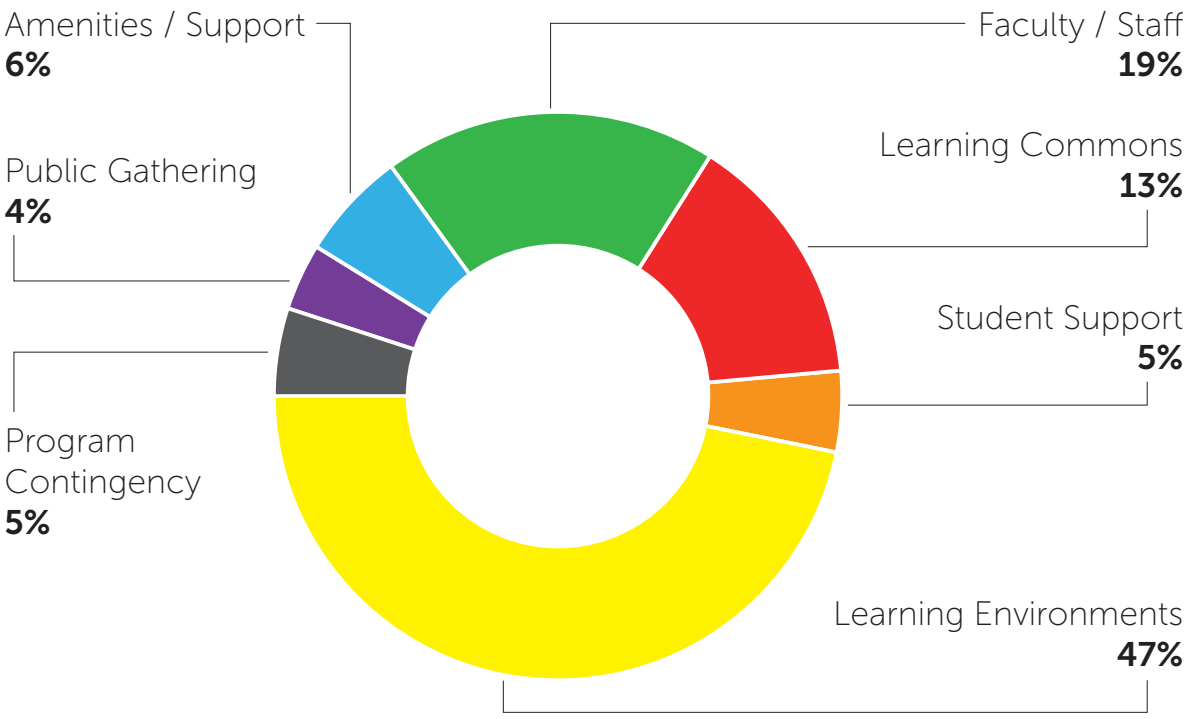
This next phase of development finishes out the main "campus core" area. Additional buildings are constructed flanking both sides of the Chisholm Green, and this major public space along with the lower pond are completed. Building footprints are shown that can accommodate larger and more flexible buildings which could house more specialized programs and student life space. The southernmost building in this phase is imagined as a hub of activity, and acts as a hinge between the northern and southern areas of the campus as it continues to develop. As the campus and growing student body continue to grow they will require student life, food service, and learning commons uses, and this building could house these uses. Parking is expanded southward to accommodate the need generated by the growth of campus.

This second phase of growth is planned to accommodate an enrollment of 9,000 (headcount) and adds roughly 275,000 gsf, bringing the campus to a total of 635,000 gsf through the year 2030.

## The First Building (Multipurpose Education Building)

**Program Summary**

Over the past several years, the university has grown by 10-20% per year rising from 579 students in Fall of 2007 to 1,720 students in Fall of 2016 (a net increase of more than 250% over ten years). Prior enrollment growth was served by increasing the amount of lease space in the Hickman Building, a 6-story office building in west Fort Worth. This solution has worked to cover the pragmatic needs of classroom space, but the space has not enabled the university to foster the collegial atmosphere and university environment conducive to providing the holistic, student-centered experience it hopes to achieve.



## Summary of Space Requirements by Area

| Areas | NASF | %NASF | % Internal Circulation | DGSF | Description |
|---|---|---|---|---|---|
| Learning Environments | 24,144 | 55% | 0.15 | 27,766 | Space used for formal instruction and learning; classes occur in these spaces |
| Learning Commons | 5,660 | 13% | 0.15 | 6,509 | Space used for any activity that supports learning |
| Student Support | 3,078 | 7% | 0.15 | 3,540 | Advising and administrative space dedicated to assisting students |
| Public Gathering | 1,140 | 3% | 0.15 | 1,311 | Central atrium |
| Amenities Support | 420 | 1% | 0.15 | 483 | Spaces that provide benefits to faculty, staff, and students |
| Faculty and Staff Areas | 9,074 | 21% | 0.15 | 10,435 | Spaced dedicated to facutly & staff use |
| Building Support | | | 0.15 | 3,190 | Spaces for building infrastructure |
| *Sub-Total* | *43,516* | *100%* | | *53,233* | |
| Efficiency Factor | | | | 70% | Utilitarian spaces and building circulation (not including central atrium) |
| Total Gross Building Area | | | | 76,048 | |

Tarleton State University, therefore, requires a new building to meet its programmatic requirements as well as to foster a true campus environment befitting the institution. Toward this end, the planning team developed a Program of Requirements for the first building on the new campus, a “Multipurpose Education Building” which will be home to Academics, Student Affairs, Faculty, Student Support and other spaces when the campus opens its doors. This first building is intended to be a 3-story, 76,048 gross square foot, facility that will serve as the heart of the university’s presence in Fort Worth and is targeted to open its doors for classes as early as the Spring 2019 semester.

**First Building Blocking Diagrams**
The blocking diagrams of the proposed 3-story building are for illustrative purposes only, demonstrating key concepts and deisred adjacencies but may not represent acutal building layout, which will be determined by the selected design architect.


**Level 1**


**Level 2**

**First Building - Design Considerations**

The building is intended to face out onto both the Formal Quad and Chisholm Green, mediating the transition between these two grand public spaces. It is intended to be an iconic element in the landscape, occupying the highest and most prominent point on the campus. The building has the challenge of having multiple "front doors" – one on each major green space and another facing the parking area. The grandest façade will face the Formal Quad, though the heaviest student traffic, particularly in the earliest years of the campus, may come from the parking area. As the campus evolves, students and other building users will shift to other entrances off these public spaces as they move between other buildings and classes.

There will be an ample lawn on the southeastern side, mediating the space between the parking and the building, allowing views and installation of public sculpture to serve as a local landmark. Loading and servicing for the building are tucked on its northeastern end, shielded from the street with appropriate landscaping.


**A** Landscape Plan

**B** Transportation Plan

**C** Civil Engineering Narrative

**D** MEP Narrative

**E** IT Narrative

# appendices A

**Appendix A - Landscape Plan**

# LANDSCAPE MASTER PLAN

## TARLETON STATE UNIVERSITY - FORT WORTH CAMPUS

The campus Landscape Master Plan at Tarleton State University Fort Worth builds on the identity, tradition and quality of the campus in Stephenville. The recommendations in this section are designed to promote a learning environment that enhances and supports campus life by creating exterior spaces that provide a sense of permanence and a setting for a variety of academic, social, recreational and cultural experiences. These goals align with the notion of fostering community and a sense of "ownership" among faculty, staff, and students.

The Landscape Zones:

- Respond to the region's aesthetic context, history and the local landscape character of the heritage grasslands and pastoral past
- Lay out circulation, open space and buffers with special attention to topography, views to and from the campus that limit visual impact to pedestrian and natural environments
- Integrate sustainable strategies and Low Impact Development (LID)
- Define campus edges, entrances, and gateways to promote university identity

Landscape Qualities and Signage:

- Emphasize the campus as a destination
- Highlight key attractions
- Enhance the user's experience
- Improve mobility
- Reinforce links
- Reinforce community identity and character
- Enhance campus design
- Develop a system that can be implemented
- Explore integrating a range of navigation tools

The Landscape Master Plan intent is to provide adequate design direction to facilities staff in developing and prioritizing landscape projects as well as guidance in implementing projects over time with flexibility and adaptability. In order to organize the design of the campus landscape plan, an overlay of the campus master plan was created. This overlay allowed for the creation of multiple landscape zones. Each zone's boundary is defined according to the commonality of design goals and objectives for the zone. Each zone has distinct requirements that are specific to location and context but integrated into the campus as a whole. The following narrative provides a description of the overall character proposed for the four zones. It defines each zone, landscape qualities, signage and describes the intellectual basis and the framework for applying each concept.

**Recommendations for additional landscape qualities, including paving, outdoor furniture, lighting, signage, etc. will be created in tandem with the first building design being undertaken by the Perkins+Will team and issued as an addendum to this document to supplement Appendix A.*

## LANDSCAPE ZONE | LEVEL 1

### FORMAL QUAD

This zone should convey a sense of place and meaning unique to the Tarleton brand and should communicate the University's values and mission in the design and execution of the project. The Formal Quad should incorporate information or details in the landscape to convey historical and cultural context; it provides a setting to develop campus landmarks that echo those of the Stephenville campus. Because the zone exemplifies the founding of the institution and the importance of education to the greater community, the area should be highly formalized highlighting the built environment as well as what will become a historical campus view. The design and development of the landscape adjacent to the College town street should emphasize the Academic building's prominence and the campus' physical and ceremonial center as it interfaces with the city. Great care should be taken to preserve the quads role as a symbolic place for observing graduations, institutional milestones, and special events that bring the campus and community together.

This zone requires the highest level of maintenance, attention to aesthetics and the installation of special plant species. Plant beds although limited to the edges of the main axis along the walkways and gateways should provide bright and uniform color and lush foliage that require regular care, time, effort and irrigation. Tree planting should frame walks leading to the Academic building and help create gathering spaces shaded by canopy trees and specimen oak trees. Because this zone is the heart of the campus, the planting palette should provide a textural and multi-sensory experience—with the use elm trees, which have exfoliating tree, bark and through fragrant shrub and groundcover selections. The expansive lawn in this area should be manicured by mowing and irrigating regularly. Plantings will be predominantly evergreen groundcovers, perennials, shrubs, and ornamental trees for year round foliage.

## LANDSCAPE ZONE | LEVEL 2

### INFORMAL QUAD + COURTYARDS

This landscape zone marks the major pedestrian crossroads of campus where outdoor social interaction takes place. This is the area where organizations and clubs will set up tables during mild weather and will be the primary location on campus for promoting activities and encouraging engagement among students as they move through campus. The zone is designed to provide the most dramatic views on campus and should accommodate both planned activities and impromptu gatherings. The quad's less formal character, use of native grasses, wildflowers, and trees that create a more natural feel is a response to the regional flavor, aesthetic context, and provides design sensibilities to the areas heritage grasslands and pastoral past.

The quad will use low impact development (LID) to help manage storm water as it travels from the top of the site towards Rocky Creek to the south and west. These strategies mimic the pre-development hydrology of the site using a combination of site planning and structural design strategies to control runoff rate and volumes. These include (1) structural methods such as infiltration planters, vegetated swales, rain gardens, rainwater collection, and pervious pavement and (2) non-structural methods such as reducing lawn areas, avoiding soil compaction, and minimizing impervious space. Because of the inherent natural qualities of LID practices, the level of maintenance for this zone is less intense than Zone 1. It will however still require regular care, time, effort and irrigation. The Informal Quad will include rolling topography and plantings that will consist of ornamental grasses, native shrubs and groundcovers, aquatic plants at the detention pond and very limited lawn areas. The area should be designed as a four-season landscape; with alternating colors and trees should be installed in natural groupings that create or accentuate views into campus from the street and of the pond from the campus.

Courtyards distributed throughout buildings and arcades create exterior rooms that provide collaborative settings for small groups. Generous plantings and a diverse materials palette are characteristics that will draw users to these courtyards. These elements help activate the space and provide visual interest, while their detail can be appreciated when the spaces are used for intimate gatherings and respite. Courtyards have the potential of becoming "anchors" of community life, facilitate, and foster broader, more creative interaction. Because these areas will be highly accessible and proximate for students, staff and faculty that will habitually congregate there these must be welcoming and comfortable.

Courtyards should be regularly maintained because of their importance in community building even if they fall at the inner sections away from the public edges of the campus. These community anchors should be shaded by canopy and specimen ornamental trees and lawn in these areas should be limited, mowed and irrigated regularly. Plantings will be a balanced mix of deciduous and evergreen groundcovers, perennials, shrubs, with textural foliage.

## LANDSCAPE ZONE | LEVEL 3

### PARKING + RING ROAD

The landscape in this zone should enhance pedestrian and vehicular circulation on campus. The design of Ring Road provides openness to the campus to the west side of the road, while the east side consists of planting, fencing and earthwork buffers that screen parking. Ring Road will be a tree lined complete street, with bike lanes and sidewalks, limiting view lengths to naturally slow speeds and create safe crossing points for pedestrians. These pedestrian crosswalks will meet with buffered pedestrian "connections" designed to channel users from parking lots directing them uphill to face the campus and not parking. These landscape buffers will integrate LID such as vegetated swales, filter strips, and rain gardens that will help create a pleasant, memorable campus pedestrian dominated space and limit the visual impact of parking.

Landscape in this zone will conserve natural resources and promote functionality, incorporate native planting, and will be easy to maintain. Trees and sidewalk to the west of the road must be installed to maintain access to underground utilities. Large canopy trees that will be planted along Ring Road should be deciduous trees with textured foliage that will help mark the changing cool and hot seasons. Planting beds will contain a mix of ornamental grasses and evergreen groundcovers, perennials, shrubs, ornamental trees and canopy trees, with much more evergreen to balance deciduous grass plantings. Grasses will provide a unique sensory experience through grass texture and its movement in the wind. In this area, all plants should be selected for their lower maintenance than those in Zone 1 and 2 areas.

## LANDSCAPE ZONE | LEVEL 4

### ATHLETICS

This zone will be similar to the Purple Streak Zone in the Stephenville campus. It will consist of colorful plantings in predominantly purple shades along campus edges walks and plazas. Because the landscape will be centered on athletics and student recreation facilities, the landscape in this location should be conducive to active living. Pockets of small greens or lawns should be integrated in the design of public spaces to encourage pick-up games of soccer, football and Frisbee. Planting beds should be naturalistic with swaths of color from evergreen groundcovers, perennials, shrubs, ornamental trees and canopy trees. In this area, all plants should be selected for their lower maintenance such that they require very little time, effort or irrigation. Land in the Athletic and Parking Zones that will not be developed can have an interim use, serving as a functional landscape for growing trees that will be planted in future phases of campus development.

## PLANTING LEVEL 1 | FORMAL QUAD

### CANOPY + ORNAMENTAL TREES


Chinquapin Oak | *Quercus muehlenbergii*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 10' height x 6' spread


Lacebark Elm | *Ulmus parvifolia*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread


Star Magnolia | *Magnolia stellata*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 6' height x 4' spread


Mexican Plum | *Prunus mexicana*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 10' height


Muskogee Crape Myrtle | *Lagerstroemia indica var. 'Muskogee'*

Deciduous Color: Light Lavender/Green Exposure: Full Sun
Minimum Planting Size: 10' height

## CANOPY + ORNAMENTAL TREES

Cedar Elm | *Ulmus crassifolia*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread

Shumard Oak | *Quercus shumardii*

Deciduous Color: Green/Red in fall Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread

White Fringe Tree | *Chionanthus virginicus*

Deciduous Color: White/Green Exposure: Part Shade
Minimum Planting Size: 10' height

Austrian Pine | *Pinus nigra*

Evergreen Color: Light/Dark Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread

## PLANTING LEVEL 1 | FORMAL QUAD

### SHRUBS + PERENNIALS

False Red Yucca | *Hesperaloe parvifolia*

Evergreen Color: Red/Green Exposure: Sun
Minimum Planting Size: 20" height x 12" spread

Fragrant Sumac | *Rhus aromatica*

Deciduous Color: Yellow/Green Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 14" height x 20" spread

Dwarf Crape Myrtle | *Lagerstroemia indica 'Acoma'*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 18" height x 24" spread

Texas Star Hibiscus | *Hibiscus coccineus*

Deciduous Color: Red/Green Exposure: Sun
Minimum Planting Size: 18" height x 24" spread

May Night Salvia | *Salvia x 'May Night'*

Deciduous Color: Purple Exposure: Full Sun
Minimum Planting Size: 6" height x 12" spread

Wavy Scaly Cloakfern | *Astrolepis sinuate*

Semi-Evergreen Color: Green Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

## SHRUBS + PERENNIALS

Kaleidoscope Abelia | *Abelia x grandiflora 'Kaleidoscope'*

Evergreen Color: Red/Yellow/Green/White Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Dwarf Yaupon Holly | *Ilex vomitoria var. 'Nana'*

Deciduous Color: Green/Red Berries Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 36" height x 24" spread

New Jersey Tea Plant | *Ceanothus americanus*

Deciduous Color: White/Green Exposure: Part Shade/Shade
Minimum Planting Size: 12" height x 18" spread

Texas Lantana | *Lantana urticoides*

Deciduous Color: Red-Orange-Yellow/Green Exposure: Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

Coralberry | *Symphoricarpos orbiculatus*

Deciduous Color: Yellow/Green Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 12" height x 18" spread

Cherry Sage 'Autumn Sage' | *Salvia greggii var. 'Autumn Sage'*

Evergreen Color: Red/Green Exposure: Full Sun
Minimum Planting Size: 12" height x 12" spread

## PLANTING LEVEL 1 | FORMAL QUAD

### GROUNDCOVERS + VINES

Gray Santolina | *Santolina chamaecyparissus*

Evergreen Color: Blue/Grey Exposure: Sun
Minimum Planting Size: 4" height x 12" spread

Lamb's Ear | *Stachys byzantine*

Deciduous Color: Green/Grey Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Purple Heart | *Setcreasea pallida*

Deciduous Color: Purple Exposure: Full Sun/Part Shade
Minimum Planting Size: 6" height x 12" spread

Wright's Skullcap | *Scutellaria wrightii*

Evergreen Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Carolina Jessamine | *Gelsemium sempervirens*

Semi-Evergreen Color: Yellow/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height

Incense Passion Vine | *Passiflora incarnate cinnicata var. 'Incense'*

Deciduous Color: Purple Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height

## GROUNDCOVERS + VINES

Damianita | *Chrysactinia mexicana*

Evergreen Color: Yellow/Green Exposure: Sun
Minimum Planting Size: 10" height x 12" spread

Mazus | *Mazus Reptans*

Deciduous Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Lily Turf | *Liriope muscari*

Deciduous Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 4" height x 6" spread

Fig Ivy | *Ficus pumila*

Evergreen Color: Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height

Madame Galen Trumpetcreeper | *Campsis x tagliabuana 'Madame Galen'*

Deciduous Color: Red/Orange Exposure: Full Sun
Minimum Planting Size: 18" height

## PLANTING LEVEL 2 | INFORMAL QUAD + COURTYARDS

### CANOPY + ORNAMENTAL TREES


Bur Oak | *Quercus macrocarpa*

Deciduous Color: Yellow/Green Exposure: Sun/Part Shade
Minimum Planting Size: 12' height x 6' spread


Lacey Oak | *Quercus laceyi*

Deciduous Color: Yellow/Green Sun: Part Shade
Minimum Planting Size: 12' height x 6' spread


Honey Mesquite | *Prosopis glandulosa*

Deciduous Color: Yellow/Green Exposure: Sun
Minimum Planting Size: 10' height


Roughleaf Dogwood | *Cornus drummondii*

Deciduous Color: White/Green Exposure: Part Shade/Shade
Minimum Planting Size: 10' height


Cooke's White Vitex | *Vitex agnus-castus var. 'Cooke's White'*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 6' height

## CANOPY + ORNAMENTAL TREES


Live Oak | *Quercus virginiana*

Deciduous (Appears Evergreen) Color: Green Exposure: Sun
Minimum Planting Size: 12' height x 6' spread


Bald Cypress | *Taxodium distichum*

Deciduous Color: Green/Red-Orange Exposure: Sun/Part Shade
Minimum Planting Size: 18' height x 6' spread


American Smoketree | *Cotinus obovatus*

Deciduous Color: Green/Red-Purple Exposure: Sun/Part Shade
Minimum Planting Size: 10' height


Mecian Buckeye | *Ungnadia speciosa*

Deciduous Color: Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 10' height

## PLANTING LEVEL 2 | INFORMAL QUAD + COURTYARDS

### SHRUBS + PERENNIALS

False Red Yucca | *Hesperaloe parvifolia*

Evergreen Color: Red/Green Exposure: Sun
Minimum Planting Size: 20" height x 12" spread

Rose Creek Abelia | *Abelia x 'Rose Creek'*

Evergreen Color: Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Possumhaw Holly | *Ilex decidua*

Deciduous Color: Green/Red Berries Exposure: Sun/Part Shade
Minimum Planting Size: 36" height x 24" spread

Flame Acanthus | *Anisacanthus quadrifidus*

Deciduous Color: Red/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Purple Coneflower | *Echinacea purpurea*

Deciduous Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Walker's Low Catmint | *Nepeta x faassenii 'Walker's Low'*

Deciduous Color: Lavender/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

## SHRUBS + PERENNIALS

Texas Sage | *Leucophyllum frutescens*

Evergreen Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 36" height x 24" spread

Upright Rosemary | *Rosmarinus officinalis*

Evergreen Color: Green Exposure: Full Sun
Minimum Planting Size: 18" height x 18" spread

Giant Coneflower | *Rudbeckia maxima*

Deciduous Color: Yellow/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Brazos Penstemon | *Penstemon tenuis*

Deciduous Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Black-Eyed Susan | *Rudbeckia hirta*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 12" height x 6" spread

Four Nerve Daisy | *Tetraneuris scaposa*

Deciduous Color: Yellow/Green Exposure: Part Shade
Minimum Planting Size: 12" height x 18" spread

## PLANTING LEVEL 2 | INFORMAL QUAD + COURTYARDS

### ORNAMENTAL GRASSES

Inland Sea Oats | *Chasmanthium latifolium*

Deciduous Color: Light Green Exposure: Part Shade/Shade
Minimum Planting Size: 24" height x 18" spread

Variegated Flax Lily | *Dianella tasmanica 'Variegata'*

Evergreen Color: Yellow/Green Exposure: Part Shade/Shade
Minimum Planting Size: 18" height x 6" spread

Gulf Muhly | *Muhlenbergia capillaris*

Deciduous Color: Pink/Purple Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 18" spread

Bamboo Muhly | *Muhlenbergia dumosa*

Deciduous Color: Light Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

## ORNAMENTAL GRASSES

Meadow Sedge | *Carex granularis*

Deciduous Color: Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 6" spread

Eulalia | *Miscanthus sinensis 'Adagio'*

Deciduous Color: White/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Weeping Lovegrass | *Eragrostis curvula*

Deciduous Color: Light Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

## PLANTING LEVEL 2 | INFORMAL QUAD + COURTYARDS

### GROUNDCOVERS + VINES

Sedum | *Sedum spp.*

Evergreen Color: Multi-Color Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Mazus | *Mazus reptans*

Deciduous Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Autumn Joy Sedum | *Sedum 'Autumn Joy'*

Evergreen Color: Pink/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Virginia Creeper | *Parthenocissus quinquefolia*

Deciduous Color: White/Green Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 18" height

## GROUNDCOVERS + VINES

Texas Frogfruit | *Phyla nodiflora*

Semi-Evergreen Color: White/Light Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Blackfoot Daisy | *Melampodium leucanthum*

Deciduous Color: White/Green Exposure: Sun
Minimum Planting Size: 10" height x 12" spread

Sweet Autumn Clematis | *Clematis paniculata*

Deciduous Color: White/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height

## PLANTING LEVEL 3 | PARKING + RING ROAD

### CANOPY + ORNAMENTAL TREES


Urbanite Ash | *Fraxinus pennsylvanica 'Urbanite'*

Deciduous Color: Yellow/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12' height x 6' spread


Valley Forge American Elm | *Ulmus americana 'Valley Forge'*

Deciduous Color: Yellow/Green Sun: Full Sun/Part Shade
Minimum Planting Size: 12' height x 6' spread


Chastetree | *Vitex agnus-castus*

Deciduous Color: Purple/Green Exposure: Full Sun
Minimum Planting Size: 6' height


Texas Redbud | *Cercis canadensis var. texensis*

Deciduous Color: Pink-Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 8' height


Warren's Red Possumhaw | *Ilex decidua 'Warren's Red'*

Deciduous Color: Green/Red Berries Exposure: Full Sun/Part Shade
Minimum Planting Size: 8' height

## CANOPY + ORNAMENTAL TREES

Allee Elm | *Ulmus parvifolia 'Emer II' Allee*

Deciduous Color: Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread

Ginkgo | *Ginkgo biloba*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 10' height x 6' spread

Desert Willow | *Chilopsis linearis*

Deciduous Color: White/Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 10' height

Pride of Houston Yaupon | *Ilex vomitoria 'Pride of Houston'*

Evergreen Color: Green/Red Berries Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 8' height

## PLANTING LEVEL 3 | PARKING + RING ROAD

### SHRUBS + PERENNIALS

Giant Red Yucca | *Hesperaloe funifera*

Evergreen Color: White/Green Exposure: Full Sun/Reflected Heat
Minimum Planting Size: 24" height x 24" spread

Rose Creek Abelia | *Abelia x 'Rose Creek'*

Evergreen Color: Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Dwarf Wax Myrtle | *Myrica pusilla*

Evergreen Color: Green Exposure: Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

Flame Acanthus | *Anisacanthus quadrifidus*

Deciduous Color: Red/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Pink Gaura | *Gaura lindheimeri*

Deciduous Color: Pink/Green Exposure: Full Sun
Minimum Planting Size: 12" height x 12" spread

Indigo Spires Salvia | *Salvia x 'Indigo Spires'*

Deciduous Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 12" spread

## SHRUBS + PERENNIALS

Littleleaf Sumac | *Rhus microphylla*

Deciduous Color: Red/Green Exposure: Part Shade
Minimum Planting Size: 18" height x 24" spread

Gray Cotoneaster | *Cotoneaster glaucophyllus*

Evergreen Color: Gray/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 24" spread

Hancock Snowberry | *Symphoricarpos x chenaultii 'Hancock'*

Deciduous Color: Pink/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 24" spread

Gregg's Dalea | *Dalea greggii*

Deciduous Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

Weber's Agave | *Agave weberi*

Evergreen Color: Green Exposure: Full Sun
Minimum Planting Size: 24" height x 24" spread

## PLANTING LEVEL 3 | PARKING + RING ROAD

### ORNAMENTAL GRASSES

Lindheimer Muhly | *Muhlenbergia lindheimeri*

Deciduous Color: Grey/Green Exposure: Sun
Minimum Planting Size: 24" height x 24" spread

Weeping Lovegrass | *Eragrostis curvula*

Deciduous Color: Light Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Little Bluestem | *Schizachyrium scoparium*

Deciduous Color: Blue/Grey Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Heavy Metal Blue Switchgrass | *Panicum virgatum*

Deciduous Color: Grey/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 12" spread

## ORNAMENTAL GRASSES

Mexican Feathergrass | *Eragrostis curvula*

Deciduous Color: Light Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Coolio Blue Hair Grass | *Koeleria glauca 'Coolio'*

Deciduous Color: Blue/Grey/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 12" spread

## PLANTING LEVEL 3 | PARKING + RING ROAD

### GROUNDCOVERS + VINES

Sedum | *Sedum spp.*

Evergreen Color: Multi-Color Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Damianita | *Chrysactinia mexicana*

Evergreen Color: Yellow/Green Exposure: Sun
Minimum Planting Size: 10" height x 12" spread

Pink Skullcap | *Scutellaria suffrutescens*

Evergreen Color: Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Green Santolina | *Santolina pinnata*

Evergreen Color: Light Yellow/Green Exposure: Sun
Minimum Planting Size: 4" height x 12" spread

## GROUNDCOVERS + VINES

Texas Frogfruit | *Phyla nodiflora*

Semi-Evergreen Color: White/Light Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Blackfoot Daisy | *Melampodium leucanthum*

Deciduous Color: White/Green Exposure: Sun
Minimum Planting Size: 10" height x 12" spread

Tangerine Beauty Crossvine | *Bignonia capreolata 'Tangerine Beauty'*

Semi-Evergreen Color: Orange Exposure: Full Sun
Minimum Planting Size: 18" height

Coral Honeysuckle | *Lonicera sempervirens*

Evergreen Color: Red-Yellow/Green Exposure: Sun/Part Shade
Minimum Planting Size: 18" height

## PLANTING LEVEL 4 | ATHLETICS

### CANOPY + ORNAMENTAL TREES


Chinquapin Oak | *Quercus muehlenbergii*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 10' height x 6' spread


Lacebark Elm | *Ulmus parvifolia*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread


White Fringe Tree | *Chionanthus virginicus*

Deciduous Color: White Exposure: Part Shade
Minimum Planting Size: 10' height


Redbud 'Forest Pansy' | *Cercis canadensis x 'Forest Pansy'*

Deciduous Color: Pink Exposure: Full Sun/Part Shade
Minimum Planting Size: 10' height


Natchez Crape Myrtle | *Lagerstroemia indica var. 'Natchez'*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 10' height

## CANOPY + ORNAMENTAL TREES

Cedar Elm | *Ulmus crassifolia*

Deciduous Color: Yellow/Green Exposure: Full Sun
Minimum Planting Size: 12' height x 6' spread

Lacey Oak | *Quercus laceyi*

Deciduous Color: Yellow/Green Sun: Part Shade
Minimum Planting Size: 12' height x 6' spread

American Smoketree | *Cotinus obovatus*

Deciduous Color: Green/Red-Purple Exposure: Sun/Part Shade
Minimum Planting Size: 10' height

Mecian Buckeye | *Ungnadia speciosa*

Deciduous Color: Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 10' height

## PLANTING LEVEL 4 | ATHLETICS

### SHRUBS + PERENNIALS

American Beautyberry | *Callicarpa americana*

Deciduous Color: Green/Purple Berries Exposure: Part Shade
Minimum Planting Size: 18" height x 24" spread

Bridal Wreath Spiraea | *Spiraea prunifolia*

Deciduous Color: White/Green Exposure: Full Sun
Minimum Planting Size: 24" height x 24" spread

Adam's Needle 'Color Guard' | *Yucca filamentosa*

Evergreen Color: Yellow/Green Exposure: Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

Harvard's Agave | *Agave havardiana*

Evergreen Color: Blue/Grey Exposure: Full Sun
Minimum Planting Size: 24" height x 24" spread

Lanceleaf Coreopsis | *Coreopsis lanceolate*

Evergreen Color: Yellow/Green Exposure: Sun/Part Shade/Shade
Minimum Planting Size: 12" height x 6" spread

Fall Aster | *Aster oblingifolius*

Evergreen Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 24" height x 24" spread

## SHRUBS + PERENNIALS

Texas Sage | *Leucophyllum frutescens*

Evergreen Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 36" height x 24" spread

Pale Leaf Yucca | *Yucca pallida*

Evergreen Color: Blue/Grey Exposure: Full Sun
Minimum Planting Size: 18" height x 18" spread

Butterfly Bush | *Buddleia davidii*

Deciduous Color: Purple/Green Exposure: Full Sun
Minimum Planting Size: 24" height x 18" spread

Purple Coneflower | *Echinacea purpurea*

Deciduous Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

Starry Eyes Nierembergia | *Nierembergia gracilis var. Starry Eyes*

Evergreen Color: Purple-White/Green Exposure: Sun/Part Shade
Minimum Planting Size: 12" height x 6" spread

Gregg's Blue Mistflower | *Eupatorium greggi*

Evergreen Color: Light Blue-Purple/Green Exposure: Full Sun
Minimum Planting Size: 18" height x 18" spread

## PLANTING LEVEL 4 | ATHLETICS

### ORNAMENTAL GRASSES

Lindheimer Muhly | *Muhlenbergia lindheimeri*

Deciduous Color: Grey/Green Exposure: Sun
Minimum Planting Size: 24" height x 24" spread

Weeping Muhly | *Muhlenbergia dubioides*

Deciduous Color: Green Exposure: Sun
Minimum Planting Size: 12" height x 12" spread

Dallas Blues Switchgrass | *Panicum virgatum x 'Dallas Blues'*

Deciduous Color: Purpleish/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 12" spread

Blonde Ambition Blue Grama | *Bouteloua gracilis 'Blonde Ambition'*

Semi-Evergreen Color: Chartruese/Green Exposure: Full Sun
Minimum Planting Size: 18" height x 18" spread

## ORNAMENTAL GRASSES

Mexican Feathergrass | *Eragrostis curvula*

Deciduous Color: Light Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height x 24" spread

Eulalia | *Miscanthus sinensis 'Adagio'*

Deciduous Color: White/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 12" height x 18" spread

## PLANTING LEVEL 4 | ATHLETICS

### GROUNDCOVERS + VINES

Sedum | *Sedum spp.*

Evergreen Color: Multi-Color Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Periwinkle | *Vinca minor*

Evergreen Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 6" height x 12" spread

Wright's Skullcap | *Scutellaria wrightii*

Evergreen Color: Purple/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Jackmanii Clematis | *Clematis x 'Jackmanii'*

Deciduous Color: Purple/Green Exposure: Full Sun/Part Shade
Minimum Planting Size: 18" height

## GROUNDCOVERS + VINES

Texas Frogfruit | *Phyla nodiflora*

Semi-Evergreen Color: White/Light Pink/Green Exposure: Sun/Part Shade
Minimum Planting Size: 4" height x 12" spread

Purple Heart | *Setcreasea pallida*

Deciduous Color: Purple Exposure: Full Sun/Part Shade
Minimum Planting Size: 6" height x 12" spread

Chinese Wisteria | *Wisteria sinensis*

Deciduous Color: Purple/Green Exposure: Full Sun
Minimum Planting Size: 18" height

# Transportation Plan

VHB's role on this project is centered on assessing vehicular access to the new campus, establishing pedestrian connections to and from the first building, right-sizing parking supply during the initial phase of campus development, and identifying future considerations for pedestrians, bicyclists, and transit riders.

Established campuses with robust parking and transit options are typically concerned with balancing the parking demand with alternative transportation modes. This typical scenario is not the case for Tarleton State University because this is a new campus within a suburban setting with no on-campus housing and no existing transit service.

This memo will present transportation considerations in order of significance to Tarleton State campus:

1. Vehicular Access
2. Vehicular Circulation
3. Parking Demand
4. Pedestrian
5. Bicycling
6. Transit

## Vehicular Access

Because of its ranchland location and significant distance from the City of Fort Worth, it is appropriate to view Phase 1 of development as analogous to that of a community college campus, with 90 percent of students, faculty, and staff arriving by vehicle and the remaining 10 percent by carpool. Transit service from Fort Worth Transportation Authority (FWTA) system currently circulates within eight (8) miles of the campus, and it may be several years before development density is significant enough to justify shifting transit routes to the south to service campus locations. Bicycling to campus will be likewise limited or non-existent for novice, intermediate, and even experienced cyclists.

Traffic engineering guidance suggests that the AM peak period will be slightly lower than the PM peak period. Travel behavior patterns suggest that people will typically arrive at staggered intervals in the morning, but will leave at the same (or similar) time in the evening. This pattern holds true for college campuses, employment centers, and even special events such as concerts or athletic events. Tarleton State University should anticipate a morning wave of employee vehicles traveling southbound along Brewer Road, Stewart Feltz Road, University Drive, and Campus Loop Road. This wave of vehicles may be more apparent during the PM peak period, where at 5 PM one could anticipate a line of vehicles exiting the campus parking lots and heading northbound along Brewer Road to the MacPherson Boulevard interchange along the Chisholm Trail Parkway toll road.

In the near term, the first building on the Tarleton State campus is scheduled to open for the 2019 Spring Semester. Students and employees arriving from the north will exit the Chisholm Trail Parkway at the MacPherson Boulevard exit. Drivers will turn right from a signalized intersection onto MacPherson Boulevard, a four-lane, median-divided commercial connector. From a signalized intersection, drivers will turn left onto Brewer Road and head south for 2.6 miles along a four-lane, median-divided neighborhood connector. The intersection with Stewart Feltz Road will represent the end of Brewer Road, which is scheduled to be extended further to the south at a future date as a two-lane neighborhood connector. A roundabout has been proposed for this intersection; the roundabout will maintain traffic flow as opposed to a traditional signalized intersection which requires traffic to stop. Drivers will exit the roundabout onto eastbound Stewart Feltz Road, which will be partially constructed until a future interchange is constructed by the North Texas Tollway Authority (NTTA) along the Chisholm Trail Parkway. Drivers will turn right onto University Drive, and left onto the Campus Loop Road before arriving at a parking lot along the periphery of campus.

Under future conditions, drivers will exit the Chisholm Trail Parkway at the Stewart Feltz Road exit (future interchange). This roadway will be constructed as a four-lane, median-divided commercial connector, similar to MacPherson Boulevard. Unless the median is broken to allow left turn access onto University Drive, drivers must pass through the roundabout located at the intersection of Stewart Feltz Road and Brewer Road to access campus. Traffic movements should be evaluated by a registered professional engineer, licensed in the State of Texas, for future roadway and intersection conditions.

## Vehicular Circulation

Phase 1 of the campus will include one campus entrance (Campus Loop Road) and an additional, temporary, construction entrance. Campus Loop Road should be designed as a three-lane, undivided roadway with a curb-to-curb width of 34-36 feet. Travel lanes should be a minimum of 11 feet wide, and are typically 12 feet wide to allow for larger vehicle turning movements and passing of stopped vehicles. The center turn lane will be essential for left-turning vehicles accessing the campus parking lots and loading docks, and for exiting vehicles turning left or right onto University Drive. Students, employees, visitors, and delivery vehicles will all utilize the one entrance roadway for the near term, with a separate construction entrance provided for other vehicles. This one campus entry for students, employees and visitors may present challenges for turning movements of larger vehicles, such as delivery box trucks, waste management and recycling trucks, or passenger van/bus vehicles. Vehicle stacking length for left turning movements into parking lots as well as the placement of entry/exit driveways to these parking lots will need to be evaluated to avoid potential conflicts with pedestrian crossing locations from parking lots to campus buildings.

In the longer term, a second campus entry point along Campus Loop Road will be opened further to the south. This will allow vehicle access to parking without traveling past the pedestrian crossing locations near Building One.

The campus wide posted speed limit should be 25 mph or less, ideally 20 mph if allowable. The number of driveways along the Campus Loop Road should be limited to the fewest number of logical locations to serve building loading areas and parking facilities.

## Parking Demand

The estimation of peak period parking demand for an educational institution can be derived from a variety of metrics: building gross square footage types, number of seats in the largest assembly hall, student enrollment and employee headcounts, or other measures. Each of these metrics has a varied range of low, median, or high values depending on the type of college campus (community college or traditional university).

Initial parking demand for this campus has been assessed based on information derived from the schematic design of the first building, total seats, THECB targets for seat utilization, and current and projected student, faculty, and staff peaks. The schematic design for the first building contains 694 seats (Classrooms: 13 rooms, 455 seats; Event Space Classrooms: 2 rooms (when divided), 100 seats; Class Labs: 4 rooms, 139 seats)

**Peak Student Demand Estimation**

| Room | Total Seats | THECB Utilizatoin | Peak Parking Demand |
|---|---|---|---|
| Classrooms | 555 | 65% | 361 |
| Class Labs | 139 | 75% | 104 |
| Peak Students | | | 465 |

Seat utilization targets set by the THECB are 75% for classroom and 65% for class labs. Following these guidelines we can arrive at an expected peak of students.

Taking the existing peak of students (362), and projected future peak arrived for the first building in the table above (465) we can apply a multiplier of 1.28 to the existing peak of faculty and staff (30) to arrive at a projected peak for faculty and staff (39), which assumes an increase proportional to the student increas. Adding these two projected peaks together, we arrive at a peak demand of 504. This number is being used as the parking need for the schematic design of the first building.

**Total Parking Demand Estimation**

| Room | Current Peak | Multiplier | Projected Peak |
|---|---|---|---|
| Students | 362 | 1.285 | 465 |
| Employees | 30 | 1.285 | 39 |
| Total Demand | | | 504 |

Not all parking spaces must be paved and striped stalls, especially in the early years of the campus. Overflow parking can be provided as temporary gravel parking areas that may be shared with construction crew parking, staging, and material laydown space.

## Parking Lot Design

Tarleton State should establish a minimum parking stall dimension of 9-foot wide by 18-foot long. Parking lots should be designed as perpendicular parking stalls, with parking around the perimeter of the lot. The remaining parking stalls should be designed along the longest length of the parking lot (not the width) to minimize the number of drive aisles and maximize parking space efficiency.

Parking lots should be designed for two-way travel lanes, with a 24-foot minimum drive aisle (for both directions of travel) unless there are topography constraints that require one-way travel. All parking lots should be interconnected to allow traffic flow through as many driveway access points as possible. Movable bollards may be utilized to create smaller-sized parking areas as needed for visitor or special event parking.

## Pedestrian

Phase 1 of the campus development plan suggests three primary roadway crossings of Campus Loop Drive, connecting the surface parking lots with Building One. These three crossing locations directly align with campus pathways that serve as primary pedestrian corridors to the campus quad. Pedestrians will naturally travel in direct paths from their vehicle to their destination. These tendencies may lead to unsafe pedestrian crossings of the roadway in several locations and potential conflict with vehicles.

Tarleton State should use landscaping and hardscaping materials to guide or channelize pedestrians to the three crossing locations. There are a variety of vegetation options (plantings, bushes), landscaping materials (mulch, pinestraw), stormwater control devices (swales or retention areas), or physical barriers (low walls, fencing, post and chain) that will help guide pedestrians. Examples of these pedestrian guiding materials are included in Figures 1 through 3).

Campus Loop Road should include a 3-foot (minimum) vegetative strip between the back of curb and sidewalks along both sides of the roadway, separating pedestrians from vehicles. This vegetative strip may also be utilized for pedestrian channelization materials.

## Bicycle

Bicycle racks should be installed incrementally on new campus with each new building project, and should be conveniently located nearest a building entrance to incentivize this alternative mode of commuting. Building One should include at least one location for bicycle rack parking, even if no students or employees are expected to arrive on bicycle. Bicycling to campus is a transportation mode that slowly grows over time, and will become more popular as the campus and surrounding areas develop. A lack of bicycle parking would likely deter students and employees from choosing this alternative mode in the future.

The ideal bicycle rack style is the "Inverted-U" design, which allows for two points of contact for the bicycle to rest (Figures 4 and 5). Bicycles that are secured to racks with only one point of rest are prone to tipping over (Figure 6). Bicycle racks should be installed to a concrete pad, and avoid obstructing the pedestrian pathway (Figure 7). Building overhangs are ideal locations for bicycle racks as they provide covered parking; however, this amenity is not always possible. Examples of good and poor bicycle rack placement are included in Figures 7 and 8, respectively.

For the near term, amenities such as on-road bicycle pavement markings, signage, and intersection treatments are not necessary. In the longer term, the posted speed limits will be low enough to allow for Shared Lane Markings for bicycles (Figure 9). This treatment is ideal for college campus roadways such as Campus Loop Road and University Drive, allowing bicycles to operate within the travel lane for improved visibility and safety. Shared Lane Markings can save 10 feet of roadway pavement width by eliminating the need for dedicated bicycle lanes. Bicycle lanes are more appropriate for roadways that are posted as 35 mph (such as Brewer Road or Stewart Feltz Road) or roadways with steep topography.

## Transit

The Fort Worth Transportation Authority (FWTA) provides 35 fixed routes within the City of Fort Worth. The nearest transit route to the future Tarleton State campus loops within eight (8) miles of campus (Route 6 and Route 32). It is unlikely that development density surrounding the campus will be significant enough for the FWTA to modify its routes and serve the campus in the near-term. If a fixed-route transit service to campus is not feasible in the near term, Tarleton State could assess the feasibility of running a park-and-ride shuttle service as an option for students, if demand is strong enough to support this option. Tarleton State should administer an annual transportation survey of its students and employees to assess this feasibility, and should track responses over time to evaluate their changing perspectives before funding transportation system improvements.

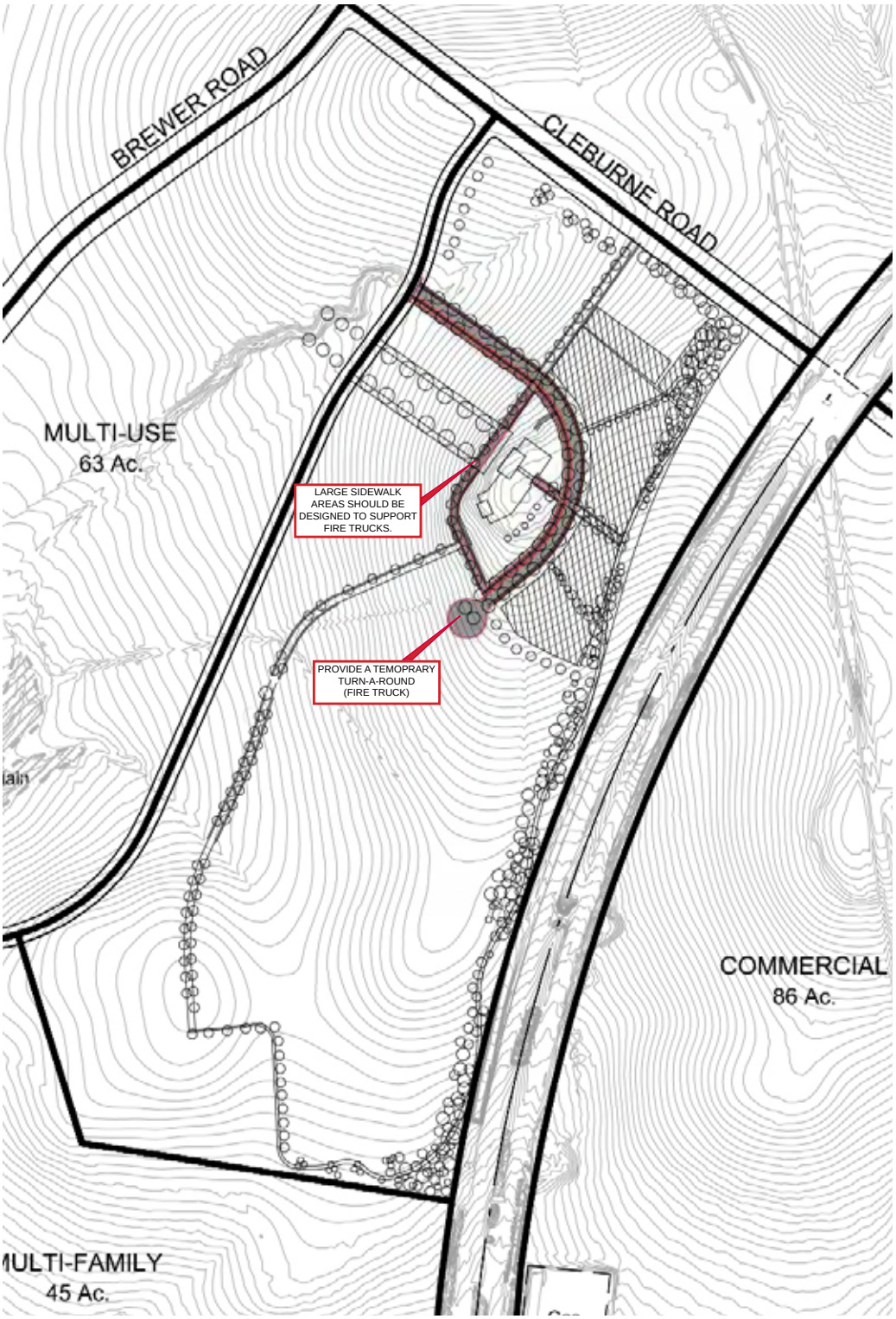
In the longer term, University Drive is an ideal location for future transit service, shelters, and amenities. Buses have larger turning radii and would require a larger roadway intersection design. Tarleton State should reserve locations for future transit shelters along University Drive on opposite sides of the formal Quad. Transit riders will exit the bus, walk to the rear of the bus, cross University Drive at a safe and convenient location, and connect directly with campus pathways along the Quad.

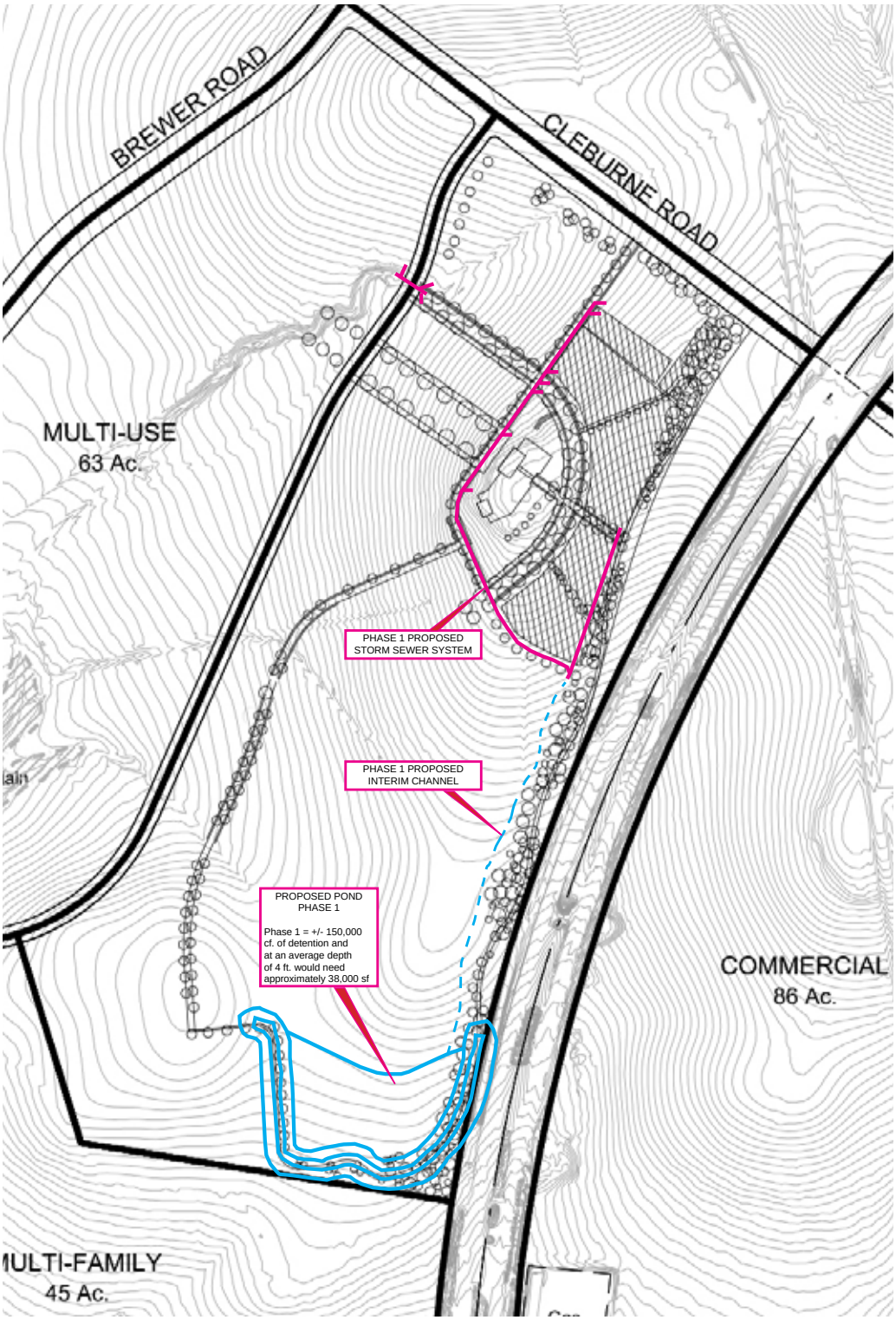
# Civil Engineering Narrative

The following Civil Engineering narrative describes the nature of the on-site improvements needed for the development of the project.

## Transportation:

The extension of the off-site roadways will be completed by the developer at the developer's cost. The internal ring-road (36 feet wide foc-foc) should terminate at a temporary turn around suited for a fire truck. The larger pedestrian sidewalks (20 feet wide) should also be designed to withhold fire trucks.





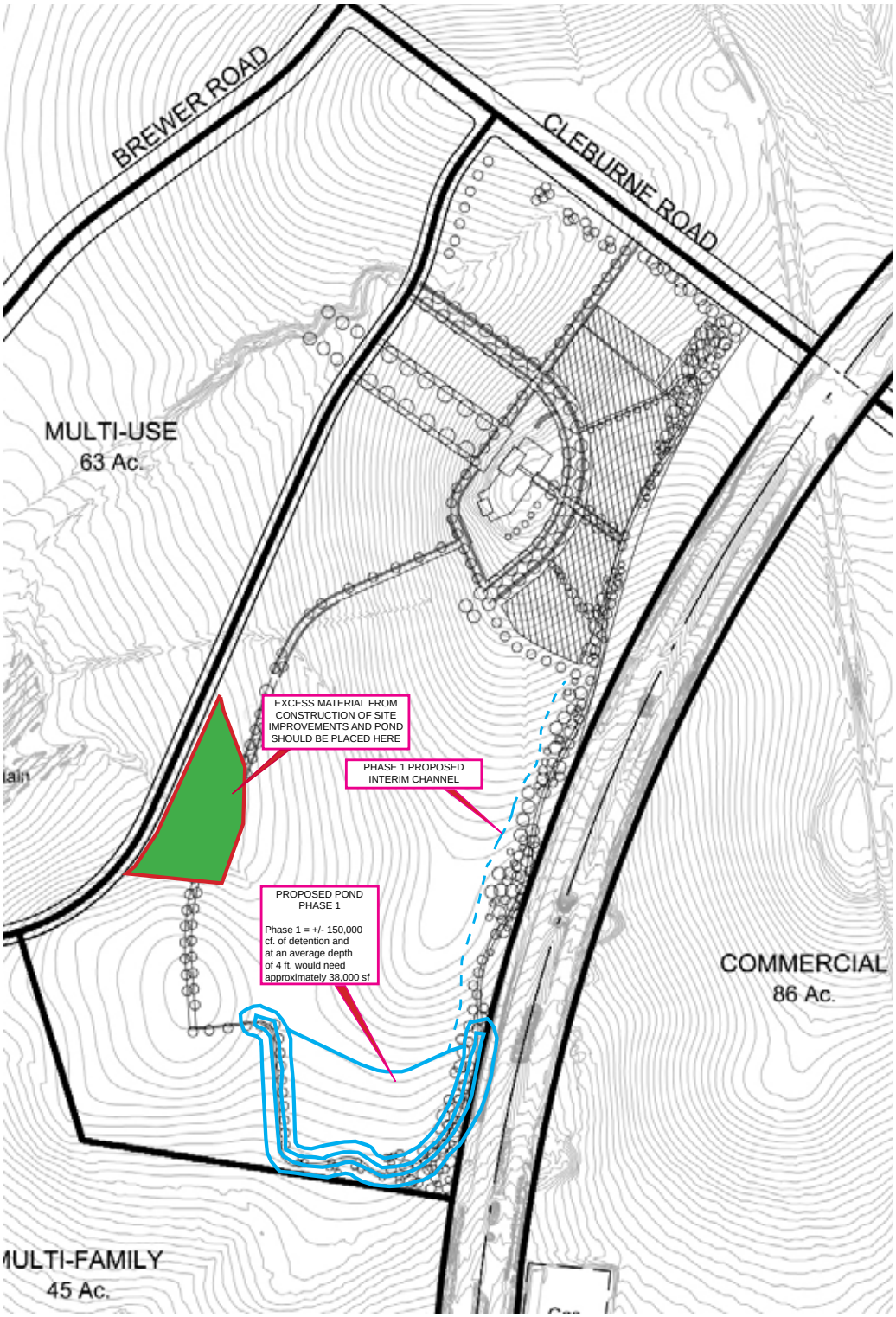

## Drainage:

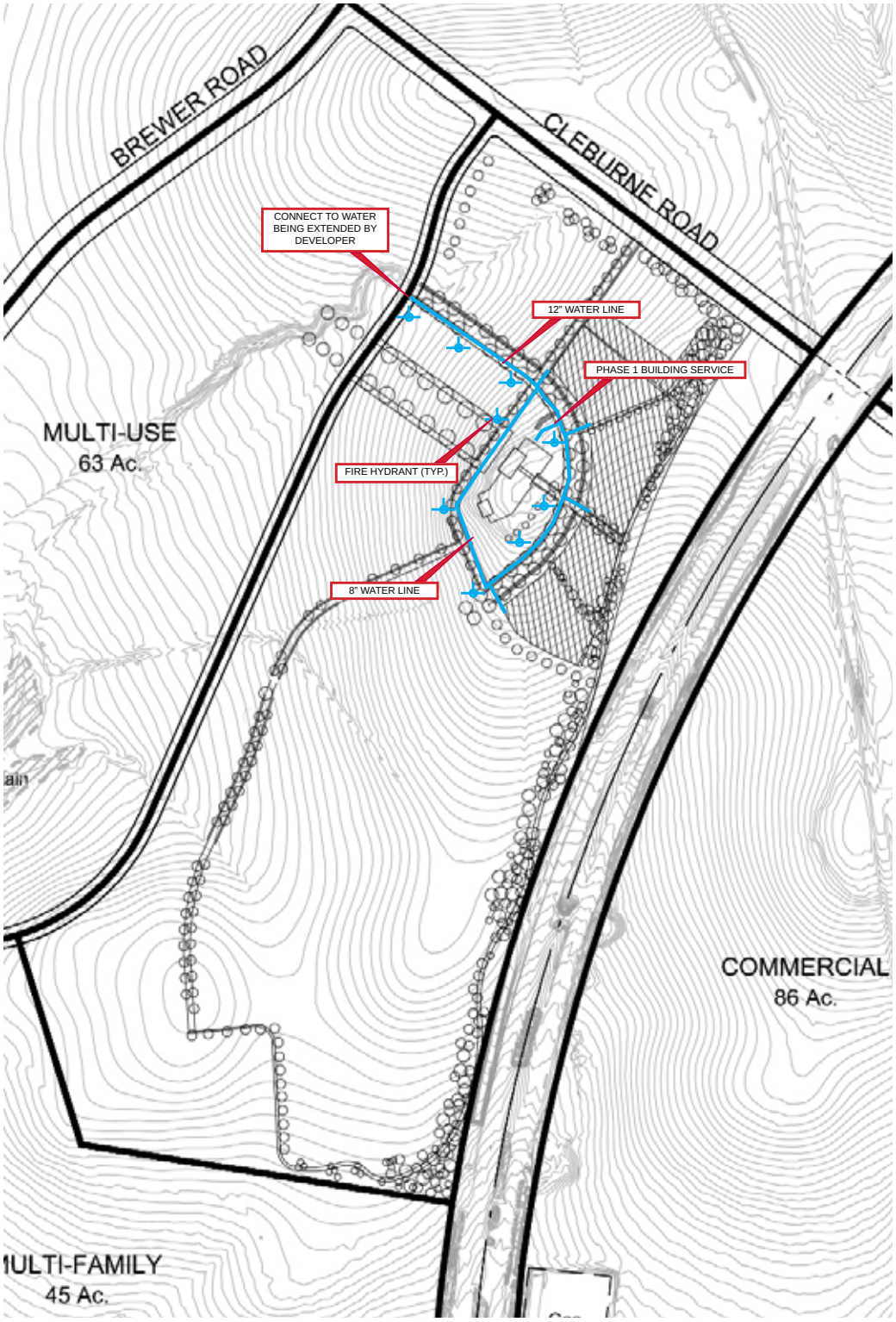
While most of the property flows from northeast to southwest the runoff is intended to be collected and routed to a detention pond located on the southern end of the property. The initial phase will require approximately 150,000 cubic feet of detention volume.

Assuming an average depth of approximately 4 feet the footprint of the detention pond will be approximately 1 acre in size. Any excess material from pond and channel should be placed onsite in the area identified in the grading plan.

## Grading:

It is anticipated excess material will be generated with the first phase of construction. This material should be placed in the area identified on the exhibit. Future phases will continue to level that area out with the placement of fill. The site should be assumed to be balanced with only select material being imported for building pads (if required).



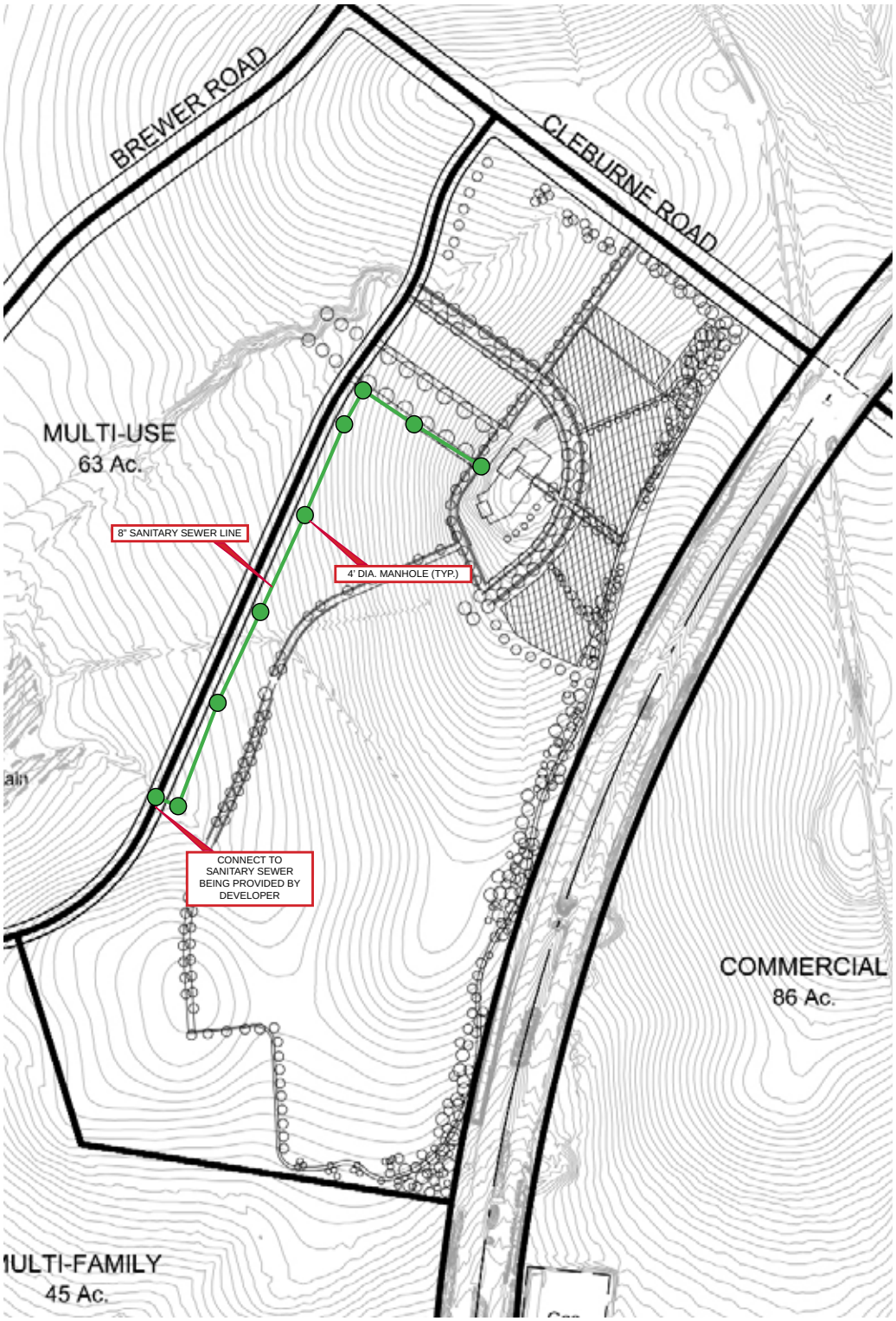


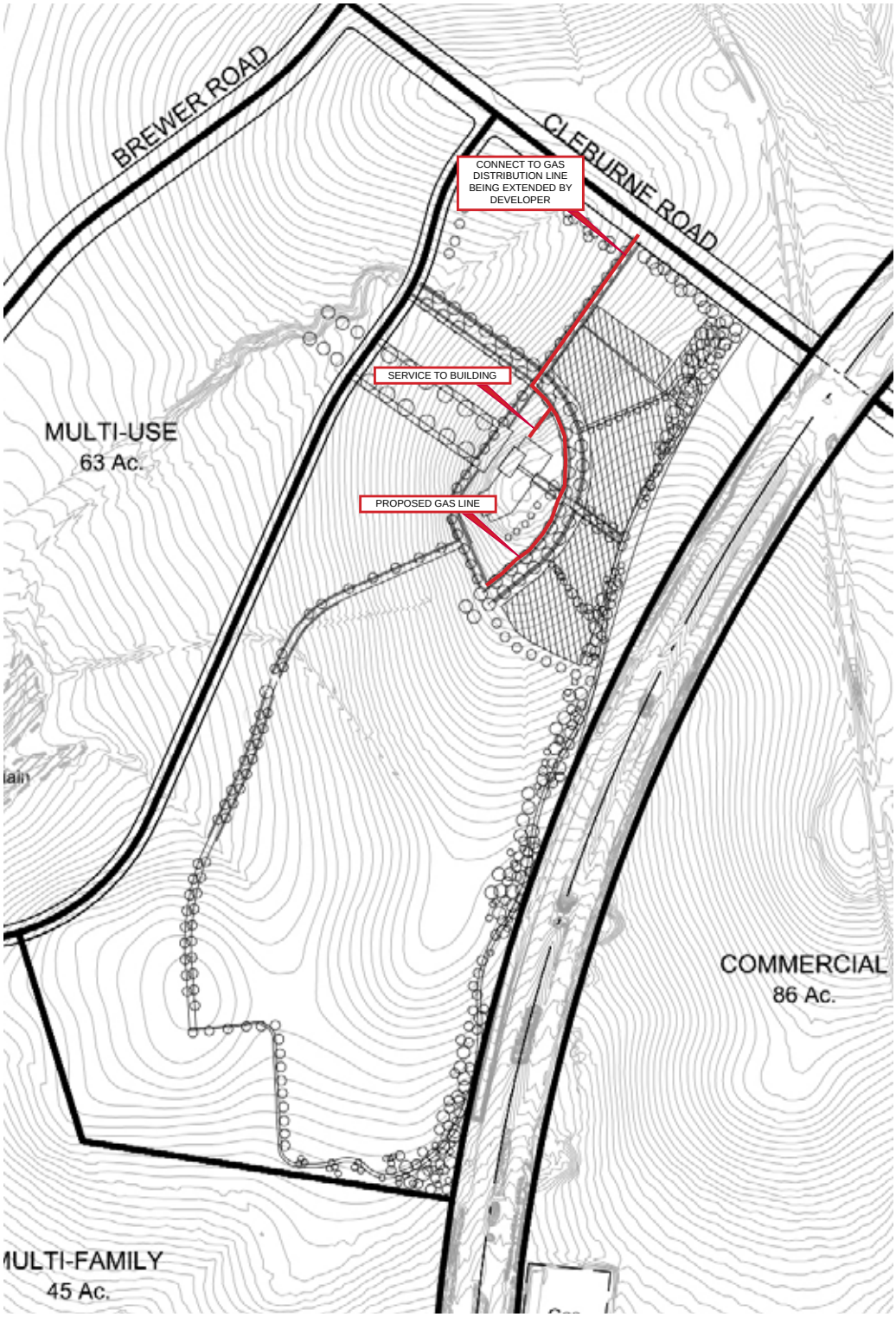

## Water:

A 12” water line will be brought to the site and will be on the east side of the public street bordering the campus. A single master meter (fire demand meter) will serve the first building and 12” line will be extended adjacent to the internal ring road. Fire Hydrants should be placed at a minimum every 300 feet along the ring road. An 8” fire line should be placed on the west side of the proposed building to create a loop around the phase 1 building.

## Sanitary Sewer:

An appropriately sized gravity sewer line will be extended by the developer to the southwest corner of the property. An 8" line should then be extended adjacent to future street ROW to the proposed formal quad and then follow the pedestrian and utility corridor adjacent to the quad up to the first building. Manholes (4' diameter) will be required every 500 feet at a minimum.






## Gas:

Gas will be extended to the property by the developer to a location that will be near the future central plant. Once on the property the gas line will be extended to the common utility trench / corridor to service each building.

# MEP Technical Narrative

## *Mechanical*

### Initial Building - Phase 1

The HVAC requirements of the Academic-Multipurpose building will be met by two 100% redundant, 305-ton air cooled chillers and two 100% redundant, 2500 MBH gas-fired condensing type boilers. Separate boilers will provide domestic hot water.

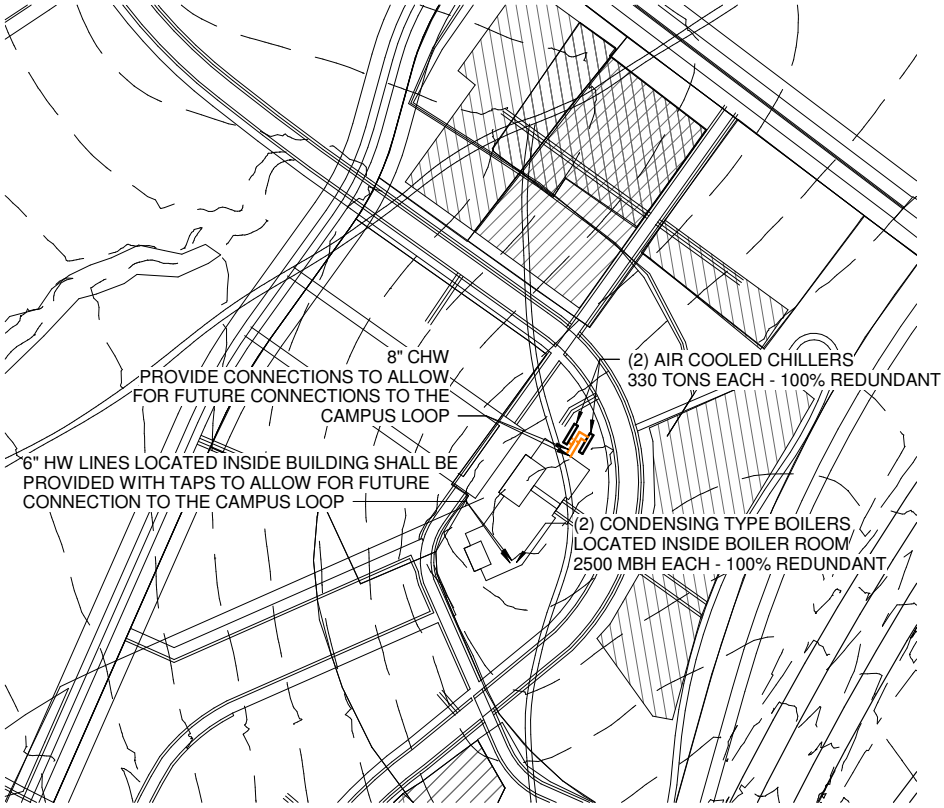
The recommended VFD drive screw type chillers will be located outside on the north side of the building. See attached drawings indicating the approximate chiller locations that have been coordinated with the proposed service yard and loading dock areas. The Architect will provide walls around chillers to improve aesthetics and reduce chiller noise. Adequate space around the chillers shall be provided to maintain the manufacturer's service clearance and chiller performance. Screw type chillers were chosen as they operate more efficiently than reciprocating air cooled chillers for this size and load. Air cooled chillers are recommended for this first building versus water cooled to reduce the capital cost of installing a cooling tower in this initial phase. SSA recommends a variable-primary chilled water pumping arrangement to reduce first cost and pumping energy in the long term. 100% redundant CHW pumps are to be located inside the building in the first level mechanical room.

The boilers recommended are condensing type as they are more efficient modular boiler types and will have a smaller footprint than other types. The boilers shall be located inside the building in a 20'x 28' 1st level mechanical/boiler room that will house the CHW and HW pumps. SSA recommends a primary-secondary hot water pumping arrangement. 100% redundant HW secondary pumps shall be provided.

The building thermal piping will be configured to allow future connection to the future utility corridor so the central plant may serve the Multipurpose building's load in the next development phase.

| Phase | Year | Bldg Tag | Building | Gross sq ft. | Peak Cooling Load (Tons) | Peak Heat Load MBH |
|---|---|---|---|---|---|---|
| Phase I | 2019 | 1 | Academic - Multipurpose | 76,048 | 305 | 2,281 |
| Phase 2 | 2026 | A | Academic - General Classroom | 88,287 | 321 | 2,207 |
| | | B | Academic - Health Professions | 112,764 | 451 | 2,819 |
| | | C | Student Services Center | 64,563 | 258 | 1,614 |
| | | D | Central Plant & Offices | 20,000 | 100 | 625 |
| Total Phase 2 | 2026 | | | 285,614 | 1,110 | 7,140 |
| Cumulative Total | | | | 361,662 | 1,415 | 9,422 |
| Phase 3 | 2030 | E | Academic - General Classroom | 114,129 | 415 | 2,853 |
| | | F | Academic - General Classroom | 60,312 | 219 | 1,508 |
| | | G | Student Union/Dining/Health Center | 98,586 | 438 | 2,958 |
| Total Phase 3 | 2030 | | | 273,027 | 1,072 | 7,319 |
| Cumulative Total | | | | 634,689 | 2,487 | 16,740 |
| Phase LT | TBD | P | Academic Research | 65,000 | 289 | 1,950 |
| | | Q | Academic Research | 60,000 | 267 | 1,800 |
| | | R | Academic Research | 60,000 | 267 | 1,800 |
| Total LT | TBD | | | 185,000 | 822 | 5,550 |
| Cumulative Total | | | | 819,689 | 3,309 | 22,290 |
| Overall Total | | | | 819,689 | 3,309 | 22,290 |
| Diversified Total | | | | | 3,000 | 20,000 |

| No. | Description | Date |
|---|---|---|




## 1 MECH SITE PLAN - PHASE 1 (FIRST BLDG)

1/16" = 1'-0"

**LEGEND**

- PHASE 1
- PHASE 2
- PHASE 3
- PHASE LONG TERM

True NORTH

0' 16' 32'

1/16" = 1'-0"

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| TARLETON STATE FORT WORTH<br>MASTER PLAN<br>Enter address here | Shaw Smith & Associates, Inc.<br>2825 Wilcrest, Suite #350 Houston, Texas 77042<br>Ph. 713.780.7563 Fax.713.780.9209<br>Texas Registered Engineering Firm F-2113 | Sheet Name:<br>MECH SITE PLAN - PHASE 1 (FIRST BLDG) | Project No.: 1105-009-01<br>Date: 02/18/2016<br>Designed By: Designer<br>Checked By: Checker<br>Scale: As indicated | Drawing No.<br>MEP-1 |

## Phases 2-3 & Long Term

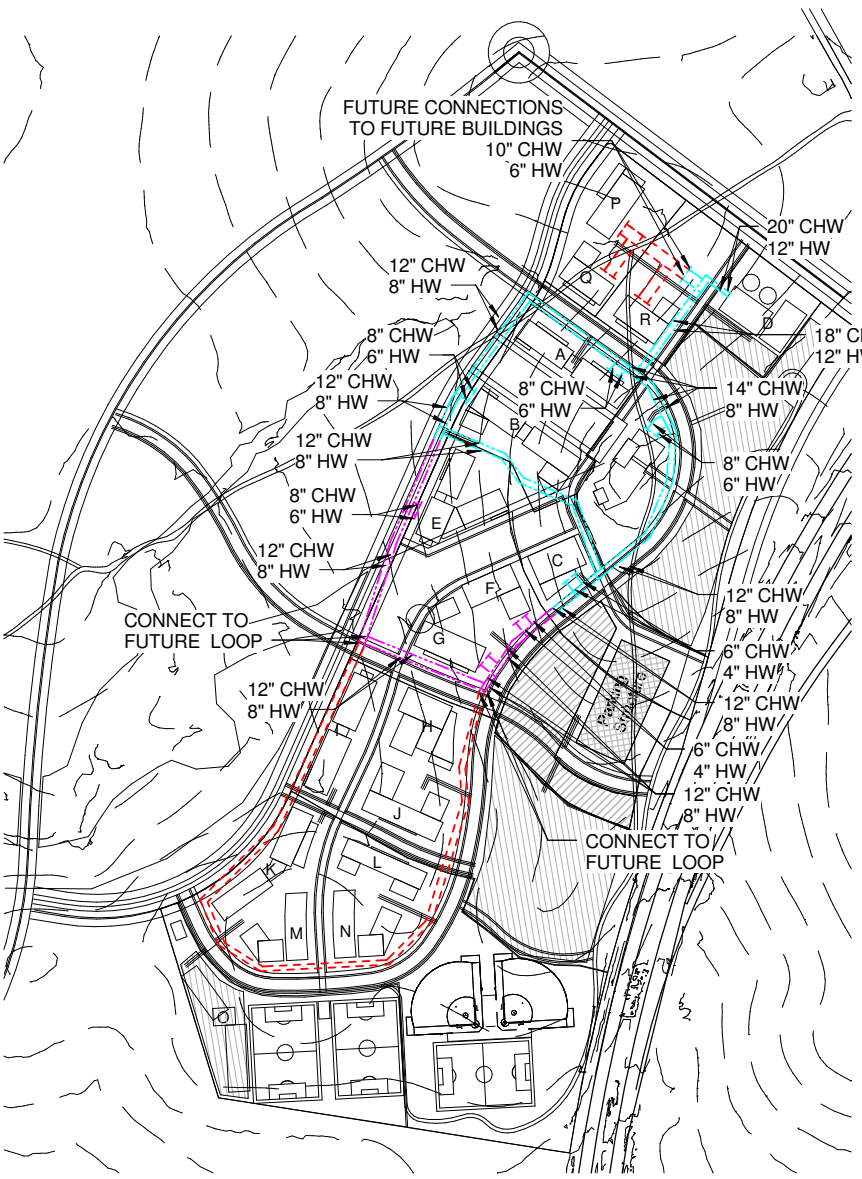
**Central Utility Plant**
In this phase, a significant portion of the thermal infrastructure will be built. In addition, a General Classroom, Health Professions, Student Services building will be built. The recommended central plant location for the north half of the university is on the northeast side of the campus. This allows the Central Utility Plant to be close enough to the current local utilities to economically route electric, gas, and water during phase 1 construction. It also will be in a location that will support a sensible utility generation and distribution scheme in routing supply and return lines for chilled water and heating hot water leaving the central plant. Shah Smith and Associates recommends the central plant be built out in 3 stages. The first buildout stage will occur when the first building of phase 2 comes online. After initial construction, the central plant will have enough firm capacity to meet demand for the first two buildings and then chiller capacity would be added to meet the full phase 2 load. Shell space will be provided to allow for equipment installation that will meet demand through phase 3 and any long term future buildings located on the north side of campus. Firm capacity is having the additional chiller or boiler capacity to meet the load at any point time i.e. in the event that one chiller needs to be taken down for service and maintenance.

Chilled water capacity throughout all development phases will be met incrementally by 750 ton centrifugal water cooled chillers with VFDs. Water cooled centrifugal chillers were chosen for the central plant because they are more efficient; they also have a longer equipment life when compared to air cooled chillers. By the end of phase 2, three (3) chillers should be installed providing 1500 tons of firm capacity. Once the first building of phase 3 comes online, a fourth chiller will be added to handle the load for all the buildings in phase 3 and providing 2250 tons of firm capacity. This equipment selection and phasing will meet the projected load taking into account a 90% diversity factor. For the future long term buildings planned for the north portion of the campus, a spot for a fifth chiller will be left for this to be added once these buildings are built. Stainless steel cooling towers will reject the heat absorbed by the condensers in the centrifugal chillers. The towers will be counter flow type and use PVC fill. Upon completion of the central plant, the cooling towers will require 200 gpm makeup water due to blowdown, drift, and evaporation. A 6” domestic water line from the main water line from the site lines shall be routed to the central plant to provide sufficient capacity to satisfy the water requirements for the central plant. A 2250 gpm (750 ton) cooling tower cell shall be added at each phase a chiller is added. An equalization line shall be provided under the cooling tower cells with connections for each additional cell to be added in the future.
A hot water distribution system will meet heating demands for the campus with boilers being located in the central utility plant. Hot water was chosen over steam because it is less complicated and lower maintenance system.
A typical heating water system is designed with large fire-tube boilers. However, for many months the campus heating load is well below the capacity of one boiler. During these periods the boilers are cycled on and off excessively, which leads to condensing of the flue gases. This condensation is damaging to the boiler, and the flue stack.

Condensing boilers are capable of running through broad temperature ranges without causing boiler damage. Since they are designed to condense exhaust gases they can handle low return and supply water temperatures. This style of boiler also has a large turndown ratio (typically 20:1) which allows for good partial load operation. The exit water temperature can be reset as low as required to satisfy demand as needed during the low heating months. During peak heating the condensing boiler can also produce design water supply temperature (180 oF). Due to the modularity of these boilers, additional units can be added as the campus expands. Due to these items SSA recommends modular condensing type boilers at the Central Plant.

For Tarleton State Fort Worth Central plant, the condensing boilers should be sized at 4000 MBH increments. Phase 2 requires about 8,000 MBH of heating when diversity is taken into account. In order to satisfy this requirement, 3 of the 4,000 MBH boilers are needed to provide a firm capacity of 8,000 MBH. Phase 3 will have a total hot water load of about 15,000 MBH so an additional (2) 4,000 MBH hot water boilers shall be installed. In the future long term plan, when the buildings located on the north portion of the campus are built, an additional 4,000 MBH boiler shall be provided.

See below for a table summarizing the estimated chilled water and hot water loads per phase for the north half of the campus that is planned to be served from the north central plant. The buildings plans for the long term phase that are located on the south half of campus will be served by a separate central plant located on the south half.




# 1 MECH SITE PLAN - PHASE 2 AND 3 (MASTERPLAN)

1" = 30'-0"

## LEGEND

- PHASE 1
- PHASE 2
- PHASE 3
- PHASE LONG TERM

True NORTH

0' 30' 60'

1" = 30'-0"

| No. | Description | Date |
|---|---|---|
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| TARLETON STATE FORT WORTH<br>MASTER PLAN<br>Enter address here | Shah Smith & Associates Inc<br>2825 Wilcrest, Suite #350 Houston, Texas 77042<br>Ph. 713.780.7563 Fax.713.780.9209<br>Texas Registered Engineering Firm F-2113 | Sheet Name:<br>MECH SITE PLAN - PHASE 2 AND 3 (MASTERPLAN) | Project No.: 1105-009-01<br>Date: 02/18/2016<br>Designed By: RJN<br>Checked By: ILG<br>Scale: As indicated | Drawing No.<br>MEP-2 |

## Utility Distribution

Chilled water system will have a variable primary pumping configuration. A primary only system configuration was chosen because of the lower capital first cost and lower energy consumption. The supply/return temperatures of the chilled water and hot water systems were chosen in accordance with similar types of campus requirements as indicated in the Texas A&M University System Facilities Design Guidelines and are 44/56 $^{O}$F and 180/160 $^{O}$F respectively. Please note, with the proposed boilers as the return water temperature decrease the efficiencies increase so a lower design water temperature may want to be considered for the campus. The chillers at the central plant should be designed for a temperature differential of 12 degrees while using a 14 degree differential across building AHU coils.
Please note, with the proposed boilers as the return water temperature decrease the efficiencies increase so a lower design water temperature may want to be considered for the campus. The chillers at the central plant should be designed for a temperature differential of 12 degrees while using a 14 degree differential across building AHU coils.

The utility corridors will be direct buried and consist of heating and chilled water supply and return lines, electrical duct bank, data/communications duct bank, gas and water. Isolation valves will be direct buried and operated remotely from ground level or shall be located in vaults that will be located around the campus utility corridor. The distribution lines will be sized such that they will be capable of meeting demand throughout the development of the master plan. Total projected chilled water load, for the north portion of the campus is approximately 3,000 cooling tons. This corresponds to a flow rate of approximately 6,000 gpm requiring a 20" pipe at the central plant exit. The main chilled water lines throughout the corridor are to be sized based on demand and are also sized to provide for alternate/redundant paths for CHW and HW throughout the campus utility piping system. See attached master plan drawing showing the approximate path for the future CHW and HW lines and also indicating larger pipe sizes on the perimeter and cross connections to allow for CHW and HW to be diverted throughout the piping distribution system. Total heating demand for the north portion of the campus is projected to be approximately 20,000 MBH requiring almost 2,000 gpm of flow. Shah Smith & Associates recommends providing a 12" pipe exiting the central plant. The pipe sizes for the hot water distribution system can be seen in the included drawing.

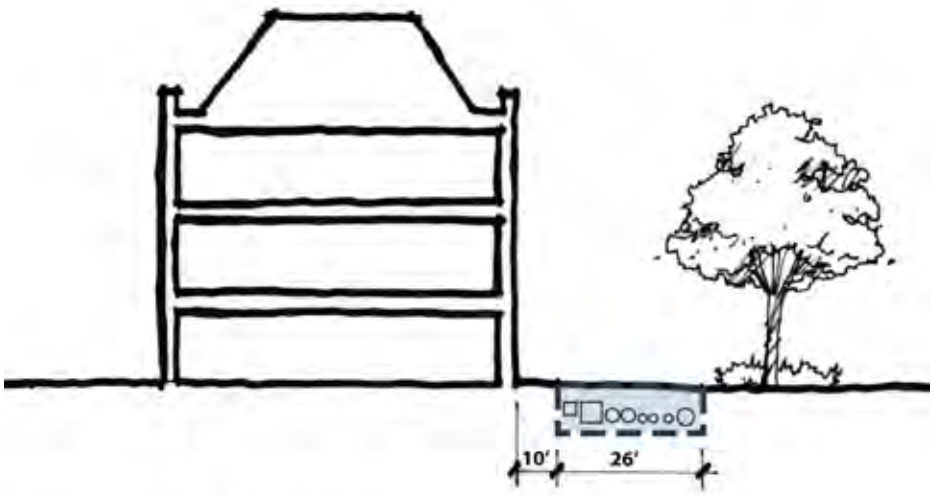
The utility corridors will be built along the inside of the loop road. The utility corridor shall be routed throughout the campus to limit the number of times it must pass through the loop road to minimize in future traffic impacts when these lines need to be serviced. One corridor will be routed along the west side of campus, while the other will be routed to the east of the buildings but located on the inside of the loop road. This structure, which will contain a balanced loop, has significant hydraulic performance benefits and allows more flexibility with future campus development plans.

The future southern half of the campus will be served by a future central plant that is expected to also provide CHW and HW utilities that will be connected to the north half piping distribution system. This will allow for some additional redundancy in the system and for the optimal hydraulic performance.

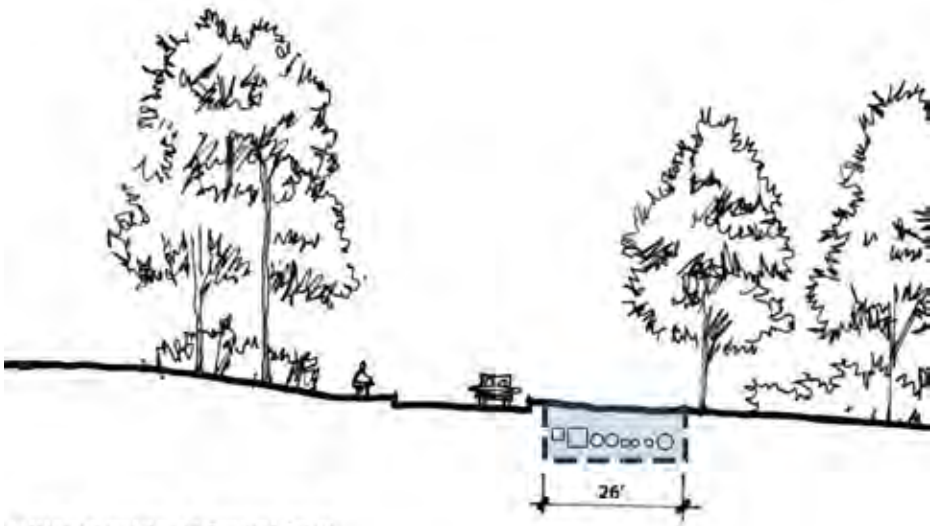
The future southern half of the campus will be served by a future central plant that is expected to also provide CHW and HW utilities that will be connected to the north half piping distribution system. This will allow for some additional redundancy in the system and for the optimal hydraulic performance.

## Plumbing

In Phase 1 the utilities that will feed the first building will be sub-metered by the owner at the building for domestic water, fire water, and natural gas to allow for future connection to the campus loops in later phases. The utility company meters should be located at the proposed location of the central plant to be built in Phase 2. Domestic water once brought into the building will need to have a backflow preventer. The building will have domestic hot water created by multiple water heaters (gas-fired) local to the building. It is expected that this building will have a fire pump and domestic water pump in order to feed the buildings fire sprinklers and fixtures on the 3rd floor. Once service to the site have been provided a flow test should be performed to determine whether these pumps are needed. Based on the current information, the sanitary line exiting the building shall be an 8". Final sanitary calculations are needed to confirm the size of the system. The storm drainage line that comes out of the building by code should be about a 12" based on footprint size but final calculations are needed to confirm. If a water reclamation system is provided for the first building the system from the building must meet SECO requirements. Natural gas is needed for the domestic hot water, heating hot water boilers and to an emergency generator depending on the final selected type.




Utility Corridor at Typical Building




Utility Corridor at Typical Drive

# Electrical

## Phase 1

In Phase 1 of the project, Oncor Electric will install two 15kV feeders from the Oncor substation located approximately one half mile North West of the site. These feeders will provide power to the Academic-Multipurpose building initially and to the entire campus. Oncor switching and metering equipment will be located somewhere in the area of the future Central Plant building. A new ductbank will be installed from the Oncor equipment to the Academic-Multipurpose building. A new 15kV high voltage switch will be installed outside the building along with a 750/840kVA, 13.2KV-480Y/277V pad mount transformer. The ductbank from the Oncor equipment to the building high voltage switch will consist of 3-5" conduits, one active, two spares. Manholes will be installed approximately every 300' along the ductbank.

An emergency/standby generator will be located at the building adjacent to the pad mount transformer. The generator will be either diesel or natural gas and will have a weatherproof enclosure. The generator will serve building life safety loads such as lighting, fire pump, fire alarm system, elevators etc. The generator will also serve non-life safety standby loads as required by the Owner.

## Phase 2

### Central Plant

In Phase 2 the central plant will be constructed as noted in the mechanical narrative above. Electrical service to the plant will initially consist of two, 2000/2240KVA, 480Y/277V pad mount transformers located outside of the plant. The transformers will serve a lineup of 3200A, 480Y/277V Main-Tie-Main switchgear located in the main electrical room in the plans. There will also be a 15kV, two source, two load pad mounted S&S Vista switch locate adjacent to the transformers. The high voltage switch will be connected to the campus loop conductors and the two pad mounted transformers. The transformers/switchgear are sized to allow for N+1 redundancy for half of the ultimate central plant load. A second set of transformers/switchgear, also sized as noted above, will need to be installed in the future as chillers are added to the plant. A 480Y/277V generator and associated transfer switch, transformer and panels will be installed to serve lighting, energy management system and any other systems required by the campus.

### Campus Electrical Loop

The main electrical service to the site will be established in Phase 1 of the project and a duct bank with 15kV conductors will be installed from the Oncor primary equipment/metering location at the plant to the Academic-Multipurpose building. As buildings are added the loop will be extended to serve the new loads. The loop conductors will consist of 250 KCMIL, 15KV copper conductors installed in a concrete reinforced duct bank. 10' X 12' manholes will be installed approximately every 350' along the duct bank routing. The routing of the duct bank will follow a path similar to the chilled water lines. The loop conductors will terminate in 15kV, two source, two load switches as noted previously. Switches will be installed as required and can serve up to two transformers/buildings. All switches will be S&C Vista type with fault interrupters. With the exception of the central plant, each building will be served from one dedicated 480Y/277V pad mount transformer. As buildings are added, the loop will need to be broken and extended to the new switches. All loop switches will be normally closed with the exception of one switch which will be open in order to isolate each side of the loop/Oncor circuits. The loop system will allow the campus to isolate and back feed buildings in case there is a fault in the system.

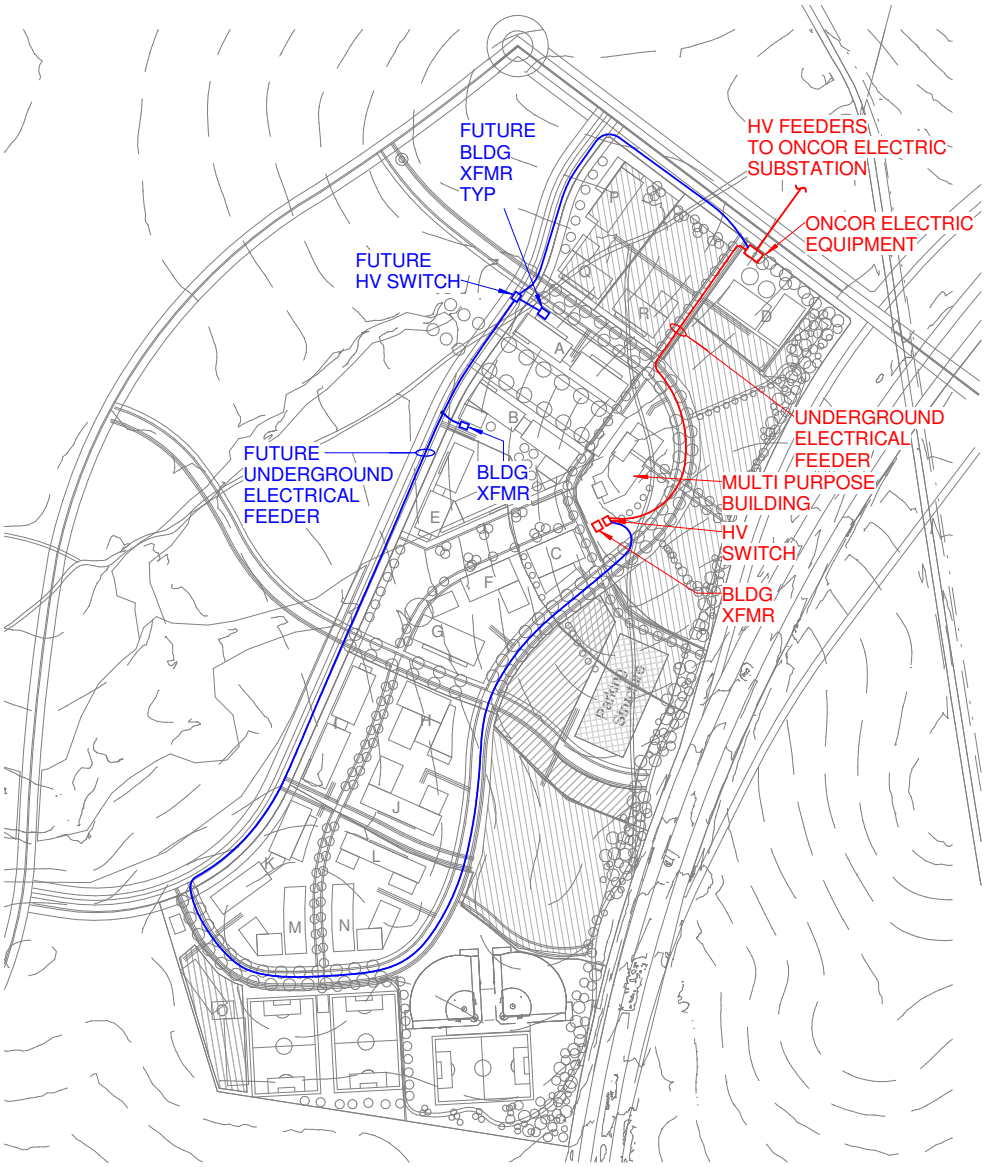
### Site Lighting

Site lighting throughout the campus will follow the footcandle requirements set forth in The Texas A&M University System Facilities Design Guide. Perimeter roadway lighting far removed from buildings will be served via pad-mounted transformers with panels and lighting contactors supported by unistrut.

Lighting for interior pedestrian ways will be served from contactors in the buildings themselves. This will reduce the number of remote lighting power locations required in the interior of the campus; thereby, reducing the aesthetic impact of large electrical installations in the interior of campus.

All lighting will be LED type and should have a color temperature of no greater than 3000 Kelvin (K).

| No. | Description | Date |
|---|---|---|
| | | |




# 1 1 - ELECTRICAL SITE PLAN

1" = 30'-0"

## LEGEND

PHASE 1

PHASE 2 TO FUTURE

True NORTH

0' 30' 60'

1" = 30'-0"

| | | | |
|---|---|---|---|
| TARLETON STATE FORT WORTH<br>MASTER PLAN<br>Enter address here | Sasaki Smith & Associates, Inc<br>2825 Wilcrest, Suite #350 Houston, Texas 77042<br>Ph. 713.780.7563 Fax.713.780.9209<br>Texas Registered Engineering Firm F-2113 | Sheet Name:<br>ELECTRICAL SITE PLAN | Project No.: 1105-009-01<br>Date: 03/11/2016<br>Designed By: DN<br>Checked By: DB<br>Scale: As indicated | Drawing No.<br>E100 |

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### Energy Management System

The front end for the campus EMS will be located at the Central Plant and will be connected via fiber optics on the campus data network and the server for the EMS will be located in the campus data center. All buildings will have dedicated building servers and shall be connect to the campus server via the campus data network. All monitoring of building utilities and critical systems will have backup power.

### Metering

All utilities entering the campus will be metered. All buildings on campus to be provided with dedicated building meters to monitor chilled water, hot water, domestic water, gas and electric utility usage.

## Water Reclamation System

Tarleton State has expressed interest in a large water well tank and a separate storage tank to be located at the plant. The water well tank shall be fed from local well water and shall have a backup feed from the site domestic cold water line. This water well tank shall provide makeup water to the cooling towers.

The water reclamation storage tank shall allow for site storm and air conditioning systems condensate to be routed back to the central plant from each building. This would require dedicated underground tanks located outside each building and would be pumped to the larger water reclamation storage tank at central plant. From here the water would be filtered and treated for grey water uses around the campus such as irrigation. This tank shall also have a backup feed from the site domestic cold water line. The site utility corridors will be planned to have two additional pipes to allow for the supply and return piping for the site irrigation system to be routed from the buildings to the CUP and then from the CUP out to the site irrigation points.

# TARLETON STATE UNIVERSITY

## TECHNOLOGY PROGRAM AND OPINION OF PROBABLE COST

## FORT WORTH MULTIPURPOSE ACADEMIC BUILDING


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# INTRODUCTION

Tarleton University is planning a new Fort Worth Campus. As part of Phase 1, the University is completing the Master Plan and the program development for the first building. The first building will serve as a general education building with faculty and building support spaces. The new building is 80,630 gsf and will include Learning Enviroment Spaces, Learning Commons, Student Support, Public Gathering, Amenities Support, Faculty and Staff Areas and Building Support. This facility is being designed to provide long term flexibly as it must accommodate the University's current needs, and those of the building's users well into the 21st century.

Although the concept of "flipping the classroom" is a popular topic in higher education, there is a need to balance this desire against the competing need for large lecture-style rooms on campus. The campus has decided to meet this challenge by incorporating several Active Learning Classroom rooms as well as 2 Tiered Classroom and a Large Divisible Classroom.

The architectural plan and design will support small-group collaborative learning in all classrooms, however, technology systems to support small groups will not be provided in all spaces. Currently, collaboration hardware and software systems will be provided for the Small and Medium Active Learning Classrooms.

## ABOUT THIS PROGRAM

This Technology Program is organized by categories referenced from the architectural program. This section will provide descriptions of the audiovisual functionality for each space type.At the end of each of the space types is a short listing of "Space Planning" comments which are primarily intended for the design team and "Discussion Points," an interactive component which will require additional input from the campus. Neither listing is intended to be exhaustive. At some point in the planning process, we will need further input on the questions or options raised here.

The bulk of the document is comprised of discussions of the audiovisual systems for specific spaces, followed by recommendations for the Building-Wide Audiovisual Systems and Information Technology. Brief discussions of Design Team and Owner considerations as related to the technology systems are included.

Finally, a summary of the Opinion of Probable Cost concludes the document.

## OWNER FEEDBACK AND COMMENTARY

This document is the first draft of the Audiovisual Program expressing our interpretation of what we gathered from meetings and interviews to date, plus results of prior work by the design team. Where there are no specific directions provided, we will be guided by our experience, focusing on innovative applications which will enrich and strengthen the on-grounds student experience.

We will work in conjunction with the appropriate departments of Tarleton University on the technology programming for the new classroom fit-out, acknowledging college guidelines, preferences and standards where applicable, and working with the college representatives whenever we see a need for modifications or additions to these guidelines.

We will rely on feedback and commentary from the design team and user groups to confirm this document and allow us to move on to the next design phase of the project.

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# PROGRAM STRATEGY

From a technology systems perspective, it is important at this stage of the project to envision emerging pedagogical models of instruction, and how the programs' curriculum might evolve in the next five to ten years. This approach informs the design team in a way that causes the technology systems infrastructure to be developed to allow for evolution and growth.

In an effort to be in line with the project budget, each space within this program has been broken down to two levels to aid with budgetary discussions. The first level is based on direction that was received from Tarleton University, which is a full outfit of each space. The second level includes the basic technology to make each space functional without more advanced features. With the multiple classrooms, we have broken down the program to include a couple of full outfitted classrooms and basic functionality in the remaining classroom. The second level still includes the infrastructure required to add the upgraded technology components at a future date.

## DESIGN PRINCIPLES

Technology systems for all new building projects on higher education campuses should adhere to basic principles of prudent planning: flexibility, adaptability, scalability, supportability and so forth. In addition, these more unique principles should guide any future planning and design of the systems:

| | |
|---|---|
| **Aligned with Campus Plans** | Technology solutions should be informed by relevant plans for the campus, such as the Strategic Master Plan. |
| **Cost Effectiveness** | The solution will use resources effectively, efficiently and strategically. |
| **Supportable** | The technology systems must be sustainable and supportable with a minimal investment in support personnel and services. "Help Desk" functionality is critical to both short- and long-term success. |
| **Active Learning** | Technologies should support active and engaged learning activities—collaboration, group projects and problem-solving, focusing on student-centered learning. |
| **Scalability** | The solutions must meet the long-term needs of the campus. Since technology integration is integral to the teaching and learning process, the long-term needs of both faculty and students will be increasingly reliant on scalable solutions. |

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# OVERVIEW OF CLASSROOM DESIGN

## SPACES THAT TRANSFORM TEACHING AND LEARNING

A critical portion of our conversation for this project has been the possible increased role of active learning and the resulting impact on your curriculum, faculty, students, architecture and technology environment. The implications of this discussion are far ranging and can be long-lasting; thus, the topic requires very deliberate consideration.

Since Active Learning is new to the Tarleton University Campus, we encourage additional internal discussion on campus and consideration of a test pilot or proto-type installation of an Active Learning Classroom to allow testing and experimentation. This will inform select but critical decisions about the new building moving forward.

The discussion below is presented as a brief synopsis of this complex and multi-faceted topic, as an aid for that discussion.

### THE POST-POWERPOINT ERA

The traditional lecture-style instruction approach is increasingly viewed as an outdated pedagogical model. Many colleges and universities are rethinking and restructuring the learning environment, challenging leaders of higher education to position their institutions to meet the demands of growing expectations and higher quality learning experiences. Trends show many institutions are moving away from the instructor lecturing from the front of the room and placing greater emphasis on the student collaboration, small work groups, and interactive learning. The Post-PowerPoint era has arrived on many campuses.

Many universities are investing in the latest technologies, design concepts and flexible classroom configurations to reinvent the teaching and learning spaces. “Flipping the Classroom” has become a popular description of the approach: use out-of-class time for on-line dissemination of information, freeing in-class time for collaborative work, Problem-Based Learning and application of the material.

Today’s students expect a personalized education in the Space, Style and Schedule of their choosing.

In the past, educators have had the luxury of determining the Space, the Schedule, and the Style of formal educational activities. Today’s students are increasingly unwilling to accept this approach; for them personalized learning takes place 24/7/365. Given the increasing evidence that Internet information and communication technologies are transforming much of society there is little reason to believe that it will not be the defining transformative innovation for higher education in meeting the needs of students. There are demands on universities to provide for a larger and more diverse cross-section of the population, to cater to emerging patterns on educational involvement which facilitates lifelong learning and to include technology-based best practices in the curriculum.

Teaching and learning improve when learning spaces are student-centered

Of course, on-line options allow students to learn while gathered together or while working apart - and to be connected to a community of learners anytime and anywhere, without being time, place, or situation bound. The increasingly prevalent practice of combining asynchronous Internet-based learning with face-to-face approaches can have significant impact on traditional campus-based institutions. This blended learning

approach deserves serious consideration while planning the learning spaces and technology infrastructure design.

## ACTIVE LEARNING RESULTS

The research on active learning is out and the message is clear. Teaching and learning improve when learning spaces are student-centered with collaborative-based instructional methods used in a technology rich environment embedded in the pedagogical approach.

Below are two success stories of how Universities have embraced these pedagogical styles and adapted their learning space to meet the needs of todays' students and instructors.

The SCALE- UP (Student Centered Active Learning Environments for Undergraduates) project at North Carolina State University has adopted this pedagogical strategy and has been highly successful with over 100 other Universities across the US following their lead. They redesigned classrooms of 100 students or more into active, engaged learning environments, radically changing the way classes are taught. NCSU has conducted extensive research in partnership with U.S. Department of Education on over 16,000 traditional and SCALE-UP students and summarize their findings as follows:

- Ability to solve problems is improved
- Conceptual understanding is increased
- Attitudes are improved
- Failure rates are drastically reduced
- "At Risk" students demonstrate improved outcomes

Research findings of The University of Minnesota's pilot evaluation of its high-tech, state of the art Active Learning Classroom suggest the following implications and recommendations:

- Students exceeded final grade expectations relative to their ACT scores.
- Students rated the new learning spaces significantly higher in terms of engagement, enrichment, effectiveness, and flexibility than traditional classrooms.
- Instructors adapted teaching strategies to new environment and found themselves in the role of learning coach or facilitator.

As with all new concepts, there may be some resistance to these design principles and a desire to do it the way it has always been done. This desire must be weighed against the realization that the digital natives of tomorrow will have a very different set of expectations for their learning experiences. They will require a blended approach that may include some traditional lecture, collaborative activities that engage them, and customized content delivered online that they can review in a Space, Schedule and Style of their choosing.

We strongly recommend that all project stakeholders examine new pedagogical concepts, emerging technologies, changing employer requirements and the evolving habits and expectations of both students and faculty prior to finalizing direction to the Design Team.

# AUDIOVISUAL REQUIREMENTS

## ROOM SPECIFIC AUDIOVISUAL SYSTEMS

### Learning Enviroment

**Small 30-Seat Active Learning Classrooms**

**(7 + 1 Instructional Computer Lab)**

The 30 seat classroom will be a flat floor arrangement with moveable tables and furniture. Some of these 30 Seat Classrooms may be combinable into a larger 60 seat classroom. As an active learning classroom, the space will include Flat Panel Displays (FPD) at end table on rolling carts for maximum flexibility. Each display will connect to a floor box for power, network and AV. When not in use, carts can nest for storage. This classroom will be equipped to highlight small-group collaborative learning with minimal disruption to sightlines back to facilitator. The Level 1 design will include infrastructure only to incorporate these FPD at a later date.

*University of Missouri Kansas City*

*Case Western Reserve University*

This classroom will include the standard classroom set-up for Tarleton University but since it is being identified as an active learning classroom, additional connectivity and support will be provided. Level 1 source devices include a dedicated computer, laptop/personal device connections, tabletop document camera and portable auxiliary devices. Equipment provided by owner is indicated in the component table below.

Level 2 source devices include pan/tilt/zoom cameras to capture the presenter and a Blu-Ray DVD/Player. Support is planned for web streaming, distance learning and audio/video recording systems. Collaboration hardware and software systems will be provided.

The current pricing includes seven Level 1 30 Seat Classrooms and one Level 2 30 Seat Classrooms. One of the Level 1 30 Seat Classrooms will be utilized as an Instructional Computer Lab but will contain the same AV technology as the Level 1 30 Seat Classroom.

A wireless microphone will be included to support presenter mobility within the room in additional to a fixed gooseneck microphone at the lectern.

One Electronic Smart Board with projector will be located in each 30 seat Classroom. In addition, auxiliary flat panel displays will be located at the end of each 5 person table that will be utilized to support multiple orientation viewing and collaborative small group activities, one display for each of the individual workgroups. Wireless presentation from Bring Your Own Devices (BYODs) will be possible at each group table and to the main presentation screen. Day 1, the additional displays will only be incorporated in one small classroom.

A touch panel control system will allow simplified control from the teaching station. The teaching station will be centrally located. Program source audio and speech reinforcement will use an overhead distributed loudspeaker system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design | Level 2 AV Design |
|---|---|---|
| Display | • One Smart Board (Owner Provided for 2 classrooms)<br>• One Projector (Owner Provided)<br>• Infrastructure for flat panel displays around room for small group collaboration | • One Smart Board (Owner Provided for 2 classrooms)<br>• One Projector (Owner Provided)<br>• Six (6) FPD (one at each 5 person table) |
| Input Sources | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera (Owner Provided) | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera (Owner Provided)<br>• Wireless connection to the displays |
| Capture/Collaborate | • Infrastructure Only | • One (1) wall or ceiling mounted pan/tilt/zoom camera to support rich media capture and recording<br>• Owner provided capture system |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Instructor Station with Equipment Rack (Owner Provided) | • Instructor Station with Equipment Rack (Owner Provided) |

**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Proper lighting to support both front-screen projection and video camera use will be critical. At least four zones of lighting will be required; for whiteboard illumination along the sidewalls, task light for the student seating, lighting for the presenter and overall lighting.
- Coordination of screen location to optimize viewing angles.
- Coordination of projector with lighting fixtures.
- Coordination of displays/whiteboards and furniture layout.

- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

### Medium 40-Seat Active Learning Classrooms

### (3 + 1 Instructional Computer Lab)

The 40 seat classroom will be a flat floor arrangement with moveable tables and furniture. As an active learning classroom, the space will include Flat Panel Displays (FPD) at end table on rolling carts for maximum flexibility. Each display will connect to a floor box for power, network and AV. When not in use, carts can nest for storage. This classroom will be equipped to highlight small-group collaborative learning with minimal disruption to sightlines back to facilitator. The Level 1 design will include infrastructure only to incorporate these FPD at a later date.

*Dartmouth College*

This classroom will include the standard classroom set-up for Tarleton University but since it is being identified as an active learning classroom, additional connectivity and support will be provided. Level 1 source devices include a dedicated computer, laptop/personal device connections, tabletop document camera and portable auxiliary devices. Equipment provided by owner is indicated in the component table below.

*University of Missouri Kansas City*

Level 2 source devices include pan/tilt/zoom cameras to capture the presenter and a Blu-Ray DVD/Player. Support is planned for web streaming, distance learning and audio/video recording systems. Collaboration hardware and software systems will be provided.

The current pricing includes three Level 1 40 Seat Classrooms and one Level 2 40 Seat Classrooms. One of the Level 1 40 Seat Classrooms will be utilized as an Instructional Computer Lab but will contain the same AV technology as the Level 1 40 Seat Classroom.

A wireless microphone will be included to support presenter mobility within the room in additional to a fixed gooseneck microphone at the lectern.

One Electronic Smart Board with projector will be located in each 40 seat Classroom. In addition, auxiliary flat panel displays will be located at the end of each 5 person table that will be utilized to support multiple orientation viewing and collaborative small group activities, one display for each of the individual workgroups. Wireless presentation from Bring Your Own Devices (BYODs) will be possible at each group table and to the main presentation screen.

A touch panel control system will allow simplified control from the teaching station. The teaching station will be centrally located. Program source audio and speech reinforcement will use an overhead distributed loudspeaker system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design | Level 2 AV Design |
|---|---|---|
| Display | • One Smart Board<br>• One Projector (Owner Provided)<br>• Infrastructure for flat panel displays around room for small group collaboration | • One Smart Board<br>• One Projector (Owner Provided)<br>• Eight (8) FPD (one at each 5 person table) |
| Input Sources | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera (Owner Provided) | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera (Owner Provided)<br>• Wireless connection to the displays |
| Capture/Collaborate | • Infrastructure Only | • One (1) wall or ceiling mounted pan/tilt/zoom camera to support rich media capture and recording<br>• Owner provided capture system |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Instructor Station with Equipment Rack (Owner Provided) | • Instructor Station with Equipment Rack (Owner Provided) |

**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Proper lighting to support both front-screen projection and video camera use will be critical. At least four zones of lighting will be required; for whiteboard illumination along the sidewalls, task light for the student seating, lighting for the presenter and overall lighting.
- Coordination of screen location to optimize viewing angles.
- Coordination of projector with lighting fixtures.
- Coordination of displays/whiteboards and furniture layout.

- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

## Large Divisible Classroom (1)

The Large Divisible Classroom will accommodate three 50 seat classrooms as well as one large classroom to accommodate large classes, meetings, special events and presentations. Each of 50 seat sections will include one projection screen.

Each 50 seat classroom will function similar to a standard classroom set-up for Tarleton University. Source devices include a dedicated computer, laptop/personal device connections, tabletop document camera and portable auxiliary devices.

To provide good sight lines and greater flexibility, a SMART Podium or podium with annotation tablet with a ceiling mounted video projector and motorized projection screen will replace the SMART Board standard in this larger classroom. Wireless presentation from Bring Your Own Devices (BYODs) will be possible to the main presentation screen.

A wireless microphone will be included to support presenter mobility within the room in additional to a fixed gooseneck microphone at the lectern. A second wireless lavaliere microphone is provided for guest lecturers or student presentations.

A touch panel control system will allow simplified control from the teaching station. Program source audio and speech reinforcement will use an overhead distributed loudspeaker system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

When the rooms are combined into a single space, a sensor will alert the audiovisual control system that the wall is open and the system will prompt the user to operate the room as a single audiovisual system, with one instructor's station as the "master console." For example, a single laptop input will be displayed on the screens for the room; lights for the overall space will be controlled from a single button push. The multiple projection screens will be capable of all displaying independent or redundant images.

The same set of source devices and functionality available to the user when the room is divided will be available when it is a combined space.

The following audiovisual components are planned:

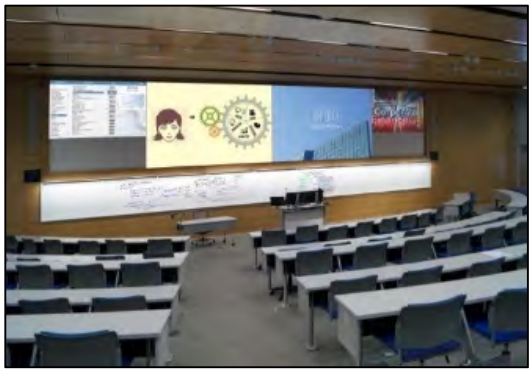
| AV Components | Level 1 AV Design |
|---|---|
| Display | • Three (3) ceiling-mounted video projectors<br>• Three (3) motorized ceiling-recessed projection screens |
| Input Sources | • Three (3) Dedicated computer with dual output display card<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera |
| Capture/Collaborate | • Infrastructure Only |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Three (3) instructor stations to house all source devices and user interfaces |

**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Proper lighting to support both front-screen projection and video camera use will be critical.
- Coordination of screen location to optimize viewing angles.
- Coordination of projector with lighting fixtures.
- Coordination of displays/whiteboards and furniture layout.
- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

## Tiered Case Rooms (2)

The tiered case rooms will accommodate 50 seats. Each of these spaces will include a front projection system.



Each 50 seat case room will function similar to the standard classroom set-up for Tarleton University. Source devices include a dedicated computer, laptop/personal device connections, tabletop document camera and portable auxiliary devices.

Two (2) ceiling-mounted video projectors with two (2) motorized ceiling-recessed projection screen will serve as the room's main displays. The screens can show different content to compare and contrast during case study reviews. Wireless presentation from Bring Your Own Devices (BYODs) will be possible to the main presentation screen.

*University of Missouri Kansa City*

To provide good sight lines and greater flexibility, a SMART Podium or podium with annotation tablet will replace the SMART Board standard in this large classroom.

A wireless microphone will be included to support presenter and guest lecturer mobility within the room in additional to a fixed gooseneck microphone at the lectern.

A touch panel control system will allow simplified control from the teaching station.. Program source audio and speech reinforcement will use an overhead distributed loudspeaker system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • Two (2) ceiling-mounted video projectors<br>• Two (2) motorized ceiling-recessed projection screens |
| Input Sources | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Annotation Tablet<br>• Auxiliary input for portable devices<br>• Document camera |
| Capture/Collaborate | • Infrastructure Only |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Instructor stations to house all source devices and user interfaces |

**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Proper lighting to support both front-screen projection and video camera use will be critical.
- Coordination of screen location to optimize viewing angles.
- Coordination of projector with lighting fixtures.
- Coordination of displays/whiteboards and furniture layout.
- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

## Teaching Labs (3)

The teaching labs will be equipped to highlight lab based learning with support for live demonstration and instruction.

Source device options include laptop/personal device connections, document camera, microscope and portable auxiliary devices.

An ceiling mounted project screen will be located along a central wall with a ceiling mounted projector.

A touch panel control system will allow simplified control from a central wall location. Program source audio will use a pair of wall mounted speakers flanking the projection screen or flat panel display. Hearing-assist system, in line with the current ADA recommendations for accessible design, will not be required.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • One (1) ceiling-mounted video projectors<br>• One (1) motorized ceiling-recessed projection screens |
| Input Sources | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Annotation Tablet<br>• Auxiliary input for portable devices<br>• Document camera |
| Capture/Collaborate | • Infrastructure Only |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Instructor stations to house all source devices and user interfaces |

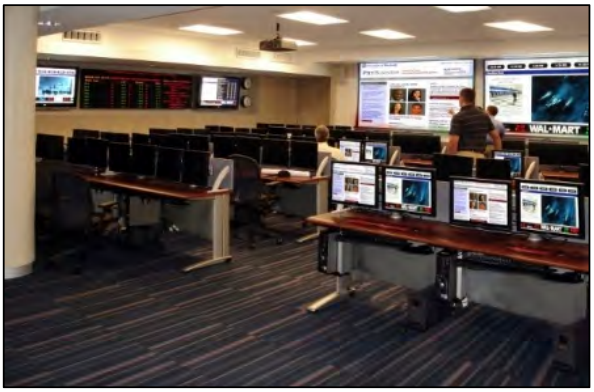
**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Proper lighting to support both front-screen projection.
- Coordination of screen location to optimize viewing angles.
- Coordination of projector with lighting fixtures.

- Specialty floor and wall boxes will be used; general coordination is required.

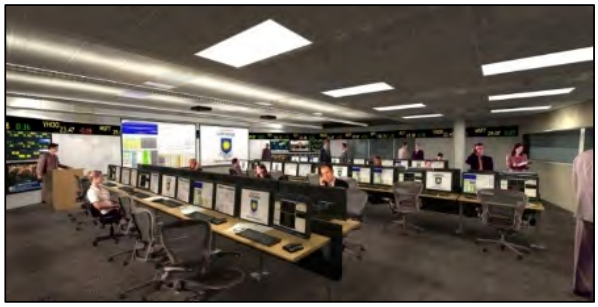
### Data Intensive Learning Space/Mock Trading Room (1)

The Data Intensive Computer room will accommodate 45 dual monitor workstations that will serve as a Mock Trading Room, Testing Space, Computer Lab and Data Intensive Computer Lab. This Data Intensive Learning Space will include a front projection system. In order to support the Mock Trading Room program, a digital ticker display will also be included.




*University of Pittsburgh*

The Data Intensive Learning Space will include the standard classroom set-up for Tarleton University. Source devices include a dedicated computer, laptop/personal device connections, tabletop document camera and portable auxiliary devices. Infrastructure will be provided for two future flat panel displays and a digital ticker display.



*University of Lethbridge*

A wireless microphone will be included to support presenter mobility within the room in additional to a fixed gooseneck microphone at the lectern.

A touch panel control system will allow simplified control from the teaching station. Program source audio and speech reinforcement will use an overhead distributed loudspeaker system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • Two (2) ceiling-mounted video projectors<br>• Two (2) motorized ceiling-recessed projection screens<br>• Network Syncronized World Clocks<br>• Infrastructure for Two (2) Flat Panel Displays<br>• Infrastructure for Digital Ticker Display |
| Input Sources | • Dedicated computer (Owner Provided)<br>• Laptop connection<br>• Auxiliary input for portable devices<br>• Document camera |
| Capture/Collaborate | • Infrastructure Only |
| Sound | • Wired lectern microphone<br>• Wireless microphone system including lavaliere and handheld microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Lectern to house all source devices and user interfaces |

**Space Planning:**

- Plan for adequate ceiling height to allow for large images.
- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

## Executive Program Room (1)

The Executive Program Room is a 25 seat space for educational leadership. The Executive Program Room will include a large flat panel display.

*Middle Tennessee University*

Source devices include a dedicated computer, laptop/personal device connections, and portable auxiliary devices. Infrastructure will be provided for pan/tilt/zoom cameras.

A touch panel control system will allow simplified control from the tabletop. Program source audio and speech reinforcement will use an overhead voice lift assist system. Additionally, the room will be outfitted with a hearing-assist system, in line with the current ADA recommendations for accessible design.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • 80 inch FPD |
| Input Sources | • Dedicated computer (owner provided)<br>• Laptop connection<br>• Auxiliary input for portable devices |
| Capture/Collaborate | • Web Camera<br>• Infrastructure Only for PTZ Cameras |
| Sound | • Four (4) Ceiling Microphones<br>• Distributed ceiling loudspeakers for speech reinforcement<br>• ADA hearing assist system |
| Control | • Touch panel at teaching station for simplified control of audio, display and lighting systems |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

**Space Planning:**

- Multiple speakers will be incorporated into the ceiling; general coordination is required.
- Specialty floor and wall boxes will be used; general coordination is required.

### Individual Counseling (1), Group Counseling (1) and Play Therapy (1)

Each counseling room will include infrastructure for a PTZ camera for future video capture.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Capture/Collaborate | • Infrastructure Only for PTZ Cameras<br>• Video Capture System (TBD) |
| Sound | • Ceiling Microphones |
| Control | • Infrastructure for Touch panel Control |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

## Student Commons

### Small and Medium Group Meeting Rooms (8)

(Two Video Pod Cast and 1 Panopto Studio)

Each small group meeting room will function as a meeting and collaboration space for small to mid-size groups. Although the size and shape of each room may differ, the audiovisual technologies should be common among them. Currently, each group meeting room includes technology. As a budget consideration, some group study rooms may not include technology and should be a point of discussion moving forward.

The display system will consist of one flat panel display mounted to the wall with a dedicated computer connected to it. The dedicated computer may have collaboration software. The dedicated computer will allow students to connect their laptop or tablet device to the display, to share content and collaborate.

The room's will include a professional grade USB camera for desktop-based video capture and video-conferencing.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • Flat Panel Display<br>• Spectrum InVision Media (2 Owner Provided) |
| Input Sources | • Dedicated computer (owner provided)<br>• Laptop connection<br>• Auxiliary input for portable devices |
| Capture/Collaborate | • Web Camera |
| Sound | • Ceiling Microphones |
| Control | • Wall Control Panel |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

**Space Planning:**

- Specialty floor and wall boxes will be used; general coordination is required.

### Individual Testing Rooms (3)

Each testing room will include infrastructure for a PTZ camera for future video capture.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Capture/Collaborate | • Infrastructure Only for PTZ Cameras<br>• Video Capture System (TBD) |
| Sound | • Ceiling Microphones |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

## One Stop Shop

### Medium Conference Room (1)

The display system will consist of one flat panel display mounted to the wall with a dedicated computer connected to it. The dedicated computer may have collaboration software. The dedicated computer will allow students to connect their laptop or tablet device to the display, to share content and collaborate.

The room's will include a professional grade USB camera for desktop-based video capture and video-conferencing.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • Flat Panel Display |
| Input Sources | • Dedicated computer (owner provided)<br>• Laptop connection<br>• Auxiliary input for portable devices |
| Capture/Collaborate | • Web Camera |
| Sound | • Ceiling Microphones |
| Control | • Wall Control Panel |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

**Space Planning:**

- Specialty floor and wall boxes will be used; general coordination is required.

### Faculty and Staff Areas

#### Small (1) and Medium Conference Room (1)

The display system will consist of one flat panel display mounted to the wall with a dedicated computer connected to it. The dedicated computer may have collaboration software. The dedicated computer will allow students to connect their laptop or tablet device to the display, to share content and collaborate.

The room's will include a professional grade USB camera for desktop-based video capture and video-conferencing.

The following audiovisual components are planned:

| AV Components | Level 1 AV Design |
|---|---|
| Display | • Flat Panel Display |
| Input Sources | • Dedicated computer (owner provided)<br>• Laptop connection<br>• Auxiliary input for portable devices |
| Capture/Collaborate | • Web Camera |
| Sound | • Ceiling Microphones |
| Control | • Wall Control Panel |
| Furnishing | • Equipment Rack in Credenza or other millwork furniture |

**Space Planning:**

- Specialty floor and wall boxes will be used; general coordination is required.

## BUILDING-WIDE AUDIOVISUAL SYSTEMS

### Lecture Capture Software / License

In addition to the hardware needed for lecture capture, software licenses are generally required.

### Rich Media Streaming Storage and Management

To enable the storage, scheduling, archiving, and serving of web-based curriculum, an allowance should be considered for lecture capture server and electronic storage via operating budget for Panopto. A dedicated central media server can be used to store all of the school's recorded lectures, and provide access to those recordings both locally and remotely. Alternately, the University may wish to consider cloud-based services. The components are highly dependent on the platform and preferences for a capital vs. operating-based spend.

### Public Information Display and Digital Signage System

A budgetary allowance for public displays and digital signage in the public and circulation spaces is provided in the Opinion of Probable Cost. It is anticipated that one digital sign would be located on each floor, one digital sign would welcome visitors at the building entrance and one digital sign would be used in the atrium. The campus currently uses

Cisco digital signage as an established enterprise standard which will be extended to to this building as well. This will require close coordination with campus staff.

## Room Scheduling and Display System

A room scheduling system places touch-panel displays outside of various gathering spaces. In addition to displaying information related to when the room is scheduled and for what purpose, the system allows users to reserve the space based on availability, either at the panel or remotely via a web interface.

These systems are most valuable serving rooms with an irregular schedule, rather than a classroom with an established schedule.

This is generally considered to be an option, but should be considered if budget allows. An allowance is currently **NOT** included in our Opinion of Probable Cost.

## Television Distribution System

There are no plans for IPTV or CATV distribution by TSU ITS.

## Portable Equipment Pool

There is no budgetary allowance for a pool of portable equipment.

# INFORMATION TECHNOLOGY

## COMMUNICATIONS INFRASTRUCTURE

Today's university campus must support a technology landscape that is constantly evolving and expanding in terms of the demand for higher data system bandwidth, voice, and video communications technology. For Tarleton State University (TSU), it also must support the anticipated growth in student population and their demands and expectations for access and capabilities. In order to dynamically provision such communications, the infrastructure must be planned to be as flexible, expandable, and resilient as possible. A prime objective is to facilitate communication and collaboration, and the ubiquitous access and transfer of information. The communication infrastructure envisioned for the the Tarleton State University (TSU) project will include items such as:

- Pathways and Spaces
- Telecommunication Rooms
- Structured Cabling throughout building
- Wireless Access (internal and external)
- The connection points to the Campus Wide Network.

The TSU Network Team has the following assumptions:

1. CATV services will be outsourced to local providers. Tarleton ITS has no plans to install or support a headend system at the new campus.
2. There are no plans to install or support IPTV at the new campus.
3. All hickman and MLS personnel will move to the new campus and the existing Hickman and MLS campus locations will be closed. The new campus will be fully operational at move-in and the old campus locations will be dismantled after move-out.
4. Classes are anticpated to begin at the new campus in January 2019.

## OUTSIDE PLANT (OSP)

The Outside Plant consists of the telecommunications infrastructure designed and installed externally to buildings and routed into an Entrance Facility (EF) and can include optical fiber cabling, coaxial cabling, balanced twised-pair cabling, and supporting structures to link serving facilities to outlying locations.

Outside Plan cable at the new Ft. Worth campus will include Campus Distributors (CDs), the backbone cables that feed from the primary building to subsequent out buildings, and Entrance Facility cables (service provider cables). The existing service provider is AT&T. The City of Fort Worth has dark fiber which can used to connect to the new campus location as a replacement to the ATT link and there by reduce the MRC. This option should be explored further with the City including opportunities to gain redundancy.

At a minimum, the OSP adheres to building codes and standards including local code requirements by the local authority having jurisdiction (AHJ).

The OSP is driven by a number of variables including capacity of the exiting network (at the current Hickman Building and Shaffer Education Building in Fort Worth) and anticipated network (across phases), transmission requirements, physical topology and route, desired cable type, and what is supported by local APs and Utility companies.

Ft. Worth uses a Home Run Star topology. As such, they do not use Main Cross-connect cables (MCs) common with a fiber ring topology.

The Texas A&M University System (TAMUS) provides a Gigabit Ethernet connection via the TTVN-WAN backbone to the main Stephenville campus of Tarleton State University and additional satellite campuses and centers including the current Fort Worth locations.

The main Data Center for all TSU locations currently is at the Stephenville campus. Per Observations from TSU, “Both power and internet access respresent single points of failure for all of the remote sites that currently tie directly back to the Sephenville Data Center. Most modern Data Centers have (at least) dual feeds for both power and commondity internet. The Stephenville Data Center has neither. When the connection back to the Stephenville Data Center is lost, our remote sites lose access to locally hosted services and basic internet access.”

Due to the single points of failure, the following local services are standard at all TSU remote campuses – and would be for the new Ft. Worth campus as well:

- VoIP analog and SRST are the remote campus standards for telecommunications and allows remote site intra-office voice services should the connection to Stephenville be lost.
- TSU has one virtual host located at each offsite location to provide for multiple virtual servers to reside. Currently at each site, TSU provides domain controller functionality as well as other services to permit users to login to the domain should the link between the offsite location and Stephenville be lost.
- Virtual servers are also created for CII within the small one host virtual cluster at each offsite campus.
- A packet shaper is provided.

Currently, TSU is also connected to Century Link for Disaster Recovery and redundancy. The Texas A&M University – Central Texas campus at Killeen Texas serves as a failover DR circuit for the TSU system. Killeen provides a redundant Data Center for mission critical services to the TSU system. It is anticipated that a Data Center would be located at the the new TSU campus at Fort Worth in phase 2 or later and would replace Killeen as the redundant Data Center for the TSU system. This expectation puts even more importance on the OSP and service providers.

Data service will enter the new Ft. Worth site via the north east from University Drive. The primary data connection would be made at this location (see Fig 1.) to the first building. Connection will need to be coordinated with service provider. It is recommended that a second redundant link be provided to the building (see Fig 2.) from the main or separate trunk. Should a line be accidentally cut or go off-line, a fail-over would be in place.

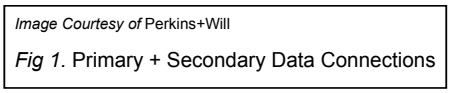


*Image Courtesy of* Perkins+Will

*Fig 1.* Primary + Secondary Data Connections

For the primary data connection, consideration must be taken for unobstructed underground or direct-buried pathways used here. These pathways involve trenching, conduit, manholes and handholes, road crossings, horizontal directional drilling, etc. to install and support the optical fiber cabling. The Contractor will need to coordinate with other utilities. On direct-buried installations, armoured cable is an accepted deployment with proper bonding and grounding. Traditional cabling typically requires the installation of dark fibers which also implies a requirement for the use of innerduct, manholes, hand holes, and pull boxes. It is expected that (2) 10G fiber routes will be used into the entrance facility/MDF.

## ENTRANCE FACILITY

The Entrance Facility is the point at which the outdoor plant cable connects with the building's backbone cabling. This is the demarcation point between the third-party service provider, public network interface equipment and the University's proprietary systems. Optical cross-connects at the entrance building would be located in the Main Distributon Frame (MDF).

The first phase of the project will create a multipurpose academic building with multiple services to create the initial hub link. The Entrance Facility (EF) located at the new building consists of the telecommunications service entrance into the MDF and the establishment of backbone pathways between future phase TSU Fort Worth buildings. It is anticipated that a quantity of (8) 4" conduits will enter the building for the core connection. TSU standards are outlined in Section 27120 Specifications.

It is expected that:

- Quantity (2) separate 10Gigabit Ethernet fiber routes will be used into the entrance facility/ MDF.
- A 400 pair entrance cable would support the anticipated campus requirements with 25 pair copper cables across a future build out of sixteen campus buildings. This entrance cable count includes enough unused cable to be used as spare pairs.

- See Texas A&M Facility Design Guielines Section-27 Communications for approved fiber selection specifications.
- The two fiber routes should be in totally separate conduits from off campus to the MDF.
- Coax into the entrance facility for CATV, if provided, would be by other service providers. Tarleton ITS has no plans to support cable TV or IPTV.
- There are no plans for blown fiber. There are also no plans for outside pedestals. All OSP cable will originate and end from within a building with cross connects inside the MDF to reduce susceptibility to storms, vandalism, or vehicular damage.
- It is expected that a crawl space will be provided beneath the building requiring the two entrance paths as described for day one.

Extending from the MDF, a network hub would be created around the campus site and will follow a similar approach used at Stephenville. A Home Run Star topology will be used. Pathways must consider a route that follows streets and walkways in the master plan while leaving the site accessible without conflicts or collisions that could impede later building development.

- All four directions (North, South, East, and West) will have multiple conduits leaving this initial first building. North, South and West directions will require a minimum quantity of (4) 4” conduits in each direction to accommodate the fiber backbone or primary entrance cables. The East direction, toward the highway frontage road, will require only a quantity of (2) 4” conduits with (1) for initial redundant service entrance cable and quantity of (1) spare.
- Connections between manholes and hand holes will need a minimum quantity of (4) 4” conduits.
- Cat3 copper service cable will consist of a 25 pair copper cable backbone to each of the sixteen planned buildings beginning in Phase 2 and beyond. Not all 25 pairs are expected to be used since they are primarily for elevator and 311 phones. Fax machines will be using a Gateway.

The Contractor provides the rack mounted modular enclosure units complete with connector couplings and mounted adapter panels for interconnection of the optical fiber cables. As the entrance location for backbone cabling, the MDF typically contains power protection, uninterruptable power supplies (UPS), LAN equipment (such as bridges, routers, core switches, etc), patch panels, and mechanical terminations. The EF will also house the backbone links to other buildings on campus.

Design recommendations in TIA/ EIA-569-B are to be followed for cables, connecting hardware, and protection devices. The MDF location should be dry, and near the vertical backbone pathways. The entrance facility should be provisioned with consideration of environment, HVAC, lighting, doors, and electrical power.

For TSU the MDF must support:

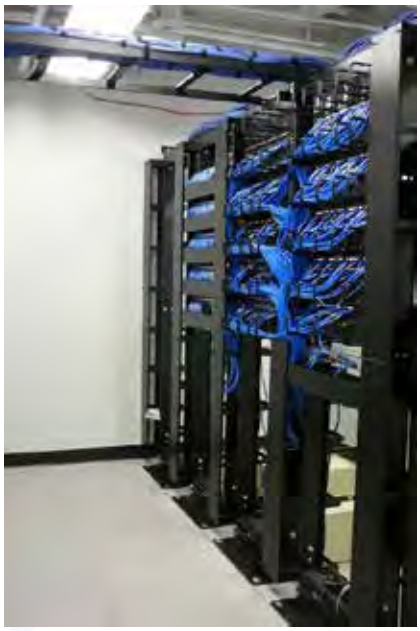
- Quantity (8), 4” conduits
- Racks and patch panels (See Section-27 for acceptable products)
- Fiber cross-connects and all associated requirements
- Power protection and dedicated electrical on Building Generator
- UPS (estimate quantity 6)

- Dedicated HVAC
- Smart Building Controls (Johnson Controls)
- Lighting
- Environmental considerations
- Access control and physical security (One Card Access and Risk Management Security equipment)
- 10 years of growth

A 350sf MDF is planned for this first building. Network switching will be stacked with the MDF connecting to building Intermediate Distribution Frames (IDFs) via vertical riser. Riser cable to include both fiber and copper (Cat 3). See Section-27 for acceptable specifications.

## PATHWAYS AND SPACES

Information technologies require dedicated rooms on each floor to house equipment racks, network switches, optical fiber terminations, copper cabling patch panels, and so on. These spaces are known as Equipment Room (ER) and Telecommunications Rooms (TR). ERs & TRs provide for the organized and logical distribution of low voltage communications signals within a building and are specifically designed to be flexible and scalable. Telecommunications Rooms (TRs) or Intermediate Distribution Frames (IDFs) are generally considered to be floor serving facilities for horizontal cable distribution. They may also be used for intermediate and main cross-connects. TRs provide value over an extended period of time as a distinct asset to the building and have an anticipated life cycle of up to 25 years. All TRs are to be designed following ANSI/TIA/EIA and BICSI standards along with recommendations and standards from Texas A&M University and Division 27 Specifications from TSU.



### Primary Components

- Fiber and copper connections between Telecom Rooms
- Connection to current campus network
- Floor mounted equipment racks equipped with both vertical and horizontal wire management.
- Overhead racking system for management of flexible connection cabling and providing additional structural support for the racks, cabinets, and systems.
- Patch panels for all horizontal cabling
- Adequate floor space and growth potential
- Independent telecommunications grounding system

- Dedicated power circuits supported by building generator and UPS
- Dedicated HVAC systems – 24/7/365
- Two TRs/IDFs per floor are planned for the first building. A minimum of one TR is required per floor.

## STRUCTURED CABLING

TSU purchases and installs components for a structured cable system utilizing a Superior Essex integrity solution. The wired building network systems or structured cabling systems originate in the Telecommunication Rooms and extend throughout the building from ER/MDF to TR/IDF and from TR/IDF to the end users (horizontal). The backbone cabling system between Telecom Rooms consists of fiber and copper cables and connects each IDF via home-run cables to the MDF. For TSU, the horizontal cabling system consists of twisted pair CAT 6A and Category 3 Intrabuilding backbone cable. All horizontal cabling routed to the TR should be through cable baskets located in corridors and other approved support systems as required per TSU Division 27 Specifications.

Common cables support all communications needs for various independent systems such as computer networks, voice system, surveillance, video, and building automation system. These diverse systems run on the same infrastructure, which offers ultimate flexibility; the same cabling supports all network requirements indifferent of the system.

### Backbone Cable

Fiber cabling is terminated in rack mounted housings in order to provide complete flexibility for cross-connecting of various networks and equipment and to provide redundancy. All copper cabling terminates at the rack on patch panels. This methodology permits cross-connection for devices requiring analog phone lines (like fax machines) by using simple patch cords instead of specialized tools. Copper tie-lines from rack patch panels to wall-mounted 110 blocks are at times incorporated into the backbone.

For redundancy, the backbone cabling should be configured in a star topology. Each horizontal cross-connect is connected directly to a main cross-connect or to an intermediate cross-connect, then to a main cross-connect.

Optical Fiber backbone cable is described in the TSU Division 27 Specifications.

### Horizontal Cable

All horizontal cabling is a minimum of CAT 6A per current TSU standards. All areas of the building follow similar design standards regarding the number of cables per workspace as established by TSU standards along with industry codes, standards, and best practices. This aspect of the horizontal cabling design should be reviewed later in the building design phase.

Horizontal cabling:

- Based on CAT 6A cabling at a minimum including all cabling, patch panels, patch cables, termination modules, and wiring blocks with TIA 568B with 568B pinout.
- CAT6A cabling for all wireless access points following Tarleton State University standards.

- Horizontal cable run-length shall be no greater than 270ft from the outlet to the horizontal cross connect, inclusive of ten feet of slack.
- Terminated on rack-mounted patch panels regardless of the application using the cable – email, phone call, fax, video, etc.
- Be the same cable regardless of the device using the cable – computer, telephone, surveillance camera, etc.
- Analog is used for emergency backup and elevator connections. Other analog requirements are converted via gateway to digital at Cisco network switches. TSU uses Cisco network electronics across telecommunication rooms including for networking, wireless access points, VoIP and digital signage.

## WIRELESS NETWORK

Across campuses, wireless technologies are used every day from radios and cellular smart phones to tablet PCs and laptop computers. In fact, the average college student owns three wireless mobile devices and often multitasks between them.

Today's campus buildings must accommodate a wide range of wireless user needs and demands in order to foster free flowing access to various formats of information. Many campuses struggle with a desire to support the ever-evolving BYOD (Bring Your Own Device) environment that is now expected by students, faculty, staff and visitors.

TSU ITS anticipates that "this building must not simply support the typical needs of the BYOD environment but also high bandwidth requirements that faculty and students desire with viewing captured video using Panopto Lecture Capture streams and wireless presentation gateways for realtime on-screen collaboration and screen sharing."

A building-wide wireless indoor network is to be designed into the new Tarleton State University Fort Worth Multipurpose Academic building to augment the traditional wired network. TSU uses Cisco wireless access points as a standard and are located below finished ceilings and activated as needed to provide full building-wide coverage. The wireless infrastructure design will be based on the latest IEEE-802.11 standard (802.11ac) and is capable of adapting to and supporting future standards such as 802.11s wireless mesh networks, 802.11v with improved wireless network management, and 802.11aa video transport stream. A heat map will be generated with a site analysis to determine optimal placement and anticipated areas of high demand. Ceiling-mounted access points would be located approximately every 75-feet with two network ports to accommodate multiple APs. Twenty five foot patch cables would allow movement of the APs to where needed from the connection point.

Power over Ethernet (PoE) technology is deployed to simplify installation and increase system flexibility by centrally locating all power requirements for the APs. This design methodology greatly increases the availability of network bandwidth by adding the capability of connecting to the network via multiple frequencies and channels. The ultimate goal of a future wireless system design is to allow for wireless coverage for the entire facility, including adjacent exterior areas, utilizing high density and dynamic load balancing wireless network standards. It is anticipated that high density spaces such as the flat floor classrooms, divisible classroom, tiered case room, teaching lab, data intensive learning lab, executive program room, and other meeting rooms will have

multiple, dedicated access points. The high level opinion of probable cost includes the cost of the wireless controller for AP management across the LAN. The exact number of APs required is dependent on a number of factors including construction material, number of devices and device types as client density, ACI/CCI, anticipated type of traffic patterns, what applications are planned in the near term, etc. It is anticipated that the APs will be running at 1/2 power so in the event of an AP interruption, the surrounding APs have available power to increase their power to fill in the coverage gap that is created. ARM will move the AP's power and channel up and down based on the surrounding environment.

We anticipate:

- A quantity of (140) Indoor Wireless Access Points will fulfill requirements for phase one in the first building. 20% growth or a quantity of (28) APs are factored into the count for phase one.
- Cisco Wireless LAN Controllers are required and support large numbers of access points which are assignable into groups. The number of controllers is dependent upon how TSU ITS would like to manage APs. Ideally, multiple controllers are used for redundancy and given the number of end points.
- APs are Powered over Ethernet. PoE compatible switches will be required.
- A quantity of (10) Outdoor APs will be required in total. 20% growth or (2) APs are factored into the total count for phase one.

Outdoor installation of wireless access points would similarly be focused to student gathering areas, parking lots, and other outdoor spaces where students will likely lounge, play or study. Long range outdoor wireless antennas hardened for demanding environments would be connected to the network of the first building. Caution should be used in the selection of construction materials including glazing for the new building as they may interfere, reflect, or block wireless RF signals indoors or out. Some campuses are also connecting blue phone networks via outdoor WiFi.

## NETWORK ELECTRONICS

Data network systems provide transport and communications for a multitude of applications. There should be a single, common data network system for all applications as opposed to individual data network systems that are single application based. A common data network allows for cost savings of equipment and supporting infrastructure (space, power, cooling, etc.) while also providing better utilization of network equipment. TSU has standardized on Cisco networking equipment and uses Cisco switching, routing, and security hardware/software.

The structured cabling systems described in the previous section make up the passive components of the data network systems. Active electronics are often dictated by how the network is administered, secured and used. Most logical architectures for routing and switching are based around a system to support three sets of functions, access for connecting devices to the network, distribution to manage and apply policies for access, security and routing, and core functions to move data packets quickly and efficiently.

A total quantity of (2600) ports are anticipated being needed with support for 10Gb bandwidth. The port count includes 20% overhead for growth during Phase one. A port count was determined by reviewing the number of estimated convenience outlets, backboxes and floor boxes, together with anticipated devices for computing, telephony, AV, wireless networking, and physical security per the program for the first building.

TSU ITS anticipates needing the following network electronics in support of all active data ports and up to 10Gig bandwidth for day one:

- Qty (6) Chasis
- Qty (55) 48 port blades
- Qty (3) 24 port switches in MDF for WAN connectivity
- Qty (1) Firewall
- Qty (1) RADIUS
- Qty (1) Packetshaper

For telecommunications requirements, the following are needed:

- Qty (1) VoIP Analog Gateway
- Qty (1) VoIP Router with Survivable Remote Site Telephony (SRST)

The above assumes Power over Ethernet (PoE) for all ports and is based on current Cisco models. Switching hardware should provide 2080 active ports with a 20% growth for a total of 2600 active ports anticipating construction on phase 2 would occur within 10 years. Switches should support all active ports with the included overhead and applications utilizing VLANs for QoS and security. Reference Texas A&M and TSU Division 27 Specifications.

The number of switches would not necessarily be evenly distributed across TRs or floors and would be concentrated to areas of high port density. In addition, analog gateways would also be needed to support legacy equipment and specific analog connections such as elevators. In addition, patch panels, UPS and power equipment, and other rack-mounted equipment would be located in each TR. We anticipate that a minimum of three full sized racks would be needed in each TR with space for growth and expansion.

## SERVER ROOM

A 400 square foot server room will be located within close proximity to the MDF. Hardware will not be moved from the existing Hickman location to the new campus. The space for the local servers and associated equipment will require adequate cooling and security with door access control. Only ITS staff, members of CII, and the building manager will have access to the server room. Two standard full-sized racks are planned for the space which will secure seven servers. Four of the severs will function as hosts for virtual machines. The other servers will provide functions for imaging local machines in instructional areas, support University Police department requirements, and as a backup solution for the local servers. A back up solution is also to be housed in Fort Worth. A UPS system will also be rack-mounted in the server room.

## DATA CENTER

Per TSU ITS, “in order to maintain the present service level, it is the opinon of the TSU network group that the new Fort Worth location should have a Data Center from day one and that the new Data Center should have independent, high speed access to the Internet. In addition, it should have a dedicated high speed connection to the Stephenville campus that will allow for multi-homing to facilitate greater resiliency of the overall network.”

The main Stephenville campus of Tarleton State University is home to the existing core Data Center which currently serves all TSU locations including the existing Fort Worth locations. Since buildings are leased at satellite campuses, there are no permanent data

centers at these remote locations. It is the intention of TSU ITS to make the new Fort Worth campus home to a dedicated data center which can also be serve in a redundant capacity for the system.

Due to budget constraints, the planning team anticipates that any new data center at the Fort Worth campus would most likely occur in phase 2. A logical location for the new data center will be at Building C which is centrally located on campus. The future underground electrical feeder is added at phase 2 with a high voltage switch and building transformer just outside Building C. The data center will have specific power requirements to feed the many racks of equipment, as well as redundant power, backup UPSs and a generator. Dedicated HVAC as a Computer Room Air Condition (CRAC) unit is required to provide the proper amount of airflow management with supporting infrastructure through raised floors to allow for cold and hot aisle containment. The future electrical feeder will need to be sized to support this add. A data center can be an expensive undertaking and will need to be planned properly for the long term. The needed electrical service would be sized and provided during the phase 2 development. As data requirements grow on campus and utilities such as the electrical CUP are added, the infrastructure would be in place to support this initiative. During phase 1, we anticipate that the new Fort Worth location will continue to operate in a similar manner as other existing locations with connectivity back to the Stephenville data center and to Texas A&M.

TSU ITS states, “a decision to configure the new Fort Worth campus to use the same connectivity as existing small remote campuses would lead to greater overhead, slower speeds and user frustration.” “…Our existing standard for small remote campuses, although not recommended by the network group, would seem to be our only option considering the current budget. This method involves connecting the new campus to the main campus at Stephenville by means of an IPSEC tunnel which will add significant overhead.”

Whenever the new Data Center at Fort Worth should come on line, it must support expansion through each of the future master plan phases and the additional requirements of serving as a redundant Data Center site for distaster recovery for other TSU locations.

## CAMPUS CORE INFRASTRUCTURE

In anticipation of growing demands on the network and expectations of the user population, the interbuilding network architecture to serve the planned Tarleton State University Fort Worth campus should comprise a significant backbone optical fiber system with redundancy to support the many diverse programs and specialized applications including, but not limited to, information technology data and voice communications, wireless access, video distribution, audiovisual systems, security systems, digital signage, and smart building automation. Anticipating future applications and providing additional fibers for unforeseen applications or for interfacing with local service providers can avoid duplication of cable and labor.

Phase 1 of the construction of the Multipurpose Academic Building will provide the OSP with connectivity back to the main Stephenville campus data center and TAMUS for Ethernet connectivity. Dual redundant backbone links would be planned.

Utilities will follow the loop road allowing for space for future phase development with additional buildings A through D in 2026 as part of phase 2. The cable backbone would follow the utility pathways. Tarleton ITS does not support a typical primary fiber ring topology. Instead, a Home Run Star tolopology is used. A cable plan that uses a physical hierarchical star topology can be universal to all applications and support all logical topologies (bus, star, ring, and point-to-point) as is recommended as part of TIA/EIA-568a standards.

Redundancy would be gained by connecting buildings with duct-banks between them. This interconnection would provide an advanced mesh network. This redundancy could be added as buildings come on line during future multi-phased growth.

A loop allows for alternate and redundant re-configurations in the event a primary fiber cable is damaged.

The topology can be built over time and provides redundancy, supporting each building phase with ease-of-future changes. There are no plans for a distributed antenna system (DAS) at this time. Phase three provides for buildings E through G in 2030. This phase connects these added buildings.

The strength of the physical backbone approach will help IT's ability to support physical growth, bandwidth and utilization increases, and as new services and technologies emerge. Long term, as Buildings K through O come on line, the duct banks will be extended for connectivity. The establishment of a flexible, high capacity campus-wide optical network will pave the way for TSU to realize many benefits in addition to that of a resilient and reconfigurable network topology.

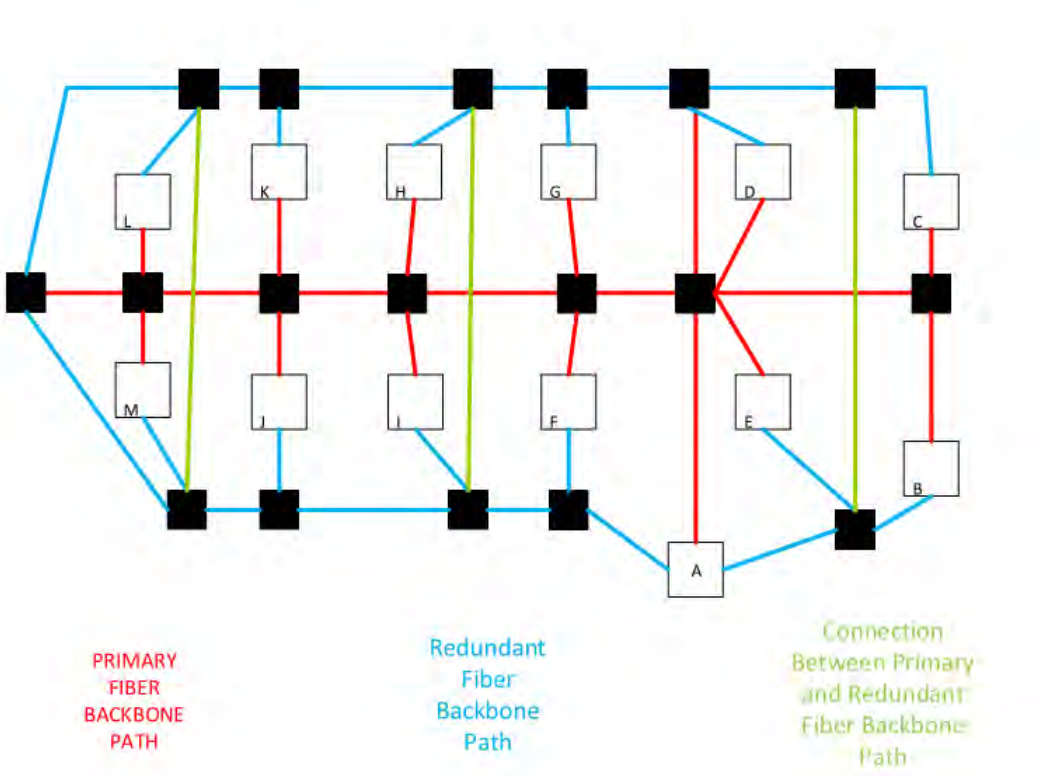



*Image Courtesy TSU ITS*

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# APPENDIX A: OPINION OF PROBABLE COST

The following Opinion of Probable Cost (OPC) represents a preliminary cost analysis for the systems required to satisfy the functional requirements of the project program. This information is for use as a decision-making tool for planning and budgeting purposes and has been prepared to support the set of functional requirements described earlier at a practical level. An audiovisual system design and specification will be required at a future date.

The OPC is based on a full implementation of the systems as described above, but it is understood that the probable cost exceeds the budget currently allocated for technology. If a full system installation is not feasible based on the available budget, it is recommended that the infrastructure to support the full system be included during construction.

The OPC identifies “Base Building” and “FF&E” costs to facilitate the development of an overall project budget. Base Building costs are typically associated with the base building and are provided by the General Contractor or its sub-contractors. FF&E costs are associated with the audiovisual systems or “movable equipment,” which on many campuses are part of the “Fixtures, Furniture, and Equipment” (FF&E) budget.

**Base Building (General Contractor)**

- In-wall blocking for equipment mounting
- Specialty wall and floor boxes
- Projection screens
- Structured cabling system

**Audiovisual Systems (FF&E)**

- Audiovisual, capture, editing systems, related AV cabling, and installation hardware
- Audiovisual control system programming and installation labor
- Specialty mounting hardware for audiovisual equipment

**This program and OPC does *not* include:**

- Cable pathways (junction boxes, floor boxes, conduit, cable tray/ladder, etc.)
- Distributed antenna systems
- Intelligent building monitoring systems
- Standard whiteboards/marker boards or furniture
- General use desktop and laptop computers
- Copiers, fax machines, printers, office equipment
- Telephone system or handsets
- Technical furniture associated with audiovisual systems

General administration costs are included but sales tax is not with the assumption that the campus is tax exempt.


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For the purpose of this document, all estimated equipment costs are based on the latest MSRP (Manufacturer's Suggested Retail Price) with considerations made for increases in cost over the duration of the construction schedule.

However, it should be noted that the Tarleton University will most likely be able to purchase equipment at a discounted rate under a competitive bidding process.

# Tarleton University
# Multipurpose Academic Building

**Planning & Programming**
**Technology Systems Opinion of Probable Cost**

| Space Description | Qty | Unit | | Extended | | System Type Extended Subtotals |
|---|---|---|---|---|---|---|
| | | Base-Building | FF&E Components | Base-Building | FF&E Components | |
| **Room Specific Audiovisual Systems** | | | | | | |
| Learning Enviroment: Small 30-Seat Level 1 Classroom | 6 | $ 5,525 | $ 24,423 | $ 33,149 | $ 146,536 | $ 179,684 |
| Learning Enviroment: Small 30-Seat Level 2 Classroom | 1 | $ 5,525 | $ 98,500 | $ 5,525 | $ 98,500 | $ 104,025 |
| Learning Enviroment: Medium 40-Seat Level 1 Classroom | 2 | $ 6,823 | $ 28,860 | $ 13,647 | $ 57,719 | $ 71,366 |
| Learning Enviroment: Medium 40-Seat Level 2 Classroom | 1 | $ 6,823 | $ 114,030 | $ 6,823 | $ 114,030 | $ 120,853 |
| Learning Enviroment: Large 150-seat Divisible Level 1 Classroom | 1 | $ 17,750 | $ 116,452 | $ 17,750 | $ 116,452 | $ 134,202 |
| Learning Enviroment: Tiered 50-Seat Level 1 Case Room | 2 | $ 6,407 | $ 53,263 | $ 12,814 | $ 106,526 | $ 119,340 |
| Learning Enviroment: Teaching Lab | 3 | $ 5,611 | $ 33,156 | $ 16,832 | $ 99,469 | $ 116,301 |
| Learning Enviroment: Data Intensive Learning Space Level 1 | 1 | $ 13,757 | $ 38,677 | $ 13,757 | $ 38,677 | $ 52,434 |
| Learning Enviroment: Executive Program Room Level 1 | 1 | $ 2,242 | $ 47,570 | $ 2,242 | $ 47,570 | $ 49,812 |
| Student Commons: Small/Medium Group Meeting Rooms | 8 | $ 1,000 | $ 11,086 | $ 8,000 | $ 88,689 | $ 96,689 |
| One Stop Shop: Medium Conference Room | 1 | $ 1,000 | $ 11,086 | $ 1,000 | $ 11,086 | $ 12,086 |
| Faculty and Staff: Small/Medium Conference Rooms | 2 | $ 1,000 | $ 11,086 | $ 2,000 | $ 22,172 | $ 24,172 |
| Learning Enviroment: Instructional Computer Lab | 2 | $ 5,000 | $ 24,423 | $ 10,000 | $ 48,846 | $ 58,846 |
| | 31 | | | | | |
| **Building-Wide and Special Systems** | | | | | | |
| Collaboration System / Site License | 0 | $ - | $ - | $ - | $ - | $ - |
| Lecture Capture Software / License | 0 | $ - | $ 23,200 | $ - | $ - | $ - |
| Rich Media Streaming Storage / Management | 0 | $ - | $ - | $ - | $ - | $ - |
| Audiovisual Metacontrol Systems | 0 | $ - | $ - | $ - | $ - | $ - |
| Public Information / Digital Signage (BB) | 1 | $ 2,000 | $ - | $ 2,000 | $ - | $ 2,000 |
| Public Information / Digital Signage (FF&E) | 1 | $ - | $ 14,900 | $ - | $ 14,900 | $ 14,900 |
| | | | | | | |
| **Telecommunications Network** | | | | | | |
| Structured Cabling System: In Fiber Optic/ CIS Interface Budget | 1 | $ - | $ - | $ - | $ - | $ - |
| Network Switches | 1 | $ - | $ 425,500 | $ - | $ 425,500 | $ 425,500 |
| Peripheral Equipment (PCs/Printers): In Telecommunications Budg | 1 | $ - | $ - | $ - | $ - | $ - |
| Telephone System/Handsets: In Telecommunications Budget | 0 | $ - | | $ - | $ - | $ - |
| Wireless Access Points / Mgmt. Software | 1 | $ - | $ 254,300 | $ - | $ 254,300 | $ 254,300 |
| Distributed Antenna System (DAS) | 1 | $ - | $ - | $ - | $ - | $ - |
| Outside Plant | 1 | $ 45,800 | $ - | $ 45,800 | $ - | $ - |
| | | | | | | * |
| **EXTENDED SUBTOTALS:** | | | | **$ 191,337** | **$ 1,690,973** | **$ 1,836,509** |

| | |
|---|---|
| **Freight & General Administration at 4%** | **$ 73,500** |
| **Less: Anticipated Discount at 18%** | **$ (343,800)** |
| **State & Local Taxes at 0%** | **$ -** |
| **Contingency at 0%** | **$ -** |
| **Total Technology Systems OPC For All Above:** | **$ 1,566,209** |

**Notes:**

1 All estimates above represent complete systems, including equipment, installation materials, installation labor and general user training.
2 Cost opinions shown above have been determined using Manufacturer's Suggested Retail Price or other published prices for equipment. The Owner should expect to receive a discount for both equipment and labor during competitive bidding. The amount of this discount will be dependent on factors such as market conditions at the time of bidding, final product selections, schedule of the installation and provision of a third-party consultant bid. An estimated discount for the complete package has been applied.
3 Typical infrastructure items such as projection screens, back boxes, conduit, cable pathways, AC power and so on are typically provided by the General Contractor or Electrical Contractor and are not included.
4 Related items not included are: access control, surveillance systems, specialty lighting fixtures and dimmer controls, traditional white boards, standard computers and Smart Building Systems.

*** Note: for the A/V Equipment line item in the other owner's costs of the total project budget this program subtracted the base building subtotal ($191,337), which is already included in the AACC, from the Total Technology Systems OPC of $1,566,209. This yields a total A/V Equipment budget of $1,374,872.**


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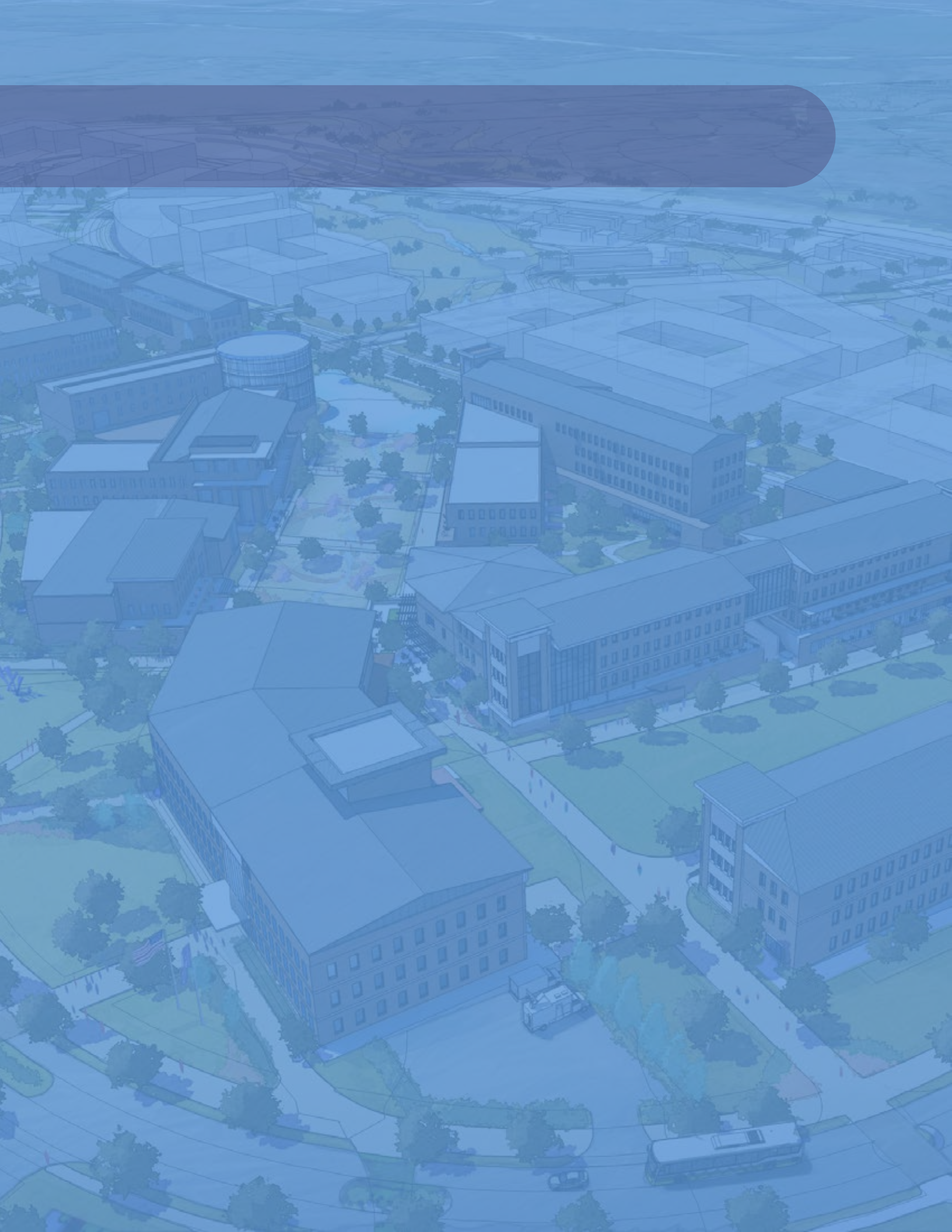
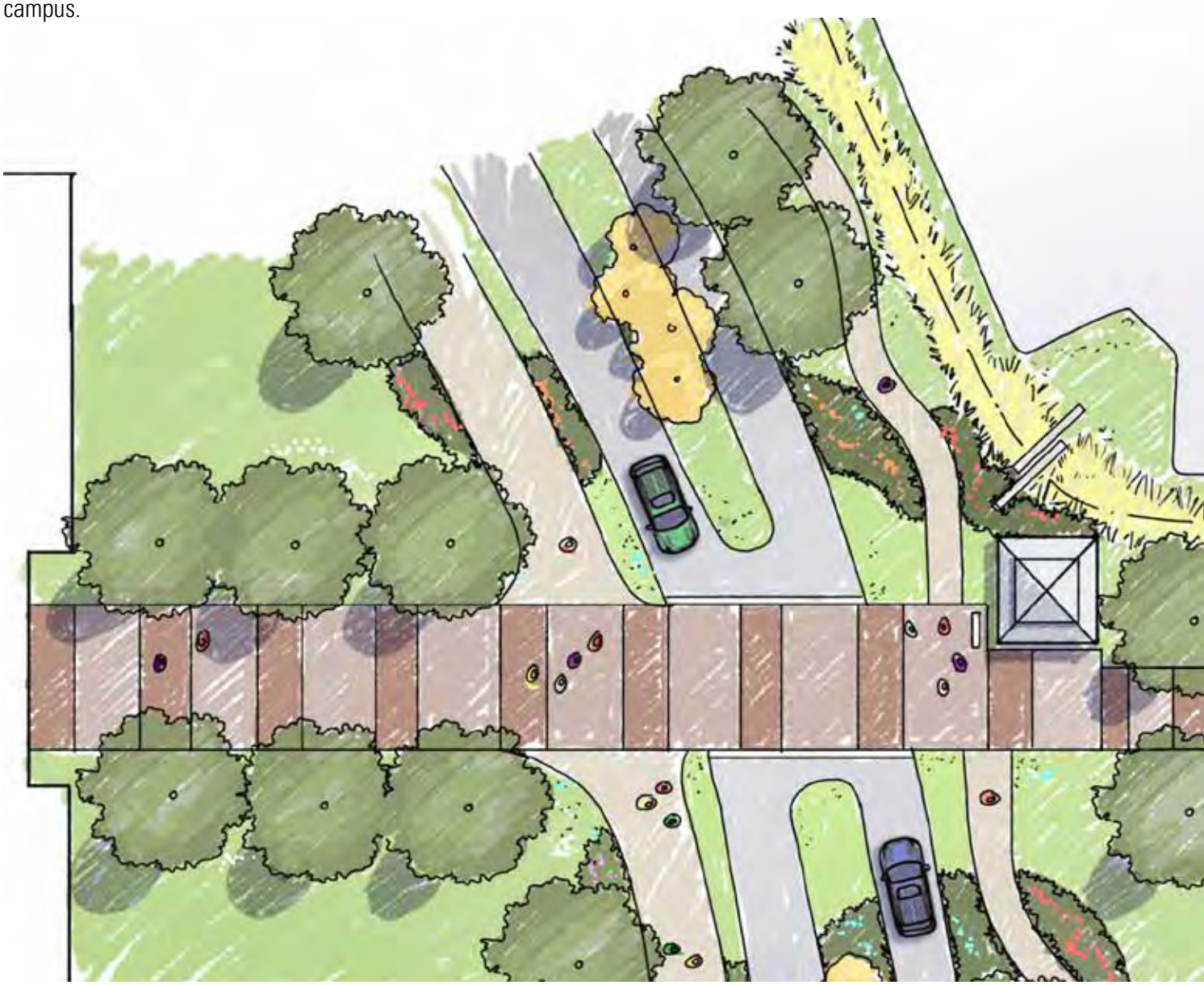


**Appendix A - Landscape Plan**

## LANDSCAPE QUALITIES

### TARLETON STATE UNIVERSITY - FORT WORTH CAMPUS

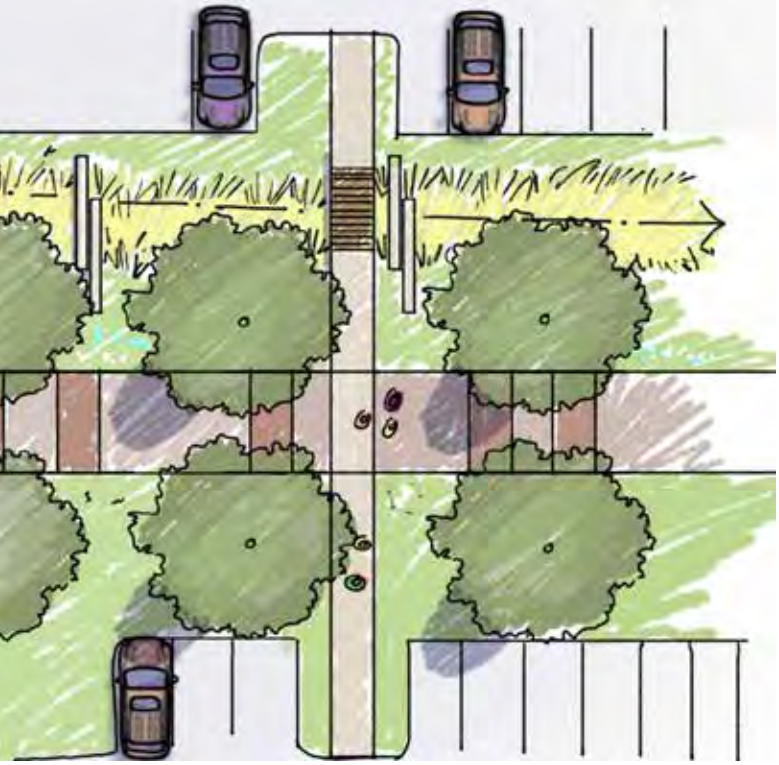
The following Landscape Qualities are intended to ensure the quality and character of the campus outdoor environment. The Qualities covered in this plan are comprised of 4 elements related to the campus landscape, each with a set of recommendations. These are: a) Sidewalk and Hardscape Materials; b) Parking; c) Site Furnishings; and d) Vegetation. Each element section includes a description of the element; the intent of the recommendation, diagram, location and sources of additional information is presented where applicable. These recommendations are based on the Visual Preference results and the overriding principles of site appropriateness and context, functionality, economy, quality and sustainability. Furthermore, this plan recommends developing comprehensive design guidelines for directional and wayfinding signage, as well as gateways to help build identity and communicate to visitors that they are entering campus.



Hardscape | Banding on Sidewalks Concept

HARDSCAPE

Type A -
Linear Pavers | Pavestone - Staggered Pattern



## SIDEWALKS

This plan recommends using a unified hardscape palette and standard paving patterns to provide visual connectivity between the Quads, along the university's major axis, and the pedestrian linkages from surface parking. Special paving bands and treatments at intersections can also highlight key crossings, announce plaza and courtyard locations and break the visual monotony of wide and lengthy expanses of concrete.

All typical paving treatments will consist of 4"x16" Pavestone City-Lock Series in a the Staggered Pattern and fall into one of the following categories:

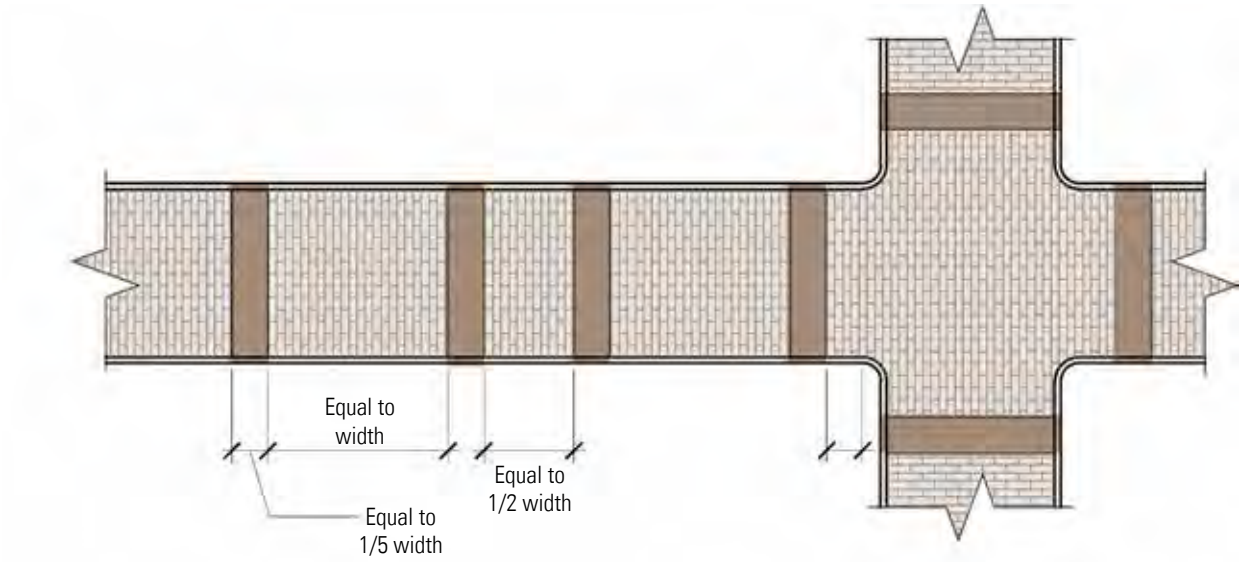
Type C paving will be installed on sidewalks that are 4 to 6 feet in width and will consist of a combination of standard concrete with 3' bands at regular intervals. The bands will consist of Staggered Pattern Pavestone City-Lock Series in a custom blend that is 75% "Light Brown" and 25% "Dark Brown".

Type B paving will be installed on sidewalks that are 6 to 12 feet in width and will consist of a combination of standard concrete with minimal brick inlay and banding at regular intervals. Bands will consist of Staggered Pattern Pavestone City-Lock Series in a custom blend that is 75% "Light Brown" and 25% "Dark Brown". The inlay will be Pavestone 100% "Tan".

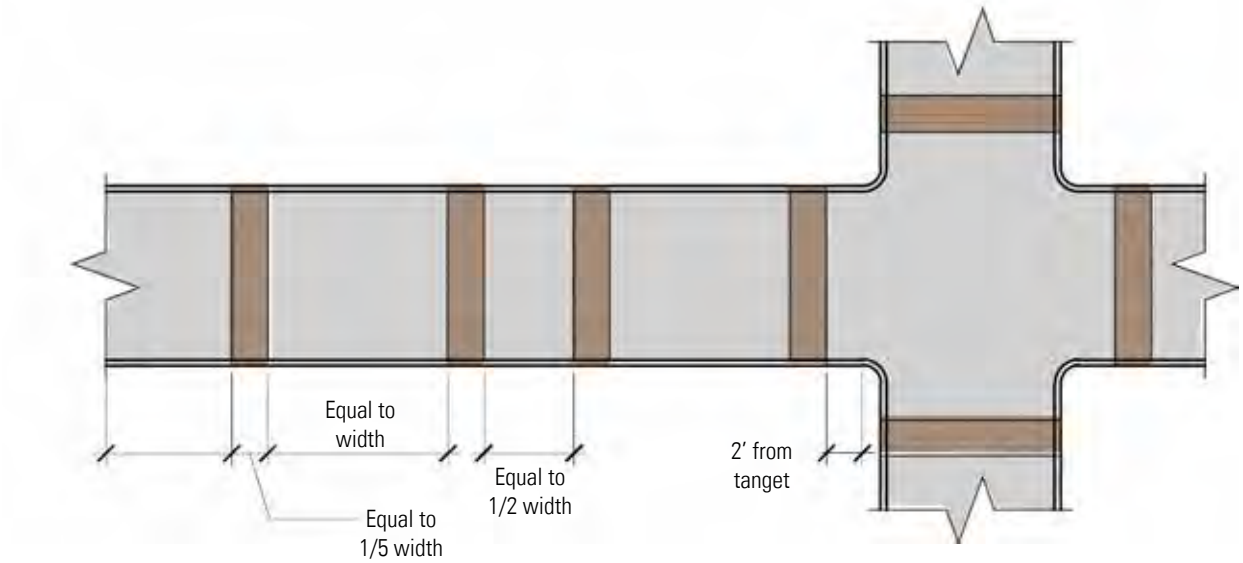
Type A paving will be located in plaza, promenades and quad areas and will consist of Staggered Pattern Pavestone City-Lock Series in a custom blend that is 100% "Cast Stone". Bands can be used at edges or to provide visual interest or tie to columns of new buildings, bands will consist of Staggered Pattern Pavestone City-Lock Series in a custom blend that is 75% "Light Brown" and 25% "Dark Brown".

## LANDSCAPE QUALITIES

### HARDSCAPE




Type B -
Linear Pavers | Pavestone - Staggered Pattern




Type C -
Linear Pavers | Pavestone - Staggered Pattern

## LOW IMPACT DEVELOPMENT

All parking lot areas are required to include canopy trees that shade a minimum of thirty-five (35) percent of any individual parking lot. Parking lots must be designed to incorporate the use of landscaped islands, divider islands, perimeter berms, buffers and/or walls to minimize views from adjacent streets and sidewalks. Additionally, sidewalks should be incorporated into landscape medians as necessary to direct visitors toward campus and reduce potential conflicts between pedestrians and automobiles. Buffering parking from walkways should be a priority as views of parking areas are considered low quality spaces.

Landscape medians should double as drainage swales and should alternate between medians with sidewalks. These bio-swales as well as perimeter berms should be designed to function as filtration during storm events. All islands must be planted with turf grass, shrubs or groundcover material under the shade trees.

## LANDSCAPE QUALITIES

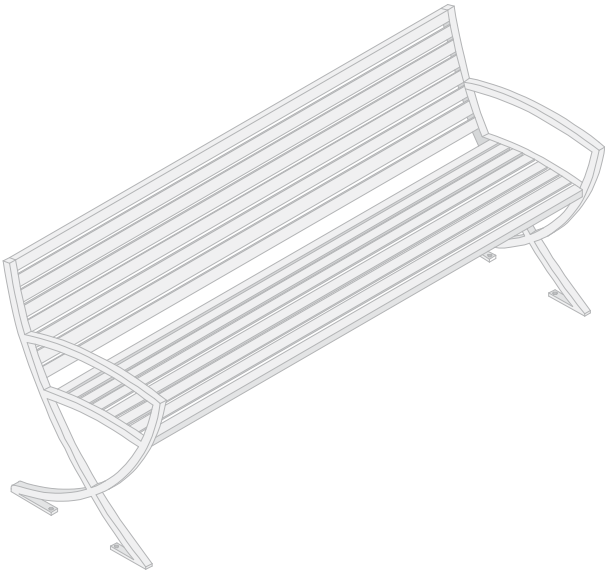
### SITE FURNISHINGS

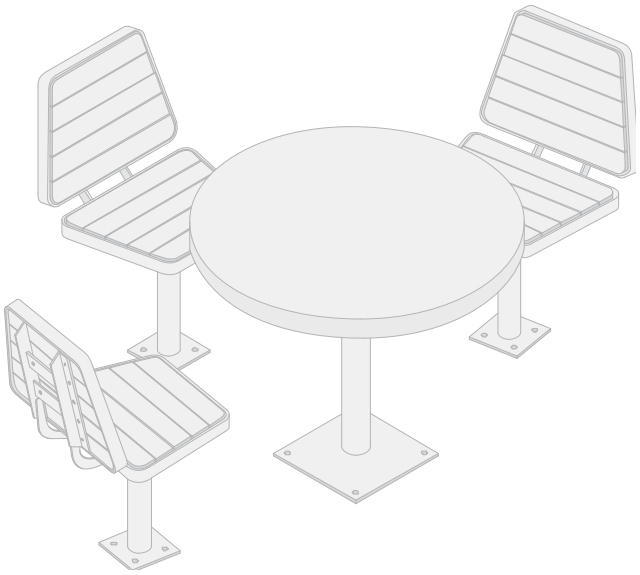
**BENCHES**

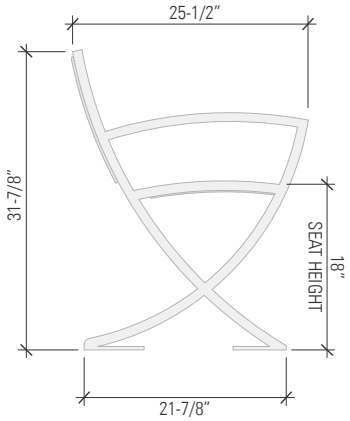
Victor Stanley's Perenne Collection Lily Bench is 6 feet in length and comes with or without an attached back. A sleek look is acquired by recycled solid steel bars in a titanium finish. Benches should be placed on a bed of the same material as adjacent paving or decomposed granite and anchored per the manufacturer's recommendations.

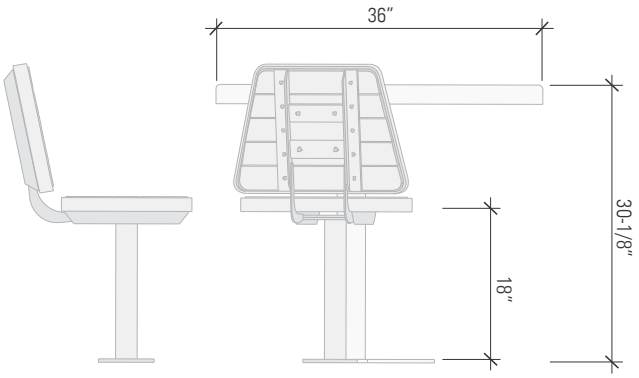
**TABLE SET**

Victor Stanley's Anthro Sites™ Collection table is available in ADA accessible form for 4 or 5-person capacity and complements the Lily bench through the horizontal steel bar design. Optional perforated pattern steel tabletop is available for more decorative interest. Table sets should be placed on a bed of the same material as adjacent paving or decomposed granite and anchored per the manufacturer's recommendations.







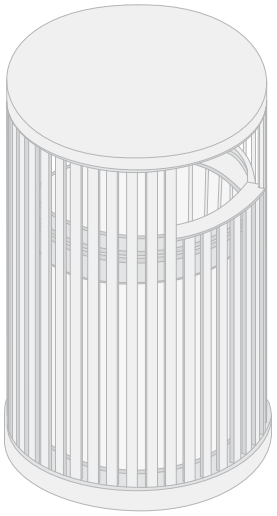



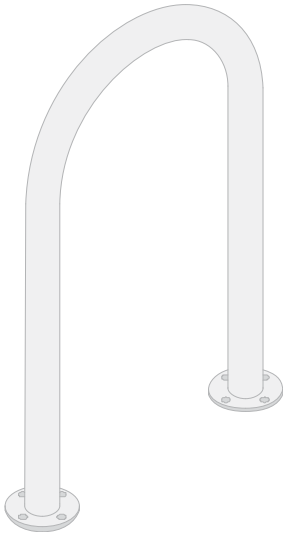
## TRASH RECEPTACLE

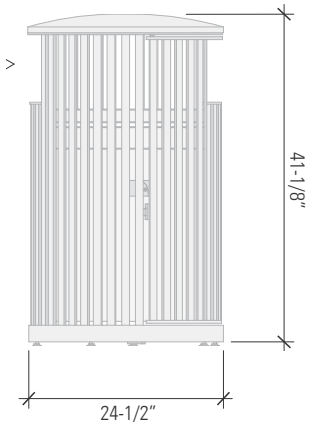
Victor Stanley's Steelsites™ Collection SDC-36 has a 36-gallon capacity, (2) side-deposits and side-opening design with a large convex lid. The steel bar design complements the other site furnishings chosen. These receptacles come with side-access plate recycling option, as well as the option for custom decals and plaques. The receptacles should be placed near seating areas and at building entries.

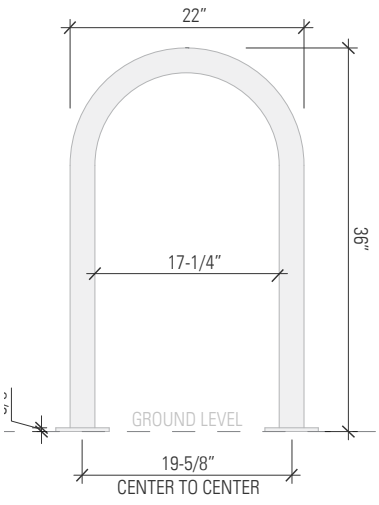
## BICYCLE RACK

Victor Stanley's Cycle Sentry™ Collection BRWS-101 is purchased in single loops. These racks can be placed outside of building entries for convenient bike parking and hold up to 2 bikes each. Racks should be installed 4' apart and at least 1'-6" away from concrete pad/ sidewalk edge.







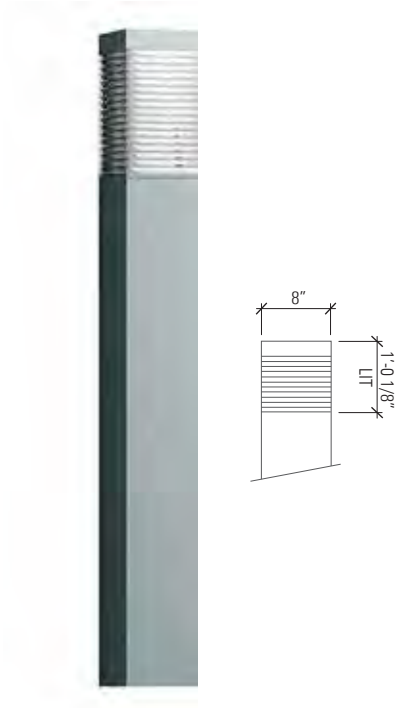



## LANDSCAPE QUALITIES

### SITE FURNISHINGS

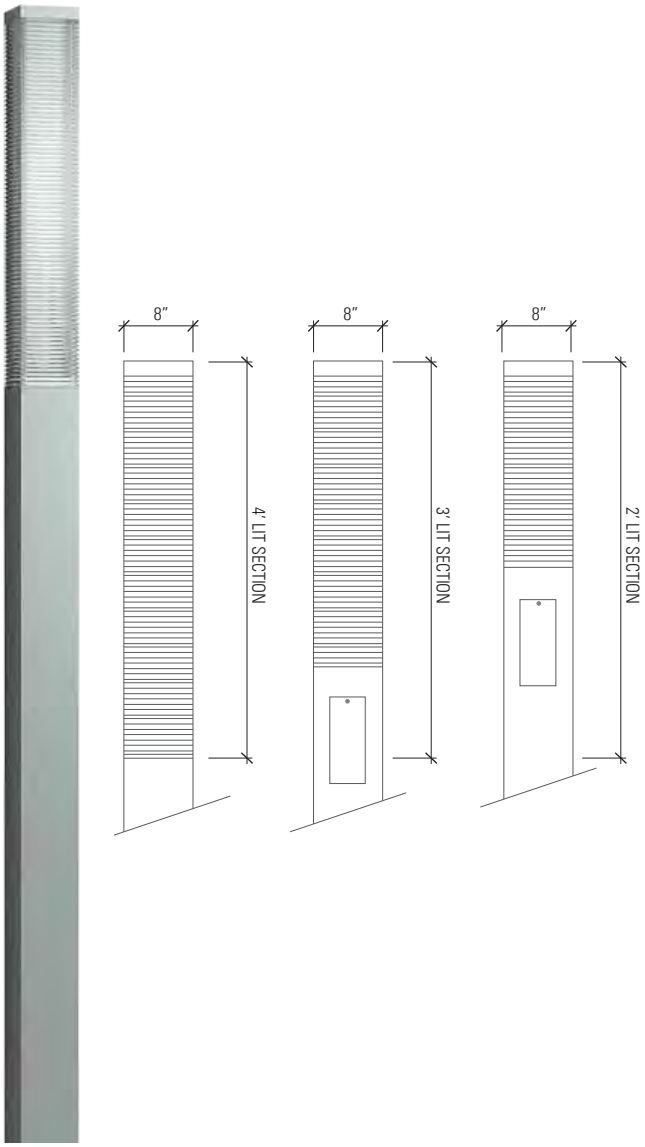
**BOLLARDS**

Bollard design should be cohesive with the rest of the furnishings as well as provide a barrier between vehicles and pedestrians. Selux's MTR Square Bollard provides lighting to create a safer environment, and is constructed with die-cast, low-copper aluminum/ extruded housing with stainless steel fasteners. The square form is complimentary to the signage and wayfinding lighting.




**LIGHT POLE**

Pedestrian-scale lighting will provide for a safe and secure environment, create a defining visual characteristic during daylight hours and reinforce unity along central spine axis, east-west cross spines and Village Grid. The MTR Square Column from Selux is constructed with a die-cast, low-copper aluminum top cap, fitter and extruded square column, and is in the same design family as the bollards selected.



**Appendix A - Landscape Plan**

## SIGNAGE + WAYFINDING

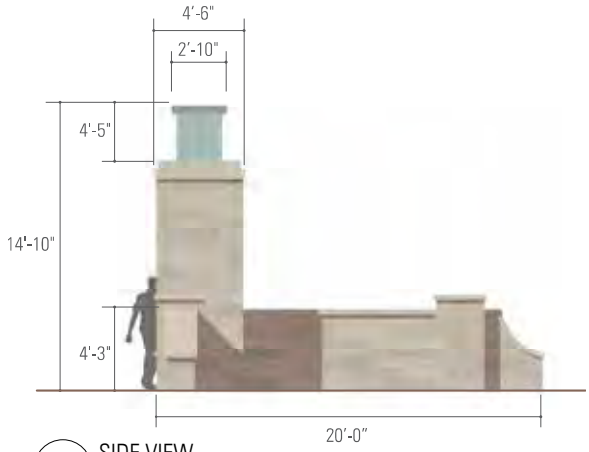
### TARLETON STATE UNIVERSITY - FORT WORTH CAMPUS | CAMPUS SIGNAGE

A comprehensive messaging and signage program unifies the campus environment and reinforces a sense of place to help build identity and communicate to visitors that they are entering the campus. The Sign Family recommendations are based around the dynamics of the visitor experience as people approach the campus, orient themselves at campus entrances and find their destinations.

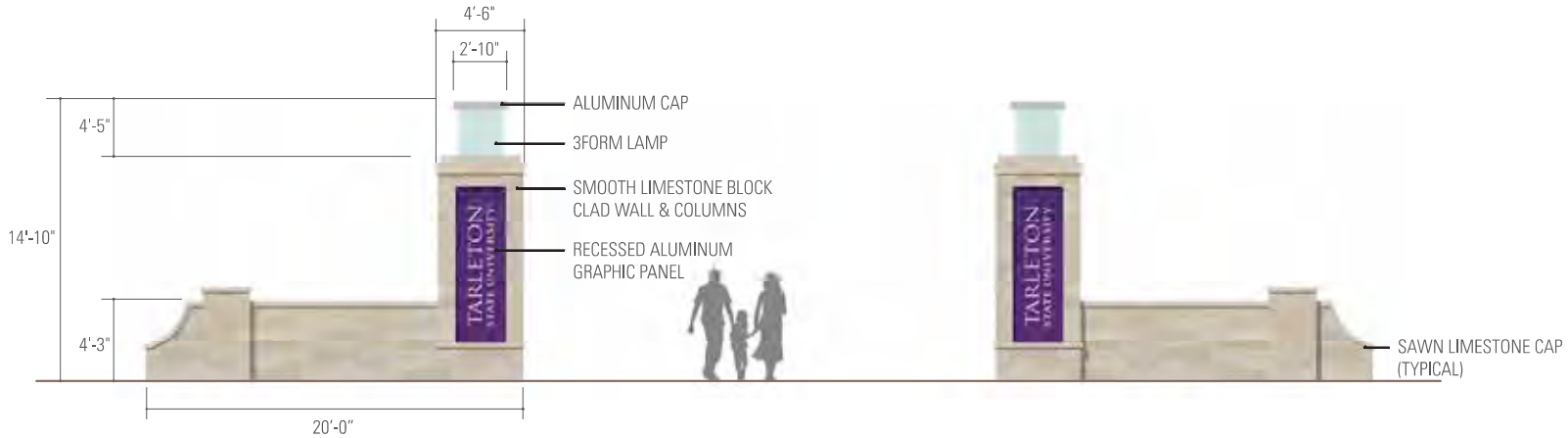
**ENTRY THRESHOLD- PRIMARY ENTRY**

Reminiscent of the lantern adorned gateway features that exist at the Stephenville campus, these updated forms are designed to compliment the new architecture, but retain the feel of the original campus. The gateway formation creates a threshold that clearly marks the entrance of the campus.


1 PERSPECTIVE
SCALE: NTS




2 SIDE VIEW
SCALE: 1/4"=1'-0"

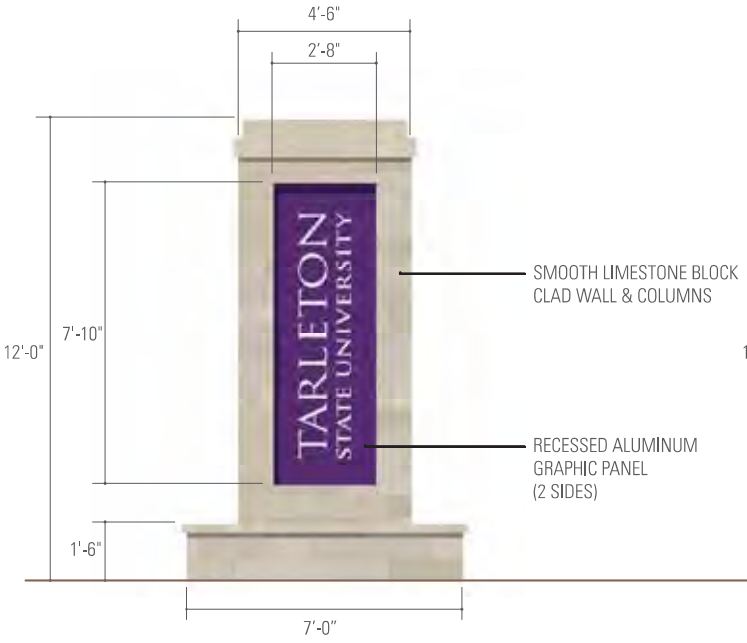



3 ELEVATION
SCALE: 3/16"=1'-0"

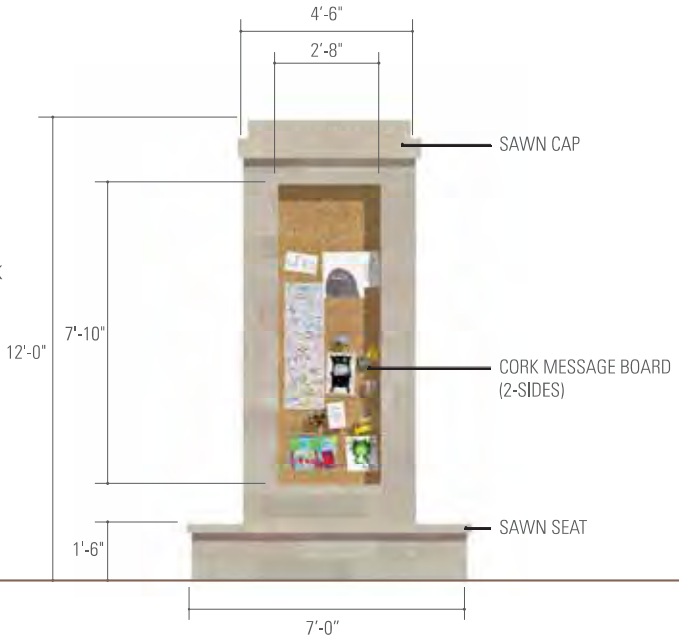
## COLUMN IDENTIFICATION

A singular column that complements the lantern adorned gateway features are to be used at drop-off points or places where a limited footprint exists. Combining identification graphics with a student populated message board transforms a single use sign to a gathering point and landmark for the campus.


1 PERSPECTIVE
SCALE: NTS




2 ELEVATION
SCALE: 1/2"=1'-0"




3 SIDE VIEW
SCALE: 1/2"=1'-0"

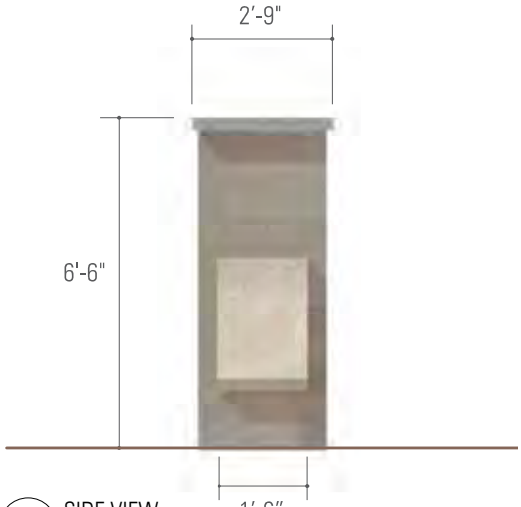
## SIGNAGE + WAYFINDING

### IDENTIFICATION

**WALL IDENTIFICATION – SECONDARY ENTRY**

This sign type can be used as a blade sign and be single or double-sided. By utilizing the design components of the entry threshold this will mark secondary entry points and help create a branded environment.


1 PERSPECTIVE
SCALE: NTS



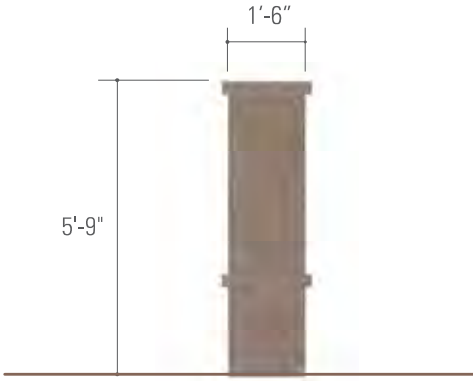

2 SIDE VIEW
SCALE: 1/2"=1'-0"


3 ELEVATION
SCALE: 3/8"=1'-0"

**Building Identification**

This sign type can be used as a blade sign and be single or double-sided to identify individual campus buildings or amenities.


1 PERSPECTIVE
SCALE: NTS

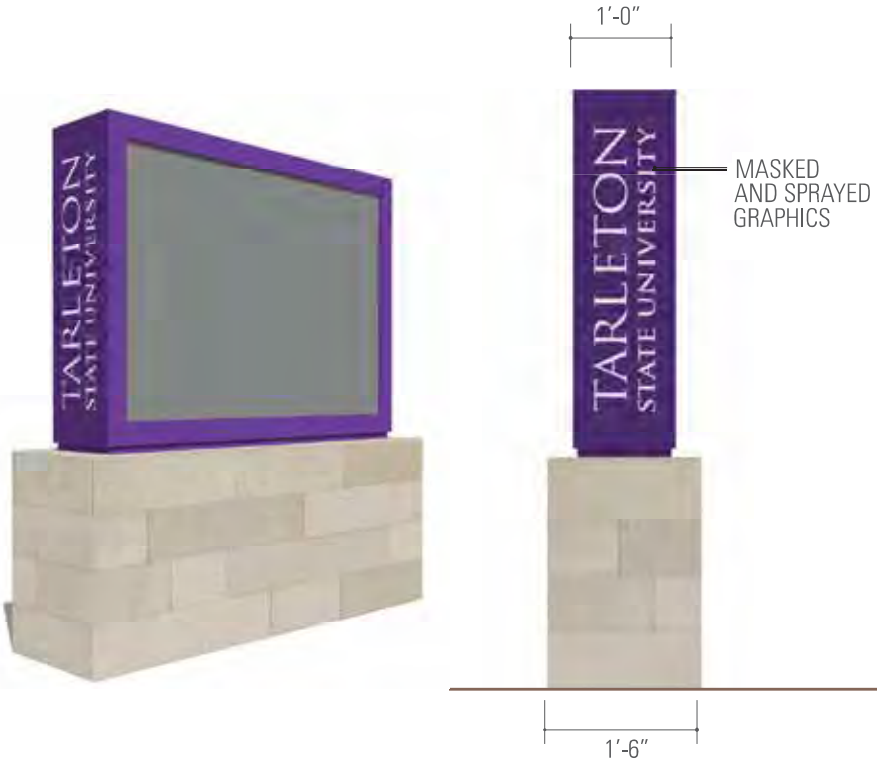



2 SIDE VIEW
SCALE: 1/2"=1'-0"


3 ELEVATION
SCALE: 1/2"=1'-0"

## SIGNAGE + WAYFINDING

### MAP

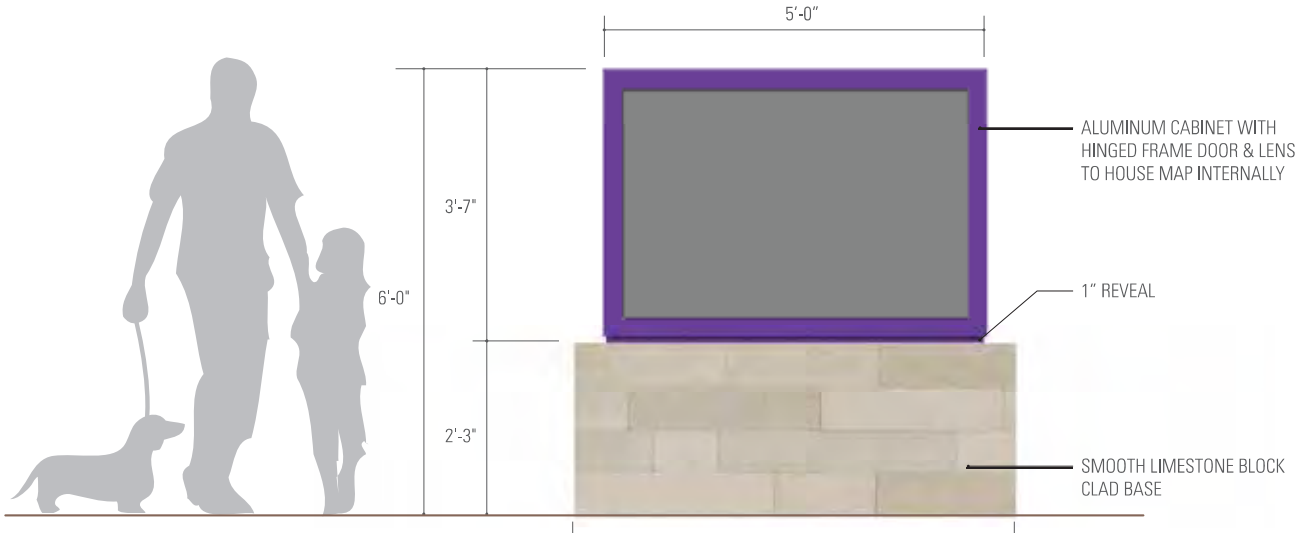



1 PERSPECTIVE
SCALE: NTS

2 SIDE VIEW
SCALE: 1"=1'-0"

**PEDESTRIAN MAP SIGNAGE**

This sign type consists of a fabricated cabinet with a lockable door panel that houses a campus map graphic. The stone base coordinated with the signage family and the campus architecture.




3 ELEVATION
SCALE: 3/4"=1'-0"

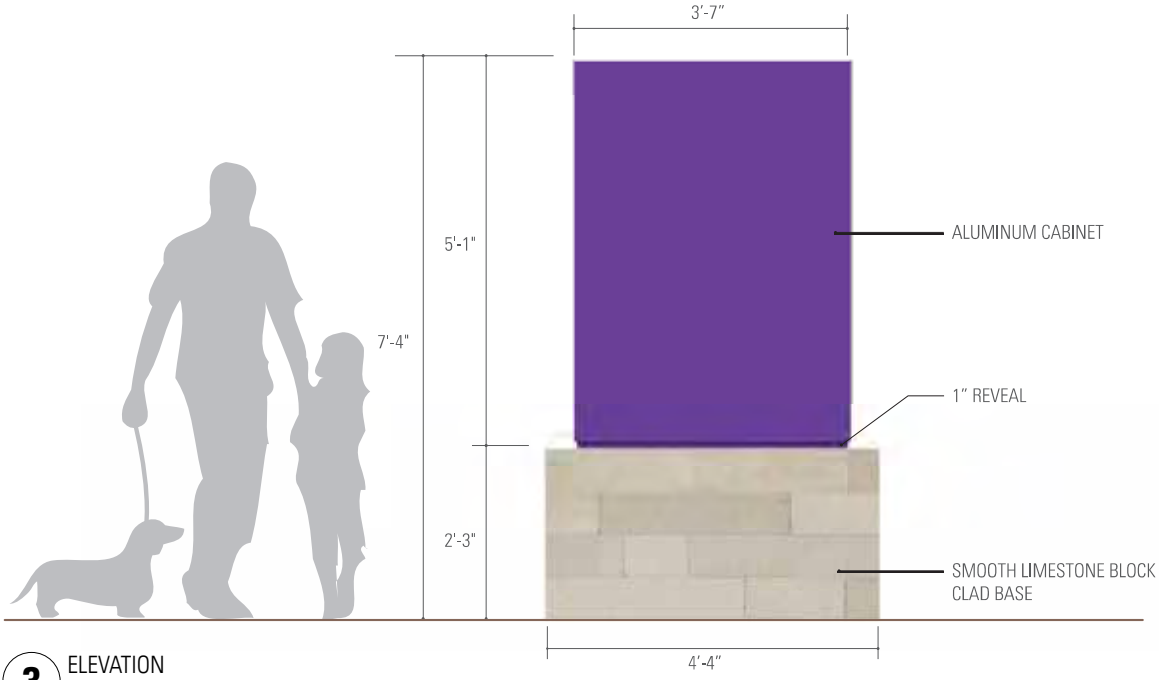
DIRECTIONAL

## VEHICULAR DIRECTIONAL

Placed at critical decision points these sign modules can have applied graphics that communicate directional information, parking lot entry identification or any other traffic oriented message.


1 PERSPECTIVE
SCALE: NTS


2 SIDE VIEW
SCALE: 3/4"=1'-0"



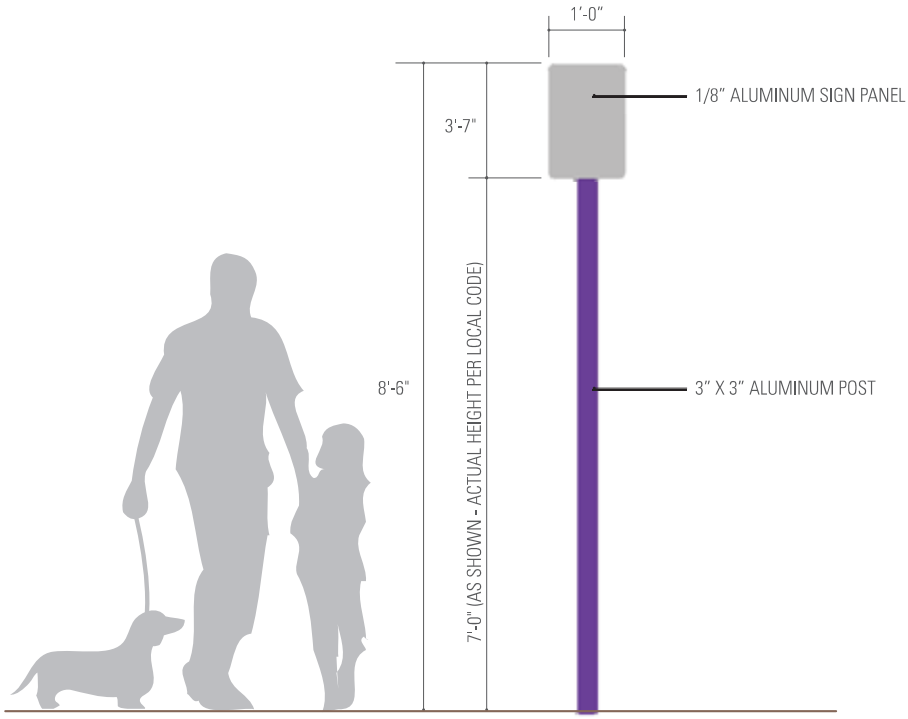

3 ELEVATION
SCALE: 3/4"=1'-0"

## SIGNAGE + WAYFINDING

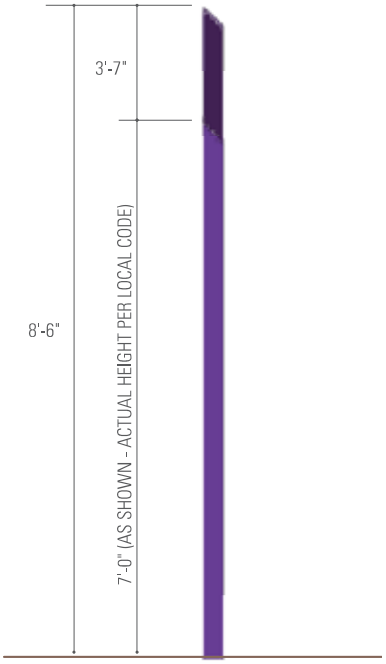
### REGULATORY

**1** PERSPECTIVE
SCALE: NTS

**REGULATORY SIGNAGE**
These post and panel signs carry the Tarleton State brand colors throughout the parking stalls.




**2** ELEVATION
SCALE: 3/4"=1'-0"

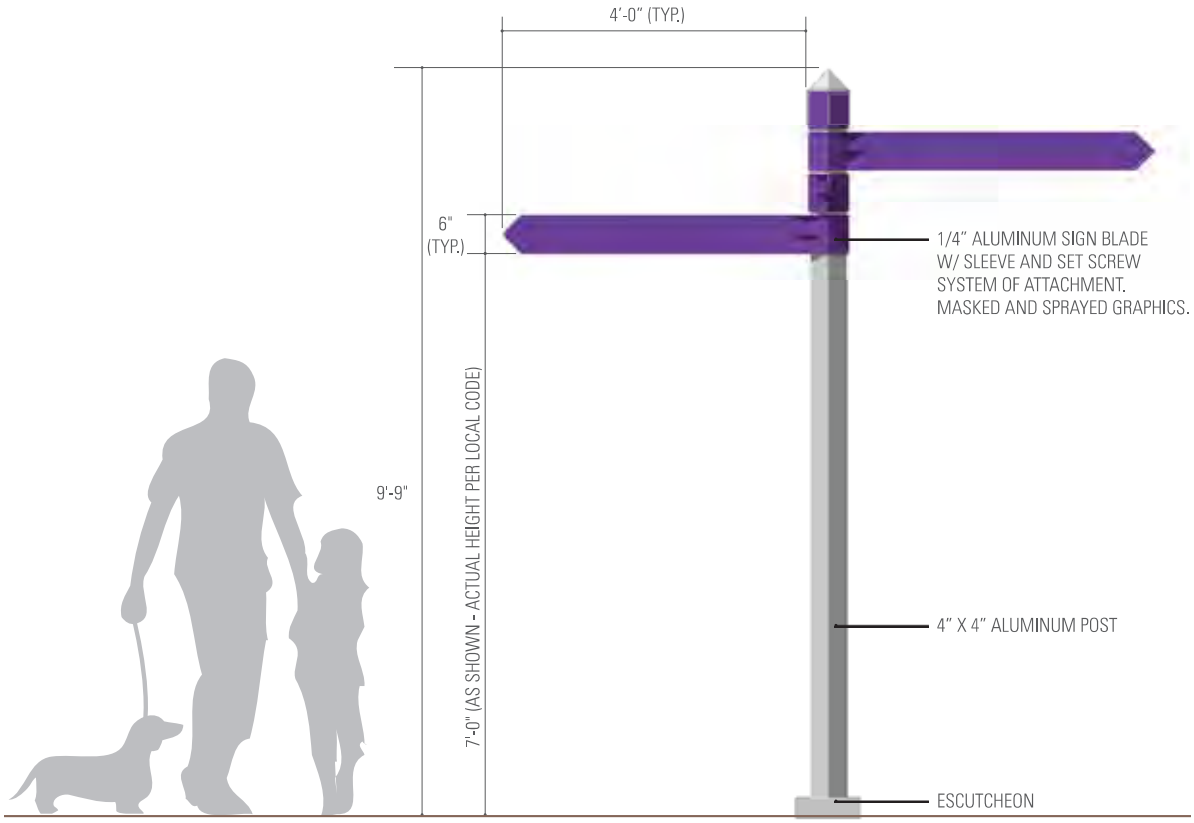



**3** SIDE VIEW
SCALE: 3/4"=1'-0"

## PEDESTRIAN DIRECTIONAL

Placed at critical decision points these sign modules can have applied graphics that communicate directional information and pedestrian oriented messages. These signs are a quick read by pointing the cardinal directions.

1 PERSPECTIVE
SCALE: NTS




2 ELEVATION
SCALE: 3/4"=1'-0"

# Tarleton State University

## Fort Worth Campus Master Plan

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