### Project Team

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<tr>
<th>Master A/E</th>
<th>Discipline</th>
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<tr>
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Executive Summary
Pre-Concept Design Report

The Texas Capitol Complex Phase 1 project is an exciting and challenging project. Executing a large, complex project requires thorough and thoughtful planning. As such, in the initial 120-day effort of this project, Page, as the Master AE, in collaboration with Balfour Beatty Construction, the CM Agent, are planning necessary direction to the design and management of the project. During this process, the Master AE team has met with stakeholders to clarify the design criteria, analyzed state agency existing spaces, identified utility and infrastructure impacts, and distilled these requirements into design strategies. This Pre-Conceptual Design Report is the culmination of the initial 120-day effort of the Master AE team to document our analysis, recommend design strategies, and establish a baseline for the project scope and quality from which a conceptual cost estimate and overall project schedule can be benchmarked.

This report is structured into the following sections:

− Preface
− Volume 1 – Programming
− Volume 2 – Infrastructure Analysis
− Volume 3 – Pre-Conceptual Design Analysis
− Appendices

Included in the appendices are supplemental documents also developed as part of the Master A/E Pre-Concept design effort. These include:
− Design Workshop Presentations to Stakeholders (5 total)
− Architectural Drawings (30”x42” sheets)

In addition to this report, several companion documents are also referenced throughout. These documents provide additional information to understand the full breadth of scope and quality of the Capitol Complex project. These referenced documents include:
− 2016 Capitol Complex Master Plan, adopted - March 2016
− Owner Project Requirements (OPR), adopted - June 2016
− Program Management Plan (being developed concurrently with this report through the CM Agent)
Executive Summary
Project Description

The Texas Capitol Complex Phase 1 project is the implementation of the Phase 1 improvements as recommended in the adopted 2016 Capitol Complex Master Plan. Funding for the Phase 1 improvements was approved in the 2015, 84th Legislative Session. The project will be administered through the Texas Facilities Commission (TFC), an agency of the State of Texas. The scope of the Phase 1 improvements includes:

The “Texas Mall”
Comprising three blocks of Congress Avenue north of the Capitol, between 16th Street and Martin Luther King Jr. Boulevard, which will be vacated to create a landscaped, tree-lined, pedestrian-oriented civic event space that will also serve as a “cultural gateway” on the north axis of the State Capitol. The north end of the new Texas Mall culminates in an open “museum plaza”, linking the Texas State History Museum, the Blanton Art Museum, and a new planned cultural venue in the new 1801 Congress Building. It should be noted that the work to complete the 4th block of the Texas Mall, between 15th and 16th Streets, is included in the future Phase 2 scope of work for which TFC is seeking approval in the 2017, 85th Legislative Session.

State Office Buildings
Two new state office buildings fronting the Texas Mall and comprising roughly 1,000,000 GSF of office space will support the goal of transitioning state agencies from leased office space into cost effective state-owned properties. The ground floors fronting the mall will incorporate public-oriented uses to activate the mall as a civic space.

1801 Congress Site Building (C18)
This site, located on the east side of the Texas Mall, between 16th and 17th Streets, is currently a surface parking lot. A new state office building, 12 floors high and with roughly 416,000 GSF will be located on this site. This building will also include five levels of underground parking, a new state employees’ child care facility, a ground level café, a shared wellness center, and a shared conferencing center.

Underground Parking Garage
A large, contiguous, five-floor below-grade consolidated parking facility will be provided beneath both office buildings and the extent of the three blocks of the Texas Mall. The parking supports the increase in state employees at the core of the Capitol Complex, the demand for parking in close proximity, and the need for additional visitor parking. The estimated total new parking provided in Phase 1 is 3,100 spaces.

Infrastructure and Support
To support the new improvements, the existing Central Utility Plant (CUP) at the Sam Houston Building will be expanded, and a new Utility Tunnel installed. These will provide district chilled water cooling that will serve the new buildings in Phase 1, establish infrastructure for future construction phases, and transition existing buildings off older equipment onto the district cooling.
Executive Summary
Scope, Cost, and Schedule Alignment

For successful project delivery, it is important to have a common understanding of the scope, cost, and schedule, as well as ensure that these items are meeting the expectations of all project stakeholders. This report's primary function is to communicate the scope and quality expectations. Listed below are the current expectations for Cost and Schedule.

Cost
The budget for the Phase 1 project has a Construction Cost Limit (CCL) of $477,940,000.

The Construction Cost Limit includes the following items:
- 1601 Congress Building core and shell
- 1801 Congress Building core and shell
- 1601 and 1801 Congress main building lobbies
- Core and shell impacts of the future cultural venue
- 1801 Congress above-grade parking garage
- Below-grade parking garage under 1601 Congress, 1801 Congress, and three blocks of the Texas Mall
- Streetscape immediately adjacent to project sites
- Three blocks of Texas Mall landscape/hardscape
- Garage access portals along the Texas Mall
- Sam Houston Central Plant expansion
- Underground Utility Tunnels for chilled water distribution from plant expansion to Phase 1
- CMR Fees and General Conditions
- Tenant agency fit-out for state agencies
- Fit-out of state employees' child care facility
- Playground equipment for state employees' child care facility
- Fixed furnishings, casework, modular furniture
- Site furnishings and public playscapes
- Technology infrastructure cabling
- Exterior building or site signage along the Texas Mall
- Utility relocations in street right-of-way (ROW)
- Various contingencies (construction, design, escalation)
- Audio visual systems for 1601 Congress Building conference center

The Construction Cost Limit does not include the following items:
- Interior fit-out of the cultural venue
- Fit-out of food service program
- Monuments for the Texas Mall
- Direct building access via tunneling to any existing facilities
- Architect/engineering fees
- Land costs
- Fees for permits from regulatory authorities or for legal recordings (ROW vacations), etc
- CMA fees
- Loose building furnishings
- Audio visual systems (other than 1601 Congress Building conference center)

Schedule
The overall project schedule is under the responsibility of Balfour Beatty Construction as the CM Agent for the project and is included in the Program Management Plan. For reference, listed below are project milestone dates, and the summary from the preliminary master schedule being developed by Balfour Beatty Construction:
- Groundbreaking - Start of Package 1 Excavation - June 2017
- Vacation of Congress Avenue - Oct 2017
- Construction Completion - March 2021
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**Construction Summary (Calendar Days)**

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**Milestone**

- Package 1 Excavation Complete
- Package 2 Site Utilities Complete
- Package 3 Central Utility Plant (CUP) Complete
- Package 4 1801 Congress Building Complete
- Package 5 1601 Congress Building Complete
- Package 6 Mall & Parking Complete

**Summary Duration**

- Package 1 Construction Duration - Early Utility Rel & Excavation
- Package 2 Construction Duration - Utility Relocations
- Package 3 Construction Duration - Central Utility Plant
- Package 4 Construction Duration - 1801 Congress Building
- Package 5 Construction Duration - 1601 Congress Building
- Package 6 Construction Duration - Mall & Parking
- Temp Chillers / Temp Util Bridge SFA/LBJ (Exc of Congress to CUP 100%)
The delivery of the project will be broken into six packages. Page, as the Master AE, will oversee design of the entire scope and bring the design to a Schematic Design level. Balfour Beatty Construction will be the Construction Manager Agent to serve as the Owner's Program Manager over the entire project scope. Cobb Fendley will serve as the Site Services Engineer to collect necessary pre-design information, such as surveys and borings. Each of the six packages will have an Architect and/or Engineer of Record (AOR/EOR) and a Construction Manager at Risk (CMR) for detailed design and construction of each package. The six packages are as follows:

- Package 1 – Excavation (EXC)
- Package 2 – Site Utilities (UTL)
- Package 3 – Central Utility Plant and Tunnel (CUP)
- Package 4 – 1801 Congress Building (C18)
- Package 5 – 1601 Congress Building (C16)
- Package 6 – Texas Mall and Underground Parking Garage (TXM)

It is expected that work will take place on multiple packages concurrently and that work in one package may rely upon completion of work in another package (e.g. relocating utilities prior to excavating an area). To ensure consistency of project delivery to TFC, it will be important to have a high level of collaboration between all design and construction teams as well as across all packages. It will be the role of the Master AE and the CM Agent to facilitate this collaboration and to establish the parameters to which each of the AOR and CMR teams will need to adhere.

To establish the framework for this collaboration, Balfour Beatty, with assistance from Page, will develop a Program Management Plan that will include detailed plans for Communications, BIM Implementation, Quality Control, and Cost and Schedule Controls.

The following pages provide a detailed description of each of the six packages.
# Project Partitioning and Packaging

## Anticipated Packages

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<tr>
<th>Package</th>
<th>Package Name</th>
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<tr>
<td>1</td>
<td>Excavation (EXC)</td>
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<td>1A Excavation and utility relocation within the site for the 1801 Congress Building</td>
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<tr>
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<td>1B Excavation within the site for the 1601 Congress Building</td>
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<tr>
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<td>1C Excavation within the site for the Texas Mall and underground parking garage (TXM)</td>
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<td>2</td>
<td>Site Utilities (UTL)</td>
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<td>2A Relocation of existing utilities from within the site for the 1601 Congress Building</td>
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<td>2B Relocation of existing utilities from within the site for the Texas Mall, to facilitate vacation of the Congress Avenue right-of-way</td>
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<tr>
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<td>2C Relocation of existing utilities from within the site for the CUP, and path for the Utility Tunnel</td>
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<td>3</td>
<td>Central Utility Plant and Tunnel (CUP)</td>
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<td>3A Early procurement of long lead equipment for the Central Utility Plant</td>
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<td>3B Construction of the Utility Tunnel and associated chilled water piping and fiber backbone</td>
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<td>3C Construction of the Central Utility Plant</td>
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<td>1801 Congress Building (C18)</td>
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<td>4A Construction of the Core and Shell of the 1801 Congress Building, including below-grade parking levels</td>
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<td>4B Interior fit-out of the Cultural Venue and Café (potentially by others)</td>
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<td>4C Interior fit-out of state agency offices - to be further broken out as needed</td>
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<td>5</td>
<td>1601 Congress Building (C16)</td>
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<td>5A Construction of the Core and Shell of the 1601 Congress Building, including below-grade parking levels</td>
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<td>5B Interior fit-out of the child care facility, shared conferencing, and shared wellness spaces</td>
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<td>5C Interior fit-out of state agency offices - to be further broken out as needed</td>
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<td>6</td>
<td>Texas Mall and Underground Parking Garage (TXM)</td>
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<td>6A Construction of the underground parking garage below the Texas Mall</td>
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<tr>
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<td>6B Landscaping and hardscape for the Texas Mall and exterior ground levels for the 1601 and 1801 Congress Buildings</td>
</tr>
<tr>
<td></td>
<td>6C Construction of the vertical architectural structures in the Texas Mall, for circulation and other functions</td>
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The Capitol Complex project, with the proposed below-grade parking structure between 16th Street and Martin Luther King Jr. Boulevard having five floors below grade, will require a significant amount of excavation work. The area of this excavation includes:

- The full city block on the east side of Congress Avenue between Martin Luther King Jr. Boulevard and 18th Street, currently used as surface parking lot 7, across from the Texas State History Museum.
- The west half of the city block at Congress Avenue between 16th and 17th Streets, adjacent to the LBJ state office building, currently used as surface parking lot 2.
- The three blocks of Congress Avenue between 16th Street and Martin Luther King Jr. Boulevard.
- Two sections of 17th Street, half a block in length, on either side of Congress Avenue.

To accommodate the five floors of below-grade parking, the excavation depth is expected to vary from 54' to 60'. Refer to the Limit of Excavation diagram for a depiction of the plan limits and estimated depths of the excavation. The soil material is expected to be mostly tan and grey chalky limestone for the full depth of the excavation below a very shallow amount of topsoil.

Deep excavations (50-60 ft) are expected in close proximity to City right-of-ways. The excavation contractor will be required to coordinate tie-back requirements for shoring which may encroach into the soils within the City's right-of-way. The excavation contractor will also be required to coordinate haul routes and access points for the jobsite with the City of Austin. It is also expected that de-watering will be needed given the depth of the excavation.

Also included in the scope of the excavation package is the relocation of one 12” wastewater utility pipe, running N-S roughly in the center of parking lot 7. This is an active line that is within an easement on state-owned property. It is anticipated that this utility line will be relocated to the east into the Brazos Street right-of-way. This will need to be relocated and the easement vacated before the area of the easement can be excavated.

Given the complexity and scale of the excavation activities, the project team determined that it would be advantageous to have one contractor responsible for this entire scope of excavation with a single point of responsibility for shoring design, haul route coordination with the City, de-watering, and other excavation-related activities. However, within the overall excavation extents, the excavation effort will need to be phased to coordinate with existing conditions and the work activities by others, including the vacation of City streets and relocation of utilities.
The phasing of the excavation work is planned as follows:

**Phase A**
The first phase of the excavation work will be at the current parking lot 7 across from the Texas State History Museum and will include the relocation of the wastewater line. It is expected that the Phase A excavation work will be the location for the groundbreaking of the entire project. This is the site for the new 1801 Congress office building which will have the longest construction schedule as it is the tallest and largest of the two office buildings, thereby necessitating the early start for this area. The wastewater relocation is a high priority and will need to be accomplished as one of the first activities to facilitate excavation in this Phase A. As this land is owned by TFC, early excavation work can begin in areas outside of the easement; however, excavation work cannot begin in the area of the easement until the wastewater line is relocated and the easement is vacated.

**Phase B**
The second phase of excavation work is at the current parking lot 2. There are also a small number of existing utilities in this area which are to be relocated by others as part of the Package 2 work. As this land is owned by TFC, excavation work can begin in areas outside of the easements; however, excavation work cannot begin in areas of easements until the utilities are relocated and easements have been vacated.

**Phase C**
The third phase of excavation work is at the current right-of-ways for Congress Avenue and 17th Street, which are to be vacated. The vacation process is expected to take several months and will also require a significant number of utility relocations from these existing right-of-ways before the vacation can be completed. The Site Services Engineer has initiated the vacation process, and coordination with the City is ongoing. The construction of the proposed, below-grade spaces – including...
the underground parking garage, sub-basement level of the CUP, and below-grade Utility Tunnel – will affect and require relocation of numerous existing utilities, both public and private. In addition to relocations, many of the existing site utilities will require capacity increases to accommodate the increased demand from additional buildings and improvements of the Capitol Complex projects.

The utility relocation scope is of critical importance to the project schedule because of its impact on all other activities. For instance, the vacation of Congress Avenue and subsequent excavation will require the utility relocations to be completed prior to commencement.

The majority of the utility relocations will affect public utilities. As such, it is expected that these relocations will be coordinated through the Austin Utility Locating and Coordinating Committee (AULCC) and permitted with the City of Austin through the General Permit Process. This work will also require coordination with right-of-way management for rights to the new space for the relocation, as well as coordination with City of Austin transportation to manage road lane closures to perform the work.
Project Partitioning and Packaging
Site Utilities (UTL)

Detailed lists of specific utility conflicts, documented by utility, can be found in Volume 2 of this report. Below is a brief summary of several utilities posing specific challenges:

**Stormwater and Wastewater in 17th and 18th Streets**
These gravity lines flow west to east toward the west side of the excavation for the underground parking garage. The ideal goal for these utilities would be to have them continue to pass through the garage structure in the final condition in order to avoid the need for a complex solution with multiple pumps and lift stations to move flows against gravity. A design solution is being investigated which would phase the excavation of Congress Avenue and construction of new garage structure such that new parallel lines could be run in new structure prior to existing lines being taken out of service with only a minimal shut down for a cut-over to the parallel lines.

**TFC Chilled Water**
The existing LBJ and WBT buildings (on the east side of the project) are served by chilled water from the plant in the SFA building (on the west side of the project). The excavation and construction of the underground parking garage will require removal of these chilled water lines. Both the LBJ and WBT buildings are intended to remain operational for the full duration of the project. In lieu of temporary cooling, a design solution is being investigated similar to the solution for the storm and wastewater lines, to phase the work so that parallel lines can be installed prior to existing lines being taken out of service.

**Electrical Duct Bank at 18th**
There is a significant Austin Energy electrical duct bank running in 18th Street that feeds a considerable amount of buildings west of the project site. The current design solution that Austin Energy prefers is to relocate to a new duct bank in Martin Luther King Jr. Boulevard, between Colorado and Brazos Streets.
Project Partitioning and Packaging
Central Utility Plant and Tunnel (CUP)

Central Utility Plant
To support the increase in office space in the Capitol Complex, Phase 1 includes an expansion of the Central Utility Plant at the existing Sam Houston Building. The expansion is proposed on the NE corner of this block at the corner of 14th Street and San Jacinto Boulevard. The new central plant expansion will support additional district cooling for the Capitol Complex with chilled water piped through a new utility tunnel to the new buildings. The utility tunnel and piping infrastructure will be sized in order to support new buildings, future Phases, and existing buildings as they transition off old equipment onto more efficient district cooling.

The site for the CUP expansion has existing equipment and utilities that will need to be relocated prior to construction of the CUP structure; these include buried power, data and chilled water utility lines, existing emergency power generators, and a UPS battery storage structure.

The new CUP building is expected to be two floors – a lower level with pumps for all primary, secondary, and condenser piping and an upper floor with chillers and electrical service equipment. The equipment will be designed and installed to provide N+1 redundancy, providing one extra redundant piece of equipment of each type above the quantity needed to service the calculated load. The structure for the CUP expansion will be sized to accommodate a full build-out of 10,000-tons of cooling; however, this Phase 1 project will only install the amount of equipment needed to support the Phase 1 demand. The cooling towers will be located on the roof of the new CUP, and the exterior walls will extend up to provide screening of the cooling towers as required in the Capitol Complex Master Plan. The design intent is to excavate one level below grade to allow the new CUP floors to align with the existing basement and sub-basement levels of the Sam Houston building. There are existing capitol-view corridors restricting heights of structures on this site, but with excavating one floor down, it is expected that the two floors, cooling tower, and screen walls can all be constructed below the view corridor height limits. The exterior walls of the CUP will be designed using materials consistent with the design guidelines of the Capitol Complex Master Plan.

Utility Tunnel
A new utility tunnel will connect the district chilled water to the new office buildings. The tunnel will be a walkable tunnel for maintenance purposes and will be for mechanical use only as it is not intended to be an occupied space or an accessible circulation route. The size of the tunnel is anticipated to be approximately 12’x12’ clear inside, and the tunnel will include chilled water supply, return, and condensate pipes racked on one side of the tunnel and a conduit rack above the maintenance access space for a district fiber backbone. The tunnel is expected to be below grade with 12’ of cover over the tunnel. The majority of the tunnel will traverse City right-of-ways, and this depth will allow other City utilities to run above the tunnel.

The design team is investigating opportunities to locate the chilled water piping within the garage structure, and reduce the scope of separate underground tunnel construction. The Master AE team is collaborating with the CMA to determine cost and schedule benefits and impacts of this potential approach.
Project Partitioning and Packaging
Central Utility Plant and Tunnel (CUP)

Along the tunnel route, there will be several conditions to consider:

Utility Tunnel installed in City Right-of-Ways (R.O.W.s)
For the majority of the tunnel between the CUP and the 1601 Congress Building, the tunnel is intended to be located in City street right-of-ways with the expectation that the tunnel will be built using open-cut excavation in the right-of-ways. As such, there will need to be considerable coordination with and approval from the City of Austin. These include: encroachment agreements for the tunnel to occupy part of the right-of-way, coordination with street closures for trenching and tunnel construction activities, and coordination with other buried utilities in the right-of-ways.

Utility Tunnel installed across 15th Street
The tunnel is expected to cross 15th Street at Brazos Street. In addition to the challenges noted above for construction in the City right-of-ways, there are additional challenges with 15th Street in that it is a major vehicular artery for the City with a significant amount of buried utilities in the street that will cross the tunnel’s path. It will be significantly more difficult to do an open cut excavation across this intersection, and as such, it is expected that this section of the tunnel across the intersection may need to be bored underneath the existing buried utilities.

Utility Tunnel installed in existing State property
The existing REJ Building and garage are built across the Brazos Street corridor between 15th and 16th Streets. In this area which is State property, the tunnel will be installed under the existing driveways that pass under these structures. Since this property is owned by the State, no encroachment agreements or City approvals are required; however, this work will need to be coordinated with the building occupants as the tunnel construction will impact driveway access to the existing building and garage.

The CUP and tunnel construction activities will need to be phased early enough in the project schedule to ensure that chilled water can be delivered to the new buildings in time for construction activities requiring conditioned air. Conditioned air will be needed to ensure finishes in the buildings can be properly acclimated and installed in a climate-controlled environment.

Package 3
Central Utility Plant and Tunnel (CUP)
One of the key goals of the 2016 Capitol Complex Master Plan is to transition state agencies out of leased space and into state-owned facilities. The new 1801 Congress Building which will be delivered in Package 4 supports this goal.

The 1801 Congress Building will be a new state office building located on the east side of the Texas Mall between Martin Luther King Jr. Boulevard and 18th Street at existing parking lot 7 across from the Texas State History Museum. This building will be 14 floors high, with roughly 603,000 GSF. The building will include five levels of below-grade parking, and eight floors of above-grade parking on the eastern side of the building. A cultural venue with a ground level café is planned on the ground floor fronting the Texas Mall to complement the adjacent Blanton and Texas State History Museums.

The Package 4 scope of work will include the portion of the below-grade garage below the office building as these will be integral structures. It is expected that there will be an expansion joint at gridline 6 on the west side of the 1801 Congress Building to separate the below-grade structure supporting the office tower from the below-grade structure of the Texas Mall. This expansion joint is expected to serve as the delineation between Package 4 for the 1801 Congress Building and Package 6 for the Texas Mall and Garage.

Package 4 is expected to be delivered in phases; breaking tenant agency finish-out into separate (later) phases allows design and construction of the core and shell to proceed earlier in the overall project schedule. It is expected that all finish-outs for state agencies will be included in the scope for Package 4 and completed in phases. These later phases for agency finish-outs could be additional contracting opportunities within the construction community. The finish-outs for the proposed cultural venue and food service space are expected to be performed under separate contracts from the main 1801 Congress Building project.
Project Partitioning and Packaging
1801 Congress Building (C18)

At the ground level, the exterior plaza in front of the 1801 Congress Building is intended to be integrated into the Texas Mall. As such, it is expected that the landscaping and plaza finishes will be incorporated into Package 6 for sake of continuity of the exterior groundscape. Package 4 will include the structure below the plaza east of gridline 6, but all exterior paving, sidewalks, and landscaping are expected to be delivered through the Package 6 scope.

Because the underground parking structure is intended to be a single, contiguous garage but has scope in multiple packages, significant coordination will need to occur between these packages. It is expected that systems such as fire sprinkler piping, mechanical ventilation, and lighting, can be zoned such that they can be constructed discreetly on either side of the gridline 6 “demarc” between Package 4 and Package 6. However, it is expected that some systems – including potentially fire alarm, building management system (BMS) controls, below-grade waterproofing, and stormwater – will need to be integrated into one cohesive system across these package boundaries. AOR and CMR teams will be expected to coordinate with other package teams to ensure complete, cohesive systems for TFC. The team is investigating how best to ensure these cohesive systems.
The 1601 Congress Building will be a new state office building located on the east side of the Texas Mall between 16th Street and 17th Street at current parking lot 2 and will share the lot with the existing LBJ state office building. The new building will be 12 floors high, with roughly 416,000 GSF. This building will also include five levels of underground parking, a new state employees’ child care facility, a ground level café, a shared wellness center, and a shared conferencing center.

The Package 5 scope of work will include the portion of the below-grade garage below the office building since these will be integral structures. It is expected that there will be a construction joint at gridline 6S on the west side of the 1601 Congress Building to separate the below-grade structure supporting the office tower from the below-grade structure of the Texas Mall. This construction joint is expected to serve as the delineation between Package 5 for the Congress Building and Package 6 for the Texas Mall and Garage.

Package 5 is expected to be delivered in phases. Breaking tenant agency finish-outs as separate (later) phases will allow design and construction of the core and shell to proceed earlier in the overall project schedule. It is expected that all finish-outs for state agencies, the state employees’ child care facility, shared wellness center, and shared conferencing center will be included in the scope for Package 5 and will be finished out in phases. These later phases for finish-outs could be additional contracting opportunities within the construction community. The finish-out for the food service café space is expected to be performed under separate contracts from the main 1601 Congress project.

At the ground level, the 1601 Congress Building will have an arcade fronting the Texas Mall. This arcade crosses gridline 6S which is the delineation between Package 5 and Package 6. This arcade is included with the Package 5 scope although it will be constructed over primary structure below that is to be installed with Package 6. It should be noted that there is no expansion joint at this demark line between packages, only a construction joint to coordinate the division of scope.
Project Partitioning and Packaging
1601 Congress Building (C16)

Similar to Package 4, it is expected that all exterior paving, sidewalks, and landscaping will be incorporated into Package 6 for continuity of exterior ground scape.

Because the underground parking structure is intended to be a single, contiguous garage but has scope in multiple packages, there will be coordination that will need to occur between these packages. It is expected that systems such as fire sprinkler piping, mechanical ventilation, and lighting can be zoned such that they can be constructed discreetly on either side of the gridline 6S “demark” between Package 5 and Package 6. However, it is expected that some systems – including potentially fire alarm, BMS controls, below-grade waterproofing, and stormwater – will need to be integrated into one cohesive system across these package boundaries. AOR and CMR teams will be expected to coordinate with other package teams to ensure complete, cohesive systems for TFC. The team is investigating how best to ensure these cohesive systems.

Package 5 - 1601 Congress Building (C16)
Project Partitioning and Packaging
Texas Mall and Underground Parking Garage (TXM)

Package 6 will be the construction of the Texas Mall and underground parking garage at the three vacated blocks of Congress Avenue north of the Capitol between 16th Street and Martin Luther King Jr. Boulevard. The new Texas Mall will be a landscaped, tree-lined, pedestrian-oriented civic event space that will serve as a “cultural gateway” on the north axis of the State Capitol. The north end of the new Texas Mall culminates in an open “museum plaza” linking the Texas State History Museum, the Blanton Art Museum, and a new planned cultural venue in the new 1801 Congress Building. It should be noted that the work to complete the 4th block of the Texas Mall between 15th and 16th Streets is planned to be completed in a future Phase 2 project as defined in the Capitol Complex Master Plan.

The work for the Texas Mall and underground parking garage in Package 6 is separated from the Package 4 and 5 work primarily because of the significant amount of utility relocations necessary for the vacation of Congress Avenue and the legal transfer of ownership of the property required before work can begin in this area. It is expected that Package 4 and Package 5 will “get out in front” of the Package 6 effort relative to schedule, but that construction of Package 6 will be completed close to the same time as Package 4 and 5 with the larger structures built in those packages. Work for Package 6 will be phased to follow the utility relocation effort in Package 2 and excavation work in Package 1. It is expected that Package 6 work will begin on some areas of the new garage structure while excavation and utility relocation efforts are still underway in other areas of Congress Avenue.

The Package 6 garage structure will also need to coordinate with the Package 3 utility tunnel effort as the district chilled water piping and fiber backbone are expected to be routed through the underground garage at some locations. The district chilled water is also expected to cross the garage at 16th and 18th Streets, so that in the future, this district piping can be extended west in order to complete a loop to serve the planned projects in future Master Plan Phases 2 and 3. It is expected that the chilled water piping installation will be performed through Package 3 even at locations where the piping runs through the Package 6 garage structures. As noted in the Package 4 and 5 descriptions above, there will be significant coordination that will need to occur between these packages and Package 6 to ensure building systems are integrated to provide a contiguous underground parking structure. It is expected that systems such as fire sprinkler piping, mechanical ventilation, and lighting can be zoned such that they can be constructed discreetly on either side of the “demark” lines between these packages. However, it is expected that some systems – including potentially fire alarm, BMS controls, below-grade waterproofing, and stormwater – will need to be integrated into one cohesive system across these package boundaries. AOR and CMR teams will be expected to coordinate with other package teams to ensure complete, cohesive systems for TFC. The team is investigating how best to ensure these cohesive systems. It should also be noted that since Package 4 and Package 5 will likely be out in front of the schedule relative to Package 6, these vendors will likely be identified for those packages prior to sub-contractor buy-out for Package 6.

The underground parking garage will have three vehicular entrances: one entrance off Brazos as part of the Package 4 and two entrances from east and west 17th Street...
as part of Package 6. The 17th Street garage entrances will ramp the street down to the B1 level for direct access in and out of the garage. The work associated with new roadways – ramping down, retaining walls, parking controls, roadway striping, and signage on the vacated portion of 17th Street – is part of Package 6. Several architectural features associated with the Texas Mall are also included in Package 6. These include vertical circulation “pop-ups” that provide pedestrian access onto the mall and a small amphitheater intended for events associated with the new cultural venue and area museums. The amphitheater will be integrated into the vertical circulation structure at the north end of the mall. Other uses to be incorporated into other vertical circulation structures on the mall include potentially public restrooms, connections for food service vendors/trailers, exhaust shafts for mechanical ventilation of the below garage, and connections for power and A/V for special events. It is expected that the mall will include regularly-spaced, recessed boxes for power and data connectivity and tie-down points for tent structures for special events. At the north end of the Texas Mall, the existing Texas State History Museum and new 1801 Congress Building will step back to allow a larger plaza to connect the museum and cultural venues. It is expected that the landscaping and plaza finishes will all be incorporated into Package 6 for continuity of the exterior groundscape. This includes all exterior paving, sidewalks, and landscaping at associated side streets around the 1601 and 1801 Congress Buildings. A key feature of the Texas Mall is an alley of trees on either side of the lawn panels. The trees in the alley are expected to be of reasonable size and growth when the mall opens. These trees will need to be identified and grown off-site in the local climate prior to installation on the Texas Mall. This will likely be an early activity of the Package 6 contract.

The scope of Package 6 for the Texas Mall does not include changes or improvements within the road of Martin Luther King Jr. Boulevard. However, there are discussions with the City to investigate options for a more pedestrian friendly crossing at this location to connect the Texas Mall with the plaza at the Blanton Art Museum across Martin Luther King Jr. Boulevard on the University of Texas campus.
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- Workplace
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- Phase 1 Workplace Analysis
1.1 Programming
Program
Introduction
Approach, Organization & Direction

Approach
The Texas Facilities Commission and Capitol Complex Master Plan stipulate that architectural programming be conducted in conjunction with pre-conceptual design analysis for specific buildings in the Capitol Complex. The Phase 1 buildings include the 1601 Congress Building, the 1801 Congress Building, and a large underground parking garage under the new Texas Mall connecting the two buildings. The high level functions of these structures were established and approved during development and adoption of the 2016 master plan. The programs for these buildings have been developed as primarily shell office buildings. Specific state agencies and commercial tenants have not been identified. Potential users were interviewed as part of the programming process to outline potential impacts and considerations to the shell buildings.

Program information contained herein has been derived through adherence to the Owner’s Project Requirements (OPR), indirect/potential agency research, best practice experience, and interactive concept design workshops.

Organization
The program tab A is organized into: a restatement of the Phase 1 projects vision, a qualitative discussion of program components and assumptions by specific use/function, a quantitative analysis of area required by space use/function, preliminary blocking and stacking analyses to test and illustrate how the program distributes through the target buildings, and a final summary of resulting space use and leasable area achieved.

Program tab B focuses on the work environment within the state agency tenant office spaces. First, a high level summary of workplace trends and best practices establishes the terminology and considerations paramount to the design of state of the art workplaces now and looking forward over the proposed building life. Following, analysis of representative and potential state agency current office environments illustrates the current range of environments in use by potential Phase 1 tenant agencies. Applying the general range of options seen in place to the Phase 1 buildings concludes the program analysis by establishing how the proposed office floor plates can be adapted to a range of workplace environment needs.

Direction: Meetings and Participants
In developing the program of requirements for the Phase 1 projects contained herein, the available direct input was confined to information gathering sessions with related, potential, and representative tenants.

Given the complex dynamics and numerous stakeholder groups which will ultimately decide the specific tenants and agencies that will occupy the Phase 1 buildings, TFC leadership have directed the project team to develop the majority of the program based upon the extensive direction contained within the OPR and the adopted Capitol Complex Master Plan as well as professional experience and best practice. Program meetings have been confined to informal discussions with representative experts on the proposed program components:

- Child Care Facilities: Hara Cootes, University of Texas Child Development Services
- Cultural Venue: Bob Santelli, GRAMMY Museum
- Food Service: Michael Hooks, Texas Workforce Commission / Business Enterprises Program (TWC/BET)
- Security: Commander Joe Ortiz, Texas Department of Public Safety (DPS)
- Wellness Facilities: Michelle Sneed & Bernie Hajovsky, Employees Retirement System of Texas (ERS)

In order to test the agency office space development and understand any unconventional requirements that may arise, representative tenant agency exploratory meetings were also held with:

- Office of the Attorney General of Texas (OAG): Louis Seller and Mandy Crawford
- Texas Commission on Environmental Quality (TCEQ): Richard Hyde
- Texas Department of Insurance (TDI): David Mattax, Patty David, Ryan Brannan, and Mike Powers
- Texas Department of Criminal Justice (TDCJ): Jerry McGinty
- Texas Lottery Commission (TLC): Mike Fernandez and Gary Grief

On the detailed space list for each building, the specific source or logic behind the assumed areas and space requirements is noted. Numerous best practice and placeholder assumptions should be reviewed and verified in support of more detailed design.
Overall Project Vision
Restatement of Established Phase 1 Vision

The Capitol Complex Master Plan, adopted in April 2016, presents a multi-phase program to construct new buildings in the Capitol Complex in order to address the statutory mandate to give preference to locating agencies in state-owned buildings and to mitigate the impact of future Austin area lease cost increases. This plan will allow the state to eliminate extensive reliance on commercial lease space, consolidate widely dispersed state agencies, and create greater operational and fiscal efficiency in state government.

The master plan incorporates goals and design principles established for the Capitol Complex through stakeholder meetings and Partnership Advisory Commission input. The goals are to: provide state office space and support facilities for short-term and long-term needs; create a destination that celebrates the Texas State Capitol and is symbolic of the great State of Texas; create civic spaces, pedestrian friendly streets, and appropriately scaled environments that support human comfort; and establish gateways to the Capitol Complex and improve connections with surrounding districts.

The primary goals of constructing new office buildings in the Capitol Complex, and relocating state employees into them, are consolidating the workforce to improve quality of service, increase employee retention, and ultimately reduce overall operational costs to the State of Texas.

Developing new office buildings in the Capitol Complex for the purpose of consolidating private market leases also represents a great opportunity to relocate staff from older spaces to modern and efficient office environments, thereby improving operational efficiencies. Visitors will also benefit from improved access to state agencies in a consolidated complex in downtown Austin. Currently, 5,000 employees in twenty-two leased properties occupying over 1.5 million gross square feet of office space are scattered over Austin. At full build-out of the master plan, the Capitol Complex has the capacity for accommodating nearly 5 million square feet of new building space, more than three times the current need.

Phase 1

The 84th Texas Legislature has funded Phase 1 of the master plan, including approximately 1,025,000 gross square feet of new office space. Phase 1 consolidates approximately seventy-five percent of current lease space into the Capitol Complex and also includes 4,840 new parking spaces, three blocks of the Texas Mall landscape and associated streetscape improvements, and needed infrastructure upgrades to support the new development.

Phase 1 construction includes the development of buildings on 1601 and 1801 Congress Avenue sites, as well as parking below three blocks of the Texas Mall. The building sites are currently occupied by surface parking lots. The master plan states that the 1601 Congress site will accommodate a new child care facility and the Department of Public Safety (DPS), however subsequent review has reallocated DPS to the 1801 Congress site. This site utilizes surplus parking from nearby garages as well as new underground parking below the building and the adjacent Texas Mall. The 1601 Congress site is centrally located within the Capitol Complex and provides a strong opportunity for a district amenity to be located at the ground level.

The 1801 Congress site is unconstrained by view corridors or the capitol dominance overlay, affording ample building space for lease consolidation. The building helps to anchor the Texas Mall along with the Texas State History Museum. Coupled with the existing museum, a public function at the base of this building can create a significant gateway for visitors to the Capitol Complex. Parking for this building is accommodated below grade as well as in an integrated garage on the east side of the building, away from the Texas Mall.

### Phase 1 Data from the Master Plan

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Program Elements
Summary by Phase 1 Component

The general program for Phase 1 buildings dedicates the bulk of the area in each building to core and shell office space to support relocating state agencies. In keeping with the best practices established and defined in the OPR, each building will incorporate building common, mechanical, electrical, plumbing, and information infrastructure appropriate for state of the art office buildings. In addition to these general requirements, the specific program elements proposed for each building in Phase 1 are driven by the overall master plan goals and organization. Each building that serves as a face onto the new Texas Mall (replacing what is now Congress Avenue) is directed to include a public facing and/or capitol employee common use element on the ground floor to help activate the pedestrian environment and present a welcoming face to the public environment.

1801 Congress Building
Located directly across from the Texas State History Museum, the building at 1801 Congress will include a cultural venue that is modeled after a music focused museum/cultural venue with a substantial assembly component to support educational and event purposes. A small cafe with exterior seating and gift shop will also be included at the ground floor of the building. The public/gateway location of the 1801 Congress Building makes it appropriate for public facing state agency space. The Drawing Studio and Claim Center portions of the Texas Lottery Commission (TLC) and Service Desk of Department of Public Safety (DPS) are included in this program as illustrative placeholders for this type of ground floor activating use. While no specific agencies have been confirmed as tenants the building at this time, at this time, the DPS Capitol District office functions are anticipated to be located in the building on a temporary basis to allow Phase 2 to commence.

1601 Congress Building
The state employees’ child care facility will be in the ground floor(s) of the building at 1601 Congress. Additionally, there will be a cafe with exterior patio seating. The central location of the 1601 Congress Building makes it an ideal location for complex-wide conference and training space. As a placeholder and proposal, the program includes a representative full-floor conference and training center with ground floor access. As the design is further developed, the specific conference and training needs for the complex should be verified.
The museum/cultural venue proposed for the public/ground floor/plaza facing area of the 1801 Congress Building is being modeled on the GRAMMY museum in Mississippi as a placeholder pending further development of the idea.

Goals for the cultural venue are:
- To bring cultural education to children and students
- To create a museum triangle/district at the Capitol Complex with three distinct spaces that feed off each other and draw traffic
- To engage the building exterior and Capitol Mall, playing a role in festivals, demonstrations, workshops, and other events

Major elements of the museum include:
- Permanent and traveling exhibit space
- Auditorium/classroom to hold performances, lectures, and films with optimal acoustics and fixed seating for 250-300
- Pre-function space to support private events and generate revenue
- Flexible classrooms for High School and College teachers to provide in-depth curriculum (can relate to grant funding)
- Gift shop accessible to Capitol Mall
- Operational and staff spaces to support recruiting and accommodate efficient and best practice cultural venue operation

Important organizational considerations for effective museum operation include efficient workflow for deliveries from the dock to workspace in the prep area and out to exhibit.
**Program Considerations**

**State Employees’ Child Care Facility**

An existing child care facility available to Texas Capitol Complex employees will be replaced by a new child care facility in the ground level of the 1601 Congress Building. For planning purposes, we assume that UT Child Care, the current operator, will continue to operate the center in the new location. However, decisions regarding the facility operator will be made by TFC at a later date.

Program considerations and requirements were derived from a detailed tour of an existing UT Child Care Center and associated interview of the director.

The design of child care environments is regulated by various accrediting entities, including the Texas Department of Family and Protective Services (DFPS). Accreditation standards require no less than 30 square feet of classroom space per enrolled child, as well as 80 square feet of outdoor space, segregating older children from infants and toddlers. Each classroom must have a direct route to the exterior for safety in event of evacuation.

Best practice for efficiency of operation is to pair classrooms that share restroom/changing, storage, and teacher preparation space in a central zone with sight lines to both classrooms.

Observation of the entry drop-off/pick up area from directors’ offices is crucial for safety. Additional space is desirable for parent meetings, staff training, and staff workspace.

Ideally child care environments are on a single floor, but multi-floor spaces can work if accessibility and evacuation requirements are met.

A full commercial kitchen may be needed if the center offers a prepared food option. Access to another food venue in the building may be preferable. At minimum a simple galley kitchen space is needed for child care operations.
Program Considerations

Shared Amenities

Food Service
Both the 1601 and 1801 Congress Buildings will house a large number of employees when fully occupied. In state of the art office environments, it is a best practice to offer convenient and immediate food service options.

Additionally, ground floor food service is an effective program element to support events and visitors on the Capitol Mall.

Specific food service venues and operators have not been identified at this time. The program includes representative placeholder space based upon recent buildings of this type: a coffee shop/grab and go space within the 1801 Congress Building with adjacent exterior seating, and a full service cafe with exterior seating in the 1601 Congress Building.

Considerations that affect the core and shell and have been taken into account are: ease of delivery access, potential need for commercial kitchen including a grease trap, ability to open the food service venue directly to the public plaza when the office building is closed, and restroom access for food service patrons.

Wellness
In order to support holistic employee wellness, state of the art offices increasingly provide space dedicated to employee fitness and health. TFC directs that each building in Phase 1 offer state employees, at a minimum, shower and locker room facilities to support bicycle commuting and exercise around or within the workday. Additionally, ERS and TFC note that state agencies increasingly use conference space ill-suited to hold group exercise, yoga, and meditation classes. The program directs that each building contain a multi-purpose space or spaces furnished to easily allow use and reservation as group exercise class space.

Numerous state agencies currently have access to fully equipped gyms that include weight lifting and cardio equipment within their current lease buildings. Additionally, there is a large group of state agency employees who participate in the DPS cross-fit program. This interest suggests there is appetite for a more extensive fitness element within the Capitol Complex. At this time, no organization or agency has been identified who might operate such a facility. Pending identification of an operator or means of funding and maintaining the equipment, the program proposes space to be further defined in future.

Office Level Common Support
The OPR workplace framework directs that, "Typical office levels in buildings subject to these requirements shall have at least one each of the following space types: shared break area, shared quiet room, and shared men’s and women’s restrooms...vertically stacked." This direction not only allows for building efficiency with respect to spaces that require plumbing, but centralized common use functions are a best practice in office planning as they allow for investment in higher quality break room environments and support cross-department (and in this case agency) collaboration and connection.

Depending on the specific agencies that are determined to occupy these new office buildings, it may also be appropriate to provide centralized large meeting and high density file areas on each floor. Preliminary design consideration has been given to these elements, but they are not included in the program calculations at this time.

Conference Space
The large number of agencies and associated personnel proposed for the Capitol Complex facilities may benefit from the provision of a centralized, large-scale conference and training facility to support periodic large meetings and events that are inefficient to provide in space dedicated to a single agency. To test this premise, the program and preliminary design concepts propose that the second floor of the 1601 Congress Building be dedicated to large scale training and meeting spaces with associated support in the form of smaller break-out spaces, catering support, and break area access.

Public Common Space
In keeping with the 50+ year life span and dignity appropriate to buildings owned by the State of Texas, generous space should be planned for lobby and public access space. Primarily driven by design, the program includes placeholders pending further development.
Program Considerations

Representative Agency Unique Spaces

Until specific agencies are identified to occupy the Phase 1 buildings, it is premature to accommodate unique space needs in the building design development. In keeping with the master plan vision for the buildings to support activation of the public realm, however, agencies with unique space needs that welcome the public who are considered candidates can help inform the direction of the core and shell design by helping to establish potential activating uses for the public building areas.

Texas Lottery Commission (TLC)
The TLC is required by statute and national lottery organization rules to hold their drawings in full view of the public, as well as welcoming large winners into their offices. Their current drawing facility houses a broadcast studio set, studio control work stations, drawing equipment storage/vault, broadcast / production room, announcer rooms, visitor viewing area, network, electrical, and UPS rooms.

The TLC also operates a publicly accessed Claim Center that includes a public lobby, claims service desk, claims staff, and supervisor office.

Department of Public Safety (DPS)
DPS will temporarily be located in the 1801 Congress Building, as DPS will need to vacate their current premises to allow Phase 2 to begin construction if approved. In addition to DPS office space located on upper floor(s), DPS temporary facilities in Phase 1 will include a publicly accessible service desk to issue permits and licenses. The service counter should be located to allow ready access to the public and state employees working in surrounding buildings - preferably on the ground floor.

In addition, DPS has several unique program elements that will be fully accommodated in their permanent Phase 2 location that will not be accommodated in temporary Phase 1 facilities (i.e. bicycle storage, motorcycle storage, equine unit, locker rooms, museum, etc.).

Diagram of the current public service desk located in the Capitol Complex.

TLC Drawing Studio Concept
The Drawing Studio has been recently renovated, maximizing the possible area in their currently constrained building footprint. This diagram shows the main facility components which would be required in a publicly accessible portion of the Phase 1 buildings if TLC is one of the tenant agencies relocating.

Diagram of the current Claim Center located adjacent to the Drawing Studio today.
Space Analysis
1801 Congress Building

Detailed Program of Spaces
In order to quantify the program spaces described above, a preliminary detailed space list itemizes each programmed space in the table at left (which continues on the following pages).

The following pages comprise the detailed core and shell program of spaces for the 1801 Congress Building, organized from top to bottom by type of space. From left, the columns contain:
- Space name or general type
- Level in the building preferred
- Total Net Area is simply calculated from a small space than a large space. In some capacity - in these cases the capacity and then area per seat or other measure is shown
- Unit Area is the area inside the walls of each space like this
- # Indicates how many spaces exactly like this are included
- Total Net Area is simply calculated from the Unit Area multiplied by the #
- With Circulation adds circulation space
to get to the specific space listed. This calculation is parametric: it applies a factor proportional to the size of the space. Logically this accounts for the fact that more corridor space is required per unit area of standard 18-wheeler - single truck dock
- Note explains the current basis/source for the space detail provided.

### Cultural Venue

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Based on discussion with experienced director/builder of representative target cultural venue.
## Preliminary Space List

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<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Unit Area (NSF)</th>
<th>#</th>
<th>Total Net Area (NSF)</th>
<th>With Circulation</th>
<th>Note/Basis/Comment</th>
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**TCC Phase 1 Pre-Conceptual Design Report**

**Texas Facilities Commission**

**Volume 1**

**Programming**

**Program**
### Texas Lottery Commission - Test/Potential Tenant Public Area Needs

<table>
<thead>
<tr>
<th>Unique/Public Facing Areas</th>
<th>Capacity Factor/Standard</th>
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<tr>
<td>Draw Studio Office/Security</td>
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</table>

*Note/Basis/Comment*
- Included for illustration of potential public facing agency function only - sizes based on TLC provided information and tour - no specific agency has yet been identified
- Includes security system and operator consoles
- Existing area + 20% growth (2 new machines planned)
- Small soundproofed rooms for single announcer
- Expiration space needed for 90 days during transition - storage/overflow/fix at other times
- Contractors maintain an inventory of components/tools onsite to assure lighting & equipment changes in event of failure
- To be verified if must be immediately adjacent or could be elsewhere in building
- Not toured - sized per TLC info given/current area
- Not toured - sized per TLC info given/current area
- Scaled from plan provided
- Scaled from plan provided
- Included for illustration of potential public facing agency function only - sizes based on DPS provided information and tour
- Shell space placeholder to be defined
- Placeholder based on recent benchmark projects
- Placeholder based on recent benchmark projects
- Placeholder based on recent benchmark projects
# Preliminary Space List

<table>
<thead>
<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Unit Area (NSF)</th>
<th>#</th>
<th>Total Net Area (NSF)</th>
<th>With Circulation</th>
<th>Note/Basis/Comment</th>
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</table>
## Tenant Agency Space

<table>
<thead>
<tr>
<th>Level</th>
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<th>#</th>
<th>Total Net Area (NSF)</th>
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<th>Note/Basis/Comment</th>
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</table>

## Building Common

<table>
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<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Unit Area (NSF)</th>
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<th>Total Net Area (NSF)</th>
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## Building Common - Subtotal

<table>
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<th>Unit Area (NSF)</th>
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## Building Common - Subtotal

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## Building Common - Subtotal

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## Public Common Space

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## Public Common Space - Subtotal

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## Public Common Space - Subtotal

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## Public Common Space - Subtotal

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## Technology Infrastructure

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<th>Total Net Area (NSF)</th>
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## Equipment Rooms

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<th>Unit Area (NSF)</th>
<th>#</th>
<th>Total Net Area (NSF)</th>
<th>With Circulation</th>
<th>Note/Basis/Comment</th>
</tr>
</thead>
</table>

# Detailed Program of Spaces

Remaining space available for tenant agencies

- **Galactic Area**: 265,993
- **Total Net Area (NSF)**: 377,710

**Note/Basis/Comment**: Placeholder based on recent benchmark projects

- **General Use/Group Class Room**: 6
- **Area**: 2,320
- **Capacity Factor/Standard**: 97
- **Total Net Area (NSF)**: 2,564

**Note/Basis/Comment**: Placeholder based on ERS auditorium space currently effective for Zumba and yoga classes

- **Office Elevator Lobby**: 3-14
- **Area**: 370
- **Capacity**: 12
- **Total Net Area (NSF)**: 4,440

**Note/Basis/Comment**: Lobby circulation at office floors along connector spine - placeholder based on current concept

- **Office Elevator Lobby**: 3-14
- **Area**: 370
- **Capacity**: 12
- **Total Net Area (NSF)**: 4,440

**Note/Basis/Comment**: Lobby circulation at office floors along connector spine - placeholder based on current concept

- **Data Center**: 3-14
- **Area**: 225
- **Capacity**: 8
- **Total Net Area (NSF)**: 1,800

**Note/Basis/Comment**: Assumes agencies require caged separation of networking equipment within - Preferred on Level 2, space assumes area for growth/extension
### Draft Program of Spaces

#### Preliminary Space List

<table>
<thead>
<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Unit Area (NSF)</th>
<th>#</th>
<th>Total Net Area (NSF)</th>
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<td>450 1</td>
<td>450</td>
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<td>Placeholder to be verified</td>
</tr>
<tr>
<td></td>
<td>Generator/ATS Gear G0</td>
<td>600 1</td>
<td>600</td>
<td>600</td>
<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Generator/Data Center G0</td>
<td>600 1</td>
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<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Electric Room All others</td>
<td>120 42</td>
<td>5,040</td>
<td>5,040</td>
<td>Placeholder to be verified</td>
</tr>
<tr>
<td></td>
<td><strong>Other Core</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Building Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Janitor Closets All</td>
<td>64 14</td>
<td>896</td>
<td>896</td>
<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Dock Office 1</td>
<td>100 1</td>
<td>100</td>
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<tr>
<td></td>
<td>Grease Trap Vault All</td>
<td>64 1</td>
<td>64</td>
<td>64</td>
<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Security Office All</td>
<td>200 1</td>
<td>200</td>
<td>200</td>
<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Elevators/Shafts - Main Building 1-15</td>
<td>532 14</td>
<td>7,448</td>
<td>9,077</td>
<td>Placeholder to be verified</td>
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<tr>
<td></td>
<td>Elevators/Shafts - Museum 1-2</td>
<td>200 2</td>
<td>400</td>
<td>551</td>
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<tr>
<td></td>
<td>Back of House/Service Access All</td>
<td>900 1</td>
<td>900</td>
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<td>Exit Stairs All</td>
<td>250 42</td>
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### Total Programmed Building - Area

<table>
<thead>
<tr>
<th>Level</th>
<th>Capacity (PNSF)</th>
<th>Total Net Area (NSF)</th>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>MEP Systems</td>
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<td>21,396</td>
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<td>Subtotal</td>
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<td>13,626</td>
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<tr>
<td>Mechanical Rooms</td>
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<td>21,396</td>
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<tr>
<td>Subtotal</td>
<td></td>
<td>7,770</td>
</tr>
<tr>
<td>Electrical Rooms</td>
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<td>7,770</td>
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<tr>
<td>Subtotal</td>
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<td>7,770</td>
</tr>
<tr>
<td>Other Core</td>
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<td>9,108</td>
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<tr>
<td>Subtotal</td>
<td></td>
<td>22,288</td>
</tr>
<tr>
<td>Total Programmed Building - Area</td>
<td></td>
<td>384,431</td>
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</table>

### Total 1801 Congress Ave. Building

<table>
<thead>
<tr>
<th>Level</th>
<th>Capacity (PNSF)</th>
<th>Total Net Area (NSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>557,827</td>
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<tr>
<td></td>
<td></td>
<td>Gross Building Area</td>
</tr>
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</table>

---

**Note:** Total Occupiable/Programmable Area, excludes Structure and Partitions.
The chart at left shows the breakdown of programmed space by level in the 1801 Congress Building. Note that the lower floors appear smaller than the upper floors in this view—this reflects the omission of the parking levels planned for the building.

The program areas are color-coded by type of space. While the program details the core and shell aspects of the building, the bulk of the area remains available for tenant agency office space (shown in orange).
**Draft Program of Spaces**

**For Pre Concept Report**

### 1601 Congress Ave.

**Preliminary Space List**

<table>
<thead>
<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Area (NSF)</th>
<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (USF)</th>
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</thead>
<tbody>
<tr>
<td>Child Care Facility</td>
<td></td>
<td>11,349</td>
<td>3</td>
<td>14,005</td>
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</tbody>
</table>

#### Notes/Basis/Comment
- Program based on tour and interview with current UT Childcare operator.

### Detailed Program of Spaces

**Space Analysis**

**1601 Congress Building**

**Detailed Program of Spaces**

The following pages comprise the detailed core and shell program of spaces for the 1601 Congress Building, organized from top to bottom by type of space. From left, the columns contain:

- Space name or general type
- Level in the building preferred
- Sizing premise, used for spaces that are driven by the number of seats or other capacity - in these cases the capacity and then area per seat or other measure is shown
- Unit Area is the area inside the walls of each space like this
- # Indicates how many spaces exactly like this are included
- Total Net Area is simply calculated from the Unit Area multiplied by the #
- With Circulation adds circulation space to get to the specific space listed. This calculation is parametric: it applies a factor to the individual space area that is inversely proportional to the size of the space. Logically this accounts for the fact that more corridor space is required per unit area of a small space than a large space. In some project types this value is also called ‘usable’ area or ‘departmental area’. Because this program details not only specific occupiable rooms, but also core building functions and vertical circulation some spaces do not include a circulation allowance.
- Note explains the current basis/source for the space detail provided.

### Student Areas

#### Classrooms

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Level</th>
<th>Capacity</th>
<th>Factor</th>
<th>Area (NSF)</th>
<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (USF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant</td>
<td>B1</td>
<td>10</td>
<td>3</td>
<td>350</td>
<td>3</td>
<td>1,050</td>
<td>1,324</td>
</tr>
<tr>
<td>Toddler</td>
<td>B1</td>
<td>11</td>
<td>3</td>
<td>390</td>
<td>3</td>
<td>1,170</td>
<td>1,475</td>
</tr>
<tr>
<td>2 Year Olds</td>
<td>1</td>
<td>16</td>
<td>3</td>
<td>560</td>
<td>3</td>
<td>1,680</td>
<td>2,048</td>
</tr>
<tr>
<td>3 Year Olds</td>
<td>1</td>
<td>16</td>
<td>3</td>
<td>560</td>
<td>1</td>
<td>560</td>
<td>663</td>
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<tr>
<td>Pre-K</td>
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<td>16</td>
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<td>560</td>
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<td>1,120</td>
<td>1,365</td>
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### Playspace

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<th>Level</th>
<th>Area (NSF)</th>
<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (USF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainy Day/Covered Multi-Purpose Play</td>
<td>B1</td>
<td>500</td>
<td>1</td>
<td>500</td>
<td>600</td>
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</table>

### Shared

<table>
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<tr>
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<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (USF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library/Parent Resources</td>
<td>B1</td>
<td>400</td>
<td>1</td>
<td>400</td>
<td>488</td>
</tr>
<tr>
<td>Reception/Entry</td>
<td>B1</td>
<td>225</td>
<td>1</td>
<td>225</td>
<td>299</td>
</tr>
<tr>
<td>Nurse/Sick Cubbie</td>
<td>B1</td>
<td>48</td>
<td>1</td>
<td>48</td>
<td>89</td>
</tr>
</tbody>
</table>

### Staff/Operations

<table>
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<tr>
<th>Area Type</th>
<th>Level</th>
<th>Area (NSF)</th>
<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (USF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director Office</td>
<td>B1</td>
<td>150</td>
<td>1</td>
<td>150</td>
<td>213</td>
</tr>
<tr>
<td>Asst. Director/Greeting</td>
<td>B1</td>
<td>150</td>
<td>1</td>
<td>150</td>
<td>213</td>
</tr>
<tr>
<td>Staff Lounge</td>
<td>1</td>
<td>300</td>
<td>1</td>
<td>300</td>
<td>383</td>
</tr>
<tr>
<td>Staff Workroom</td>
<td>1</td>
<td>200</td>
<td>1</td>
<td>200</td>
<td>275</td>
</tr>
<tr>
<td>Training/Meeting Room</td>
<td>1</td>
<td>400</td>
<td>1</td>
<td>400</td>
<td>496</td>
</tr>
<tr>
<td>Staff Restrooms</td>
<td>B1</td>
<td>30</td>
<td>2</td>
<td>60</td>
<td>125</td>
</tr>
<tr>
<td>Storage</td>
<td>1</td>
<td>750</td>
<td>1</td>
<td>750</td>
<td>902</td>
</tr>
<tr>
<td>Kitchen</td>
<td>1</td>
<td>350</td>
<td>1</td>
<td>350</td>
<td>444</td>
</tr>
<tr>
<td>Kitchen Storage</td>
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<td>100</td>
<td>1</td>
<td>100</td>
<td>153</td>
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<td>36</td>
<td>1</td>
<td>36</td>
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</table>
### Draft Program of Spaces

#### Preliminary Space List

<table>
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<tr>
<th>Level</th>
<th>Sizing Premise</th>
<th>Area (NSF)</th>
<th>#</th>
<th>Total Area (NSF)</th>
<th>With Local Circulation (JSP)</th>
<th>Note/Basis/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Food Service</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cafe and kitchen placeholder</td>
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<td>1</td>
<td>3,200</td>
<td>3,536</td>
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<td><strong>Tenant Agency Space</strong></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>170,971</td>
<td>Remaining space available for tenant agencies</td>
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<td><strong>Building Common</strong></td>
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<td>87,087</td>
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<tr>
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<td><strong>Shared Amenities</strong></td>
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<td></td>
<td>36,972</td>
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<tr>
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<td><strong>Wellness</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shower/Locker Facilities</td>
<td>600</td>
<td>2</td>
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<td>1,443</td>
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<tr>
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<td>General Use/Group Class Room</td>
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<td>2,320</td>
<td>2,564</td>
<td>Placeholder based on ERS auditorium space - currently effective for Zumba and yoga classes</td>
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<tr>
<td></td>
<td>Gym/Exercise Training Space</td>
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<td>2,750</td>
<td>3,039</td>
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</tr>
<tr>
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<td><strong>Office Level Common Space</strong></td>
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<td></td>
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<tr>
<td></td>
<td>Break Room</td>
<td>158 2.75</td>
<td>435</td>
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<td>3,915</td>
<td>OPR dictates minimum 2.75 sf per person served - test fit area used, resulting max population calculated</td>
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<td>486</td>
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<td>972</td>
<td>OPR dictates minimum 2.75 sf per person served - test fit area used, resulting max population calculated</td>
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<td>300 21</td>
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<td></td>
<td>Quiet Room</td>
<td>64 10</td>
<td>640</td>
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<td>6,405</td>
<td>OPR: 7'x7' minimum</td>
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<tr>
<td></td>
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<td>Conference Center</td>
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<tr>
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<td>Large Meeting 1</td>
<td>875 3</td>
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<td>Public Lobby</td>
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<td>2,884</td>
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<td>Staff Lobby</td>
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<td>2,700</td>
<td>2,884</td>
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<td>Restrooms</td>
<td>375 2</td>
<td>750</td>
<td>945</td>
<td>945</td>
<td>Placeholder based on preliminary concept - serving public at underground parking garage within building</td>
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<tr>
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<td>Elevator Lobby</td>
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<tr>
<td></td>
<td>Multi-Tenant 2 Corridors</td>
<td>1,918 2</td>
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<tr>
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<td>Star Egress Corridor</td>
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<td>250</td>
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<tr>
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<td><strong>Technology Infrastructure</strong></td>
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<td>6,405</td>
<td>Placeholder based on Pre-Concept Design Report</td>
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<tr>
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<td><strong>Equipment Rooms</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Building Entrance Facility (EF)</td>
<td>B1 3 providers</td>
<td>450 1</td>
<td>450 1</td>
<td>450 1</td>
<td>450 1</td>
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<td>Equipment Room (ERM)</td>
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<td>#</td>
<td>Total Area (NSF)</td>
<td>With Local Circulation (#SF)</td>
<td>Note/Basis/Comment</td>
</tr>
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<td>18</td>
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<td>Make Up Shaft All</td>
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<td>Mechanical Pump Room B1</td>
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<td>1,056</td>
<td>1,056</td>
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<td>Gross Building Area</td>
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The chart at left shows the breakdown of programmed space by level in the 1601 Congress Building. Note that the 1601 Congress site slopes, allowing direct access to the exterior at Level 1 on one face and Level B1 on the other.

The program areas are color-coded by type of space. While the program details the core and shell aspects of the building, the bulk of the area remains available for State Agency office space (shown in orange).
The chart on this page summarizes the different program elements anticipated for the 1801 Congress Building by type of space.

The first subtotal includes all of the ‘core building’ program elements. This program calculates these to total 159,547 square feet, which represents 26% of the gross building area.

The remaining space, 445,132 square feet, will be available for state tenant agency office space.
The chart on this page summarizes the different program elements anticipated for the 1601 Congress Building by type of space.

The first subtotal includes all of the ‘core building’ program elements. This program calculates these to total 125,813 square feet, which represents 30% of the gross building area.

The remaining space, 292,490 square feet, will be available for tenant agency office space.
1.2 Programming

Workplace Analysis
**Introduction**

**Changes in Work**

Consolidating State agency office space into new buildings created through the Capital Complex Master Plan offers a compelling opportunity to improve the quality and functionality of affected agency workplaces. Many agencies are in space designed decades ago before many of the recent changes that are impacting workspace layout and design.

The way that knowledge work is done has seen substantial changes since many (if not most) of the existing agency workplaces were conceived.

**Historically:**
- Roles were discrete
- Tasks were repetitive
- Pace was slow
- Hierarchy was strict
- Cumbersome, fixed tools locked work into prescribed spaces
- Assignments reflected entitlement and allocation by tenure

**Today:**
- Roles overlap and evolve – people wear multiple hats
- Problem solving and creativity rule
- Pace continues to accelerate
- Collaboration is prioritized over hierarchy
- Tools are mobile and work anywhere
- Space allocation denotes function and utilization, not seniority

These changes in the nature of work and organizations are driving dramatic reconsideration of the traditional office environment. Transcending specific work sector and organizational culture, some of the changes are so prevalent that they have become base standards for any workplace developed today.

**Workplace**

**Recent Workplaces: Prevalent Strategies**

**Natural Light**

There is a large and growing body of research showing the importance of access to natural light for human well-being. Given the large proportion of the average adult life spent in the workplace, it is no surprise that access to natural light is a priority for the modern office. Historic arrangements with offices at the perimeter and dark interiors are being turned inside out to effectively democratize access to natural light. Where culture or layout requires perimeter offices remain, the interior walls are now being made out of glass or including glazing to bring the daylight further into the interior of the floor plates.

**Reduced Barriers**

Fixed barriers (walls) in the workplace are decreasing in favor of more open plan environments. Open environments do not necessarily require less overall area for the same number of people, but the reduction of fixed walls provides a dramatic increase in flexibility of layout and density over time. Additional advantages include greater opportunities for staff development and improved collaboration and coordination when teams of people working on the same project or function can readily communicate.

**Centralized Support**

Centralization of shared/common use elements is a common strategy to improve the quality of the work environment, efficiently arrange functions requiring special construction like plumbing and ventilation, and increase cross-pollination of ideas across an organization by creating spaces where people naturally encounter colleagues they may not work with directly. By deliberately consolidating all of the ‘water cooler’ type spaces into a central area (usually per floor), more area can be allocated efficiently.
New office environments today are looking past these fundamentals to reflect a growing challenge presented by our connected digital culture: if personnel are equipped to work remotely from home, on public transit, and in coffee shops, etc. How can organizations encourage their employees to come into the workplace and conduct the necessary face to face interactions for effective work?

The realization that employees have choice is leading many organizations to shift the focus of their workplace design to the attraction and appeal of the workplace.

**Hospitality Strategies**
Organizations at the mobile worker extreme now create their new offices with the look and feel of high end hotel lobbies, complete with concierge services. More conventional organizations are improving their reception and break environments with a focus on space appeal.

**Expression of Culture**
To increase engagement and build pride in organizational culture, many environments are now designed to include explicit nods to the products, services, and mission of the organization. This goes beyond framing imagery to include full scale appliqués of relevant messages and the use of products and components in the space design.

**Quality of Design**
More broadly, these trends are combining to elevate the quality of the environment, beyond the public or client-focused areas and into the entire workplace.

**Driving research and innovation in workplace environments going forward is a comprehensive and pro-active focus on occupant well-being. Research into the neuroscience of work and productivity, efforts to reduce chronic disease and improve fitness, longevity, engagement, and satisfaction are changing the way organizations set up their environments and assign space.**

**Movement**
Workplace design and furniture manufacturers are now looking beyond the ergonomics of a fixed posture and creating workspaces and settings that support frequent movement and allow personalization. No longer driven by avoidance of chronic pain, workplaces now design in reasons to move via everything from simple moves like centralizing trash receptacles (requiring people to stand up to throw something away) to the introduction of treadmills or stationary bicycles at functional desks.

**Indoor Air Quality**
Sophisticated measurement tools and new research into cognitive function are increasing awareness of how the quality of indoor air can impact well-being and productivity. This awareness is leading pro-active organizations to improve their indoor environments before they become harmful. Indoor air quality is the focus of mechanical system improvements, material selection (to avoid toxic chemical off-gassing), and occupancy sensors that modulate fresh air based on the number of people in a meeting.

**Variety and Choice**
With all of the research into workplace improvements comes the recognition that no single space works for any given employee for all of the different types of work they do. Similarly, people vary in not only physical scale but preference for enclosure, ability to screen out distractions, personality, and habit (to name just a few) - which means that effective one-size/design fits all workspace environments are difficult to achieve. Sometimes called ‘Activity-Based’ workspace, a prevalent solution is to provide a variety of spaces within a single office that support not only a variety of personal preferences but also the many different tasks each individual may undertake.
**Agency Workplace Analysis**

**Existing Workspace - Planning Typology Review**

**Potential Tenant Agencies**

Several agencies have been identified to date as potential tenants in the 1601 and 1801 Congress Buildings. The detailed programming and design of tenant agency spaces will occur in future and separate phases of work. However, at this juncture a sampling of existing office spaces of potential agencies have been analyzed to achieve a basic understanding of the planning characteristics currently deployed in these workplaces.

It is understood that this analysis is for reference only. It is likely that new and/or existing workplace standards and new, possibly even transformative, workplace strategies will be utilized in the planning and design of workspace for tenant agencies.
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<td>Library 21x32</td>
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Agency Workplace Analysis
Existing Workspace - Planning Typology Review
Agency Workplace Analysis
Existing Workspace - Planning Typology Review

Sample Agency D

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Office Sizes
- 11X16
- 10X12

Workstation Sizes
- 7.5X8.5

Sample Agency E

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Office Sizes
- 10X15
- 15X15

Workstation Sizes
- 7-Approximated utilizing 6x6 workstations

Volume 1
Programming
Workplace Analysis

TCC Phase 1 Pre-Conceptual Design Report
Texas Facilities Commission
### Sample Agency F

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<td>1,041 usf</td>
<td>4%</td>
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| 24,603 usf | 157 total | 157 usf/pp |

| 9,264 sf | 27% | Core+Services+Common Area |

| 33,867 gsf | 216 gsf/pp |

### Office Sizes
- 10X12
- 15X15

### Workstation Sizes
- 8.5X12

### Shared
- File Room
- Conference Rm(s)
- Break Rooms
Phase 1 Workplace Analysis
Tenant Agencies - Potential Planning Scenarios

Core and shell office building design

Tenant agency fit-outs will be programmed and designed in future phases of work. However, initial high-level analysis of potential state agency tenants indicate fit-outs might include a broad range of office space sizes, as well as a broad range of workplace typologies that the design team should anticipate.

These diagrams are intended to illustrate the range of potential agency workplace strategies from the most open with the least interior enclosure to the least open with greatest interior enclosure.

Open plan workspaces will likely locate offices toward the interior (core) of the floor plate and endeavor to maximize daylight access for all staff by deploying glazed fronts on interior enclosed offices.

Workplaces for agencies with high percentages of staff engaged in “head's down” focused work might include a high percentage of enclosed offices - historically located on the exterior perimeter. In this case, the workplace design will likely endeavor to maximize daylight penetration to interior spaces by deploying glazed fronts on offices located on the exterior perimeter.

Note either typology might be deployed in a single tenant agency or multi-tenant agency scenario with common corridors.
## Volume 2
Infrastructure Analysis

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2.1 Infrastructure Analysis
Utilities
Utilities

General

There are numerous existing underground utilities that will need to be relocated in order to construct the proposed buildings, underground parking garages, Central Utility Plant, and Utility Tunnel. These utilities include water, wastewater, stormwater, telecommunications, electric, thermal (chilled water), and natural gas.

Meetings were held with the Austin Utility Location and Coordination Committee (AULCC) which is a committee of all the public utilities in the Austin area. The AULCC utility members provided maps to identify their utilities in the area of construction and discuss potential conflicts with their utilities that may be caused by construction. Additional meetings were held with each utility to further discuss conflicts and proposed solutions including the relocation and increases in capacity that may be necessary.

In addition to public utilities, the State of Texas also has private underground utilities that will be affected by the proposed construction. These utilities include telecommunication, chilled water, and electrical conduits.

The known utility conflicts and proposed conceptual relocations have been documented using conflict matrices and utility maps. These matrices and maps assist in organizing information for tracking the extent of conflicts, types of utilities, the location of conflicts, and potential locations for rerouting utilities. The following pages include the pre-concept level conflict matrices and utility maps.
The Stephen F. Austin (SFA) physical plant provides chilled water and compressed air to the William B. Travis (WBT) building. In addition, there are four 4” electrical conduits accompanying the pipes. One conduit contains the compressed air pipe. One conduit contains controls. The remaining two conduits are indicated as spares. Compressed air may no longer be required in WBT due to conversion to DDC controls.

The SFA physical plant also provides chilled water to the Lyndon B. Johnson (LBJ) building along with two 1-1/4” electrical conduits. There is no indication of the use for each conduit but controls are likely in one conduit and the other conduit may be a spare. The size of the chilled water lines should be analyzed for the appropriate capacity to form a connection into the new chilled water loop.

Service from SFA to WBT and LBJ must remain operational. However, the pipes and conduit cannot remain in the existing locations. It is proposed to reroute the pipes and conduit during the excavation of the Congress Avenue underground parking garage by using a utility bridge over the excavation site.

There are two options proposed on the exhibit for the tunnel routing for Phase 1. Option 1 is to route the tunnel outside the underground parking garage. Option 2 is to bring the tunnel to the underground parking garage and then route chilled water pipes through the garage. These two options will be evaluated for viability and cost. Both routing options will allow for existing and future buildings to connect to the chilled water system and the SFA chilled water plant to tie into the chilled water system for added redundancy.
Confirm conflict (refer to corresponding chart)

Potential conflict (refer to corresponding chart)

Phase 1

Phase 2

Phase 3

Proposed Utility Tunnel (Phase 1)

Proposed Utility Tunnel (Future Phases)

Proposed Underground Parking Garage (UPG)

Proposed buildings

TFC Utility Conflict Plan - TFC Thermal Chilled and Hot Water

OPTION 1 - ROUTE
OUTSIDE GARAGE

OPTION 2 - ROUTE
THROUGH GARAGE

Volume 2
Infrastructure Analysis
Utilities

TCC Phase 1 Pre-Conceptual Design Report
Texas Facilities Commission

Volume 2
Infrastructure Analysis
Utilities
A coordination meeting with Austin Energy (AE) was held on November 1st and 15th, 2016 to review existing facilities within Phase 1 and to discuss potential resolutions to AE facility impacts. The underground electric service on 18th Street crossing Congress Avenue (Conflict 3) will need to be cut, capped, and removed. Due to this loss, the lines along Martin Luther King Jr. Boulevard from Colorado Street to Brazos Street will need to be upgraded from overhead lines and 2-4” conduit ducts to 12-5” underground conduit ducts. The underground conduits for lighting on Congress Avenue between 15th Street and Martin Luther King Jr. Boulevard and the overhead lines crossing the parking lot of Phase 2 will also need to be removed. Additional rerouting should not be required for services to existing and proposed buildings. The proposed Utility Tunnel (Conflict 8) will need to be placed below the underground conduits on 15th and 16th Streets.

### TFC Utility Conflict Matrix - Austin Energy

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<th>Utility Owner</th>
<th>Location (Crossing Longitudinal/ Point etc.)</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
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<tbody>
<tr>
<td>01</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Longitudinal MLK Jr. Blvd</td>
<td>Congress Ave.</td>
<td>Proposed building construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility.</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Longitudinal Congress Ave.</td>
<td>From Brazos St. to Congress Ave.</td>
<td>Proposed building construction</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>UG Electric line in conflict with construction</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Crossing 18th St. Crossing Congress Ave.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility.</td>
<td>UG Electric line crossing Congress Ave.</td>
<td>Proposed to reroute north on Brazos St. to MLK Jr. Blvd, west on MLK Jr. Blvd to Colorado St., south on Colorado St. to 18th St.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Point W15th St. Heading North</td>
<td>Proposed Lot 3 Phase 3 construction</td>
<td>NA</td>
<td>Off electric line potentially in conflict with Lot 3. Confirm conflict once Lot 3 buildings are more defined.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Longitudinal From W16th St. to W 15th St.</td>
<td>West of Congress Ave.</td>
<td>Lot 11 Phase 2 construction</td>
<td>NA</td>
<td>Off electric line through proposed construction. Confirm conflict once Phase 2 buildings are more defined.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Longitudinal Congress Ave.</td>
<td>From 18th St. to MLK Jr. Blvd</td>
<td>Proposed construction</td>
<td>N</td>
<td>Off electric line connected to light poles down Congress Ave.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Electric</td>
<td>Austin Energy</td>
<td>Longitudinal +1 Heading East</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>Off Electric line crossing proposed utility tunnel on E. 15th St.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Utilities
Gas

A coordination meeting with Texas Gas Service (TGS) was held on October 27, 2016 to review existing facilities on the TFC project and discuss potential resolutions to TGS facility impacts. Existing lines on Congress Avenue between 15th Street and Martin Luther King Jr. Boulevard are not as critical as anticipated as they are low pressure or abandoned. The main 4" gas line along 18th Street crossing Congress Avenue (Conflicts 1 & 2) will need to be rerouted on Colorado Street, boring and connecting to the existing 4" line on the north side of Martin Luther King Jr. Boulevard. Services to proposed buildings and re-establishing service to existing buildings can be accomplished from existing perimeter lines along Martin Luther King Jr. Boulevard, Colorado Street, 15th Street, and on the east side by lines on 16th Street and 18th Street. The proposed Utility Tunnel (Conflict 10) will need to be placed below the gas line on 15th and 16th Streets.

<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Utility Type</th>
<th>Utility Owner</th>
<th>Location (Crossing/longitudinal Point etc.)</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Crossing 18th St.</td>
<td>Congress Ave.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>4&quot; Low pressure gas line (1) crossing Congress Ave. through proposed construction. Proposed reroute in Colorado St.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Crossing 18th St.</td>
<td>Congress Ave.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>4&quot; High pressure gas line (2) crossing Congress Ave. through proposed construction. Proposed reroute in Colorado St.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Crossing Longitudinal Congress Ave.</td>
<td>From 17th St. to E 15th St.</td>
<td>Proposed construction</td>
<td>Information from the utility whether this line can be removed at the Congress Ave. crossing.</td>
<td>N</td>
<td>4&quot; Gas line running from E 17th St. to 15th St. on E side of Congress Ave.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Longitudinal Congress Ave.</td>
<td>From 17th St. to W 15th St.</td>
<td>Proposed construction</td>
<td>Yes, but to be approved by utility</td>
<td>4&quot; Gas line running along the W side of Congress Ave., services SPA building off at 15th St. Proposed rerouting service to the Catholic Diocese from 16th St. Cap and remove the portion of gas line in Congress Ave. from 16th to 17th St. 2&quot; arterial line crosses Congress Ave. near intersection at 17th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Longitudinal Colorado St.</td>
<td>From W 16th St. to W 18th St.</td>
<td>NA</td>
<td>Proposed construction</td>
<td>4&quot; Gas line running parallel along Colorado St. potentially in conflict with Lot 3 construction. Confirm conflict once Phase 3 buildings are more defined.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Crossing E 16th St.</td>
<td>E 16th St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>4&quot;  &amp; 8&quot; Gas line crossing utility tunnel section along E 16th St.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Longitudinal/Crossing Brazos St.</td>
<td>Headed S. from 15th St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>4&quot; Gas line running parallel along utility tunnel, 4&quot; atalve coming off 4&quot; line do cross utility tunnel.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Longitudinal/Crossing W 15th St.</td>
<td>Headed E. from Colorado St.</td>
<td>Lot 11 Phase 2</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>8&quot; Gas line possibly in conflict with proposed construction. Confirm conflict once Phase 2 buildings are more defined.</td>
</tr>
<tr>
<td>09</td>
<td>Gas</td>
<td>Texas Gas</td>
<td>Crossing E 14th St.</td>
<td>Headed into capital grounds from San Jacinto Blvd</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>Abandoned 2&quot; gas line in conflict with utility tunnel.</td>
<td></td>
</tr>
</tbody>
</table>

**TFC Utility Conflict Matrix - Gas**

- **Yes** - Confirmed Conflict
- **Potential Conflict**
- **No** - Cleared Conflict

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**TCC Phase 1 Pre-Conceptual Design Report**

Texas Facilities Commission

**Volume 2**

Infrastructure Analysis

Utilities
City of Austin Watershed Protection

The existing storm inlets along Martin Luther King Jr. Boulevard at the west edge of the Congress Avenue right-of-way and at the east and west ends of the 1801 Congress Building site along Martin Luther King Jr. Boulevard (Storm Conflict No. 1) may be impacted by the proposed work along Martin Luther King Jr. Boulevard and will be removed and replaced if needed. The existing 18” storm lines located in Congress Avenue between 18th Street and Martin Luther King Jr. Boulevard (Storm Conflict No. 2) will be removed and replaced by the proposed storm drain system for the Texas Mall and reconnected back to the existing 18” storm line at Martin Luther King Jr. Boulevard. The existing 18” and 24” storm lines crossing perpendicular to Congress Avenue at 17th and 18th Streets (Storm Conflict No.’s 3-6) will be relocated over the Texas Mall Underground Parking structure just to the north or south of the existing lines to allow for the removal of the existing lines and excavation under the area where 17th and 18th Streets cross Congress Avenue. The existing 18” and 24” storm lines and manholes in Brazos Street from 16th Street to 14th Street (Storm Conflict No.’s 7 & 9-11) are within the proposed tunnel route and may need to be removed and replaced as part of the tunnel construction, depending on the depth and construction method of the tunnel in those areas.
Utilities
Water & Wastewater

Austin Wastewater

The City of Austin Wastewater (WW) coordination was held on October 27, 2016 to review existing facilities and discuss potential resolutions to impacts. Four conflicts were identified:

1. 12" WW line crossing the proposed 1801 Congress Building from Martin Luther King Jr. Boulevard to 18th Street (Conflict 1) should be able to be relocated along Martin Luther King Jr. Boulevard and down Brazos Street to connect into the 15" line on 18th Street. The site services engineer (SSE) is scheduled to start December 5th to survey the manhole elevations to verify this relocation is a viable option.

2. 12" WW line along 18th Street crossing Congress Avenue (Conflict 2); the line ends near the west right-of-way line of Congress Avenue and the section in Congress Avenue will need to be removed. The SSE will verify if services will allow this removal without services being rerouted to the Texas State History Museum.

3. 6" WW line along 17th Street crosses Congress Avenue/excavation zone (Conflict 6) and serves the LBJ and Stephen F Austin (SFA) building. It appears to be flowing in the west direction and will be difficult to route around the SFA to maintain minimum flows. Initial resolution is to install a grinder within the property site and detour the line around the SFA building and connect into the 15" WW line along 18th Street. Until the CFA survey/SUE is received impact resolution/relocated routes cannot be finalized for the Austin WW facilities.

4. The proposed Utility Tunnel (Conflict 11 & 12) will need to be placed below the WW line on 15th Street and the old Brazos Street between 15th and 16th Streets.

<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Utility Type</th>
<th>Utility Owner</th>
<th>Location</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Crossing</td>
<td>E. 18th St. to MILK Jr. Blvd</td>
<td>Middle of proposed 1801 Congress building</td>
<td>Proposed building construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>Yes, but to be confirmed from survey and approved by utility</td>
<td>12&quot; Wastewater line crossing through the middle of proposed 1801 Congress building. Proposed removal from MILK Jr. Blvd and south on Brazos St.</td>
</tr>
<tr>
<td>02</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>18th St.</td>
<td>From Congress Ave. to Brazos St.</td>
<td>Proposed construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>Abandoned 6&quot; line, active 12&quot; &amp; 12&quot; Wastewater lines potentially in conflict with proposed Congress Ave. construction and proposed 1801 Congress building. Service lines from Texas State Historical Museum and SFA building feed these lines.</td>
</tr>
<tr>
<td>03</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>MILK Jr. Blvd</td>
<td>From Brazos St. W to Congress Ave.</td>
<td>Proposed building construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Wastewater line potentially in conflict with Phase 1 of construction. 50 MPH and connections potentially in conflict with proposed building.</td>
</tr>
<tr>
<td>04</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>Congress Ave</td>
<td>Halfway between 18th to 17th St.</td>
<td>Proposed construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Wastewater line running down Congress Ave. then crossing.</td>
</tr>
<tr>
<td>05</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Crossing</td>
<td>17th St.</td>
<td>Crossing Congress Ave.</td>
<td>Proposed construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Wastewater line crossing Congress Ave. and running down E. 17th St.</td>
</tr>
<tr>
<td>06</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>East of Congress Ave.</td>
<td>South from E. 17th to E. 15th St.</td>
<td>Proposed 1801 Congress building</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Waste waterline running south from E. 15th, through proposed 1801 Congress building.</td>
</tr>
<tr>
<td>07</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>Colorado St.</td>
<td>From just north of 16th St to 17th St.</td>
<td>Proposed Phase 1, Lot 3 construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N/A</td>
<td>3&quot; &amp; 8&quot; Wastewater line running parallel along Colorado St. potentially in conflict with Phase 3 lot 3 construction, and proposed future utility tunnel. Confirm conflict once utility tunnel plans are final and depths are determined.</td>
</tr>
<tr>
<td>08</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal/Crossing</td>
<td>Utility tunnel</td>
<td>From 16th St. to just north of 15th St.</td>
<td>Proposed utility tunnel</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; potentially abandoned Wastewater line runs parallel along proposed utility tunnel then crosses the utility tunnel.</td>
</tr>
<tr>
<td>09</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>From W 12th St. to W 15th St.</td>
<td>W. of Congress Ave.</td>
<td>Lot 11 Phase 2 construction</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N/A</td>
<td>3&quot; Wastewater line running through proposed construction. Confirm conflict once Phase 2 buildings are more defined.</td>
</tr>
<tr>
<td>10</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>15th St.</td>
<td>From Colorado St. to passed Brazos St.</td>
<td>Lot 11 Phase 2 construction, Congress Ave. construction, Proposed utility tunnel</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Waste waterline possibly in conflict with proposed construction.</td>
</tr>
<tr>
<td>11</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>15th St.</td>
<td>From Colorado St. to passed Brazos St.</td>
<td>Lot 11 Phase 2 construction, Congress Ave. construction, Proposed utility tunnel</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; Waste waterline possibly in conflict with proposed construction.</td>
</tr>
<tr>
<td>12</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>Congress Ave.</td>
<td>Headed E. from Brazos</td>
<td>Proposed utility tunnel</td>
<td>Survey flow elevations and pipe sizes required</td>
<td>N</td>
<td>3&quot; wastewater line running along 14th St. line with the utility tunnel.</td>
</tr>
<tr>
<td>13</td>
<td>WasteWater</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>W. 17th St.</td>
<td>Headed S. from W. 17th St.</td>
<td>Phase 3 Lot 3 construction</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>2&quot; abandoned wastewater line running N. from W. 17th St. into Phase 3 construction.</td>
</tr>
<tr>
<td>14</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>Brazos St.</td>
<td>From E. 18th St. to MILK Jr. Blvd</td>
<td>Proposed building construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility.</td>
<td>12&quot; Water line running down Congress Ave. in proposed construction. Proposed to reroute to Colorado St. and Brazos St.</td>
</tr>
<tr>
<td>15</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal</td>
<td>Congress Ave.</td>
<td>MILK Jr. Blvd to F. 17th St.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility.</td>
<td>12&quot; Water line running down Congress Ave. in proposed construction. Proposed to reroute to Colorado St. and Brazos St.</td>
</tr>
</tbody>
</table>
## Utilities

### Water & Wastewater

**Austin Water**

The 12" water line on Congress Avenue between Martin Luther King Jr. Boulevard and 17th Street will be demolished. To provide the capacity to existing and future customers, a new 12" water line is proposed for Colorado Street from Martin Luther King Jr. Boulevard to 18th Street with the existing 6" water line between 18th Street and 17th Street upsized to a 12" line. The existing 6" water line on Brazos Street between Martin Luther King Jr. Boulevard and 17th Street would also be upsized to a 12" line. The 6" branch on 18th Street between the William B. Travis building and the future 1801 Congress Building would be upsized to a 12" with new connection points for the William B. Travis Building and an existing fire hydrant on the corner of Congress Avenue. To provide space for the underground parking structure, the 6" water lines on 18th Street and 17th Street would be cut and capped where the lines cross over Congress Avenue. Note that these proposed changes have not been evaluated by Austin Water at this time.

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### TFC Utility Conflict Matrix - Austin Energy

<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Utility Type</th>
<th>Utility Owner*</th>
<th>Location (Crossing/Longitudinal/Point etc.)</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Water</td>
<td>City of Austin</td>
<td>Crossing 18th St.</td>
<td>Crossing Congress Ave.</td>
<td>Proposed construction</td>
<td>Yes, but to be approved by utility.</td>
<td>6&quot; Water line crossing Congress Ave. proposed to cap and remove the portion crossing Congress Ave.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Water</td>
<td>City of Austin</td>
<td>Crossing June south of 18th St.</td>
<td>Crossing Congress Ave.</td>
<td>Proposed construction</td>
<td>Yes, but to be approved by utility.</td>
<td>12&quot; Water line crossing Congress Ave. proposed to cap and remove the portion crossing Congress Ave.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal E. of Congress Ave. S. from 17th St.</td>
<td>Proposed 1801 Congress building</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline running south from 17th St. through proposed 1801 Congress building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal Colorado St.</td>
<td>Proposed utility tunnel</td>
<td>NA</td>
<td>12&quot; Waterline crossing proposed construction and proposed utility tunnel.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Water</td>
<td>City of Austin</td>
<td>Crossing W 16th St.</td>
<td>Proposed construction, Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline crossing proposed construction and proposed utility tunnel.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal Congress Ave.</td>
<td>Phase 2 construction</td>
<td>NA</td>
<td>12&quot; Waterline in conflict with proposed Phase 2 construction. Confirm conflict once utility tunnel design complete and depth information known.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal From W 15th St. to W 15th St. W. of Congress Ave.</td>
<td>Lot 11 Phase 2 construction</td>
<td>NA</td>
<td>6&quot; Waterline running parallel along Colorado St. potentially in conflict with proposed utility tunnel. Confirm conflict once utility tunnel design complete and depth information known.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal 15th St.</td>
<td>Proposed construction, Proposed utility tunnel construction</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>12&quot; Waterline line possibly in conflict with proposed utility tunnel construction.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal/Crossing 15th St and Brazos St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline crossing proposed utility tunnel on E. 15th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal Brazos St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline line running parallel along utility tunnel possibly in conflict.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal 14th St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline line running parallel along utility tunnel possibly in conflict.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal W 15th St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>12&quot; Waterline running parallel along utility tunnel possibly in conflict.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal E. 18th St. to MLK Jr. Blvd.</td>
<td>Lot 11 Phase 2 construction</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; Waterline runs into Lot 11 on SW corner of St. Possibly abandoned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal 17th St.</td>
<td>Proposed Construction, Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>12&quot; Waterline crossing through proposed Congress Ave. construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Water</td>
<td>City of Austin</td>
<td>Longitudinal Brazos St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>6&quot; abandoned waterline with 2&quot; abandoned arterial line potentially in conflict with utility tunnel construction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Utility Conflict No. corresponds with No. on utility layout

*Utility Owner color corresponds with linestyle on utility layout

*Conflict No. Utility Type Utility Conflict Matrix - Austin Energy

---

TFC Utility Conflict Matrix - Austin Energy

16
## Communications

Coordination meetings were held with AT&T on October 28, 2016 Spectrum and Level 3 on November 17, 2016 Texas Department of Information Resources (DIR) on November 22, 2016 and the Greater Austin Area Telecommunications Network (GAATN) on December 2, 2016 to review existing facilities on the TFC project and discuss potential resolutions to facility impacts.

### AT&T

AT&T has multiple communication duct banks 2x3 (6 duct bank) along with copper lines existing along Congress Avenue (Conflict 1 & 2) and underground fiber on 15th Street (Conflict 21-23), 16th St west of Congress Avenue, 17th Street east of Congress Avenue, and services to existing buildings. Relocating Congress Avenue duct banks to adjacent street Colorado may be an option, although manhole and service locations are essential to determining best design alternative. For future load requirements, AT&T would need to be provided with the square footage and a number of estimated suites along with the business type for each building.

### Level 3

Level 3 stated the majority of their lines are located along Martin Luther King Jr. Boulevard, 48 counts. Level 3 is overhead from SW corner of Congress Avenue and Martin Luther King Jr. Boulevard to the west. Level 3 is a tenant in the underground conduits of Spectrum from Congress Avenue to the east. Level 3 is also a tenant of AT&T in the underground conduits along the south side of 15th Street, east side of San Jacinto Boulevard, and on the south side of 14th Street toward Brazos Street. No communication facilities are present on Congress

### Table: TFC Utility Conflict Matrix - Communications

<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Utility Type</th>
<th>Utility Owner</th>
<th>Location (Crossing/Longitudinal/Phase)</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>Longitudinal/Crossing</td>
<td>Congress Ave.</td>
<td>MLK Jr. Blvd to E. 17th St.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>AT&amp;T Comm line running longitudinal along both sides of Congress Ave. through proposed construction, crosses sides of Congress at MLK Jr. Blvd as well as between 17th and 18th St. Proposed new ductbank on the west side of Congress Ave. garage or to Colorado St.</td>
</tr>
<tr>
<td>02</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>Longitudinal</td>
<td>16th St. &amp; Congress Ave.</td>
<td>From 17th to 18th St. and 18th E. of Congress Ave.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>AT&amp;T Comm line running along 17th and Congress Ave. until 15th St., line breaks off and runs longitudinal down E. 15th St. through proposed 1601 Congress building Phase 1. Proposed temporary rerouting will be ON on poles located on the west side of Congress Ave. Proposed permanent reroute will be in ductbank located on the west side of the Congress Ave. garage, routed through the garage to the east side for reconnection.</td>
</tr>
<tr>
<td>03</td>
<td>UG Comm</td>
<td>DIR</td>
<td>Crossing</td>
<td>18th St.</td>
<td>Crossing Congress Ave.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>AT&amp;T PIBER line crossing Congress Ave. 18th St. in conflict, feeds the W. B. Travis building from north side of building. Proposed temporary rerouting will be ON on poles. Proposed permanent reroute will be through the Congress Ave. garage and tunnel.</td>
</tr>
<tr>
<td>04</td>
<td>UG Comm</td>
<td>DIR</td>
<td>Longitudinal</td>
<td>Congress Ave.</td>
<td>Halfway between 18th (at WBT) to 19th St.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>AT&amp;T PIBER line running th east side of Congress. Proposed temporary rerouting will be ON on poles located on the west side of Congress Ave. Proposed permanent reroute will be in conduit from 10th St. routed through the east side of the garage to the tunnel at 17th St., and from the tunnel into WBT.</td>
</tr>
<tr>
<td>05</td>
<td>UG Comm</td>
<td>DIR</td>
<td>Crossing/Crossing</td>
<td>Congress Ave.</td>
<td>Heading down E. 17th St.</td>
<td>Proposed construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be approved by utility</td>
<td>AT&amp;T PIBER line running from Congress Ave. E. on 17th St. Proposed temporary rerouting will be ON on poles located on the W. side of Congress Ave. Proposed permanent reroute will be in conduit to the tunnel in 17th St.</td>
</tr>
<tr>
<td>06</td>
<td>UG Comm</td>
<td>DIR</td>
<td>Longitudinal</td>
<td>W 15th St.</td>
<td>Headed North</td>
<td>Lt 11 Phase 2 construction</td>
<td>NA</td>
<td>PIBER line heading north into proposed construction. Feeds DPS and continues W/B to a manhole before feeding Texas Historical Commission offices. Confirm conflicts once Phase 2 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>Crossing</td>
<td>E. 15th St.</td>
<td>From Congress Ave. to San Jacinto Blvd</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>AT&amp;T PIBER line crossing proposed utility tunnel on N. side of E. 15th St.</td>
</tr>
<tr>
<td>08</td>
<td>UG Comm</td>
<td>DIR</td>
<td>Longitudinal</td>
<td>14th St.</td>
<td>Headed East from Brazos</td>
<td>Proposed utility tunnel and CID</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>AT&amp;T PIBER line running down E. 14th, in conflict with utility tunnel.</td>
</tr>
<tr>
<td>09</td>
<td>Level 3</td>
<td>Level 3</td>
<td>Longitudinal</td>
<td>15th St.</td>
<td>From Colorado St. to Brazos St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>C3 Comm line running longitudinally down the S. side of 15th St. crosses proposed utility tunnel at Brazos St.</td>
</tr>
</tbody>
</table>
Avenue between Martin Luther King Jr. Boulevard and 15th Street. Since Level 3 is a tenant in a conduit owned by Spectrum or AT&T, the conduit owner will relocate the Level 3 facilities.

Spectrum
Spectrum stated the majority of their lines are located along Martin Luther King Jr. Boulevard. They have 4 (3") pipes and 2 (2") pipes running the length of Martin Luther King Jr. Boulevard. Level 3 is a tenant in their pipes from Brazos Street to Congress Avenue. Spectrum stated the facilities are located on the side of Austin Energy (AE). An exception to AE policies will be needed for Martin Luther King Jr. Boulevard. to allow Spectrum to joint trench with AE. Spectrum has a line across Congress Avenue, connecting the William B. Travis building and the Stephen F. Austin building (Conflict 15). Spectrum states that the line is redundant; however, there must be dual connections to the building since it is a government building. Spectrum agreed that temporary aerial facilities are allowed but stated that they cannot be a final solution. Spectrum concurred, as long as temporary poles would be allowed but it would not be the final location. Spectrum has aerial facilities in proximity to Phase 3/ Lot 3. Spectrum stated the aerial facilities are attached to AE poles. Spectrum has underground conduits along 15th Street and down Brazos Street in conflict with the Utility Tunnel (Conflict 18 & 20). Also, Level 3 is a tenant in this line.

<table>
<thead>
<tr>
<th>Conflict No.</th>
<th>Utility Type</th>
<th>Utility Owner*</th>
<th>Location (Crossing/ Longitudinal)</th>
<th>Conflict Street</th>
<th>Street Limits</th>
<th>Potentially In Conflict With</th>
<th>Pending Info Needed</th>
<th>Proposed New Routing</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>UG Comm</td>
<td>Level 3</td>
<td>Longitudinal</td>
<td>14th St.</td>
<td></td>
<td>Proposed utility tunnel and CUP</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>SG Comm line running along E. side of 14th St., crossing utility tunnel.</td>
</tr>
<tr>
<td>11</td>
<td>UG Comm</td>
<td>Private</td>
<td>Longitudinal</td>
<td>MEA Jr. Blvd.</td>
<td>From Colorado to Brazos St.</td>
<td>Proposed Phase 3 construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be confirmed</td>
<td>parking survey and approved by utility.</td>
</tr>
<tr>
<td>12</td>
<td>UG Comm</td>
<td>Private</td>
<td>Longitudinal</td>
<td>Brazos St.</td>
<td>From E. 14th St. to E. 149 St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>Spectrum line running longitudinally along the E. side of the proposed utility tunnel, possibly in conflict.</td>
</tr>
<tr>
<td>13</td>
<td>UG Comm</td>
<td>Private</td>
<td>Longitudinal</td>
<td>14th St.</td>
<td>Headed East from Brazos St.</td>
<td>Proposed utility tunnel and CUP</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>RG line running down the E. side of 14th St., in conflict with utility tunnel.</td>
</tr>
<tr>
<td>14</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Crossing</td>
<td>Congress Ave.</td>
<td>Between 29th and 17th St.</td>
<td>Proposed construction</td>
<td>Yes, but to be confirmed</td>
<td>by utility.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Longitudinal</td>
<td>Just S. of 17th St.</td>
<td>E. of Congress Ave.</td>
<td>Proposed 1901 Congress building and utility tunnel</td>
<td>Yes, but to be confirmed</td>
<td>by utility.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Point</td>
<td>W. 16th St.</td>
<td>Heading N.</td>
<td>Proposed Lot 3 Phase 3 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 3 construction. Confirm conflict since Phase 3 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Crossing</td>
<td>Utility tunnel</td>
<td>200 ft. N. of 2150 St. and Brazos</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>Proposed line crossing proposed utility tunnel.</td>
</tr>
<tr>
<td>18</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Longitudinal</td>
<td>Congress Ave.</td>
<td>From 2150 St. to 149 St.</td>
<td>Proposed Phase 2 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Longitudinal</td>
<td>Brazos St.</td>
<td>Headed S. from 159 St. and turning on 149 St.</td>
<td>Proposed utility tunnel</td>
<td>Field survey of actual location</td>
<td>N</td>
<td>Proposed Comm line runs parallel with utility tunnel before turning on 149 St. and crossing the utility tunnel.</td>
</tr>
<tr>
<td>20</td>
<td>UG Comm</td>
<td>Spectrum</td>
<td>Longitudinal</td>
<td>MEA Jr. Blvd.</td>
<td>From 14th St. to Congress Ave.</td>
<td>Proposed Building Phase 1 construction</td>
<td>Field survey of actual location</td>
<td>Yes, but to be confirmed</td>
<td>by utility.</td>
</tr>
<tr>
<td>21</td>
<td>DH Comm</td>
<td>AT&amp;T</td>
<td>Point</td>
<td>W. 16th St.</td>
<td>Heading N.</td>
<td>Proposed lot 3 Phase 3 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 3 construction. Confirm conflict since Phase 3 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>DH Comm</td>
<td>AT&amp;T</td>
<td>Longitudinal</td>
<td>From W. 16th St. to W. 15th St.</td>
<td>West of Congress Ave.</td>
<td>Lot 11 Phase 2 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 building construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>W. 15th St.</td>
<td>Heading N.</td>
<td>Lot 11 Phase 2 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 building construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>Crossing</td>
<td>W. 15th St.</td>
<td>Heading N.</td>
<td>Lot 11 Phase 2 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 building construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>UG Comm</td>
<td>AT&amp;T</td>
<td>Point</td>
<td>W. 16th St.</td>
<td>Heading into Congress Ave.</td>
<td>Phase 2 construction</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 building construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>UG Comm</td>
<td>SDG</td>
<td>Crossing</td>
<td>Congress Ave.</td>
<td>15th St.</td>
<td>Proposed parking lot survey of actual location</td>
<td>NA</td>
<td>Proposed Lot 3 Phase 2 building construction. Confirm conflict since Phase 2 buildings are more defined.</td>
<td></td>
</tr>
</tbody>
</table>
Utilities

Communications

Texas Department of Information Resources (DIR)
Texas Department of Information Resources (DIR) has a line crossing Brazos Street to 18th Street into the William B. Travis Building. A line crossing Congress Avenue connecting the William B. Travis and Stephen F. Austin buildings, and a line crossing the Phase 3 construction. DIR has a line along the east side of Congress Avenue from the Travis Building to 15th Street and a line along 15th Street through Lot 2 Phase 2 construction. DIR duct banks are typically 3-6 4” conduits containing both copper and fiber. DIR per the OPR will re-route their facilities to provide two networks and a redundancy of service.

Greater Austin Area Telecommunications Network (GAATN)
The Greater Austin Area Telecommunications Network (GAATN), formed in 1993 by an interlocal agreement, is a joint effort of the Austin Independent School District, City of Austin, Travis County, State of Texas DIR, Austin Community College, The University of Texas at Austin, and Lower Colorado River Authority for a metropolitan-wide joint fiber information superhighway in Austin, Texas, including data, voice, and video capabilities. GAATN is in the process of providing graphics files with the exact locations of their facilities. GAATN does have facilities in the area of proposed construction for Phase 1 at the 1801 Congress Building, Congress Avenue, 14th Street, 15th Street, 18th Street, Brazos Street, and the new central utility plant (CUP).

Proposed Routing Options for All Communication
Proposed options for communication facilities include using temporary overhead poles and aerial crossings on the west side of Congress Avenue for maintaining duplicity of services and network during construction.

Permanent conduits in duct banks for joint occupancy (all public communications) can be placed along the west side of Congress Avenue with service crossings between the parking garage and pedestrian level with separate manholes/access points for each provider.

The proposed utility tunnel (Conflict 57) will need to be placed below the communication ducts on 14th, 15th, and 16th Streets. These ducts may be able to be supported during construction or may require relocation.

The handoff locations, security of the systems, ductility, or routing of services are generally the primary concerns for the communication utility companies during and after construction.
**Central Utility Plant and Tunnel (CUP)**

**Thermal Utility Tunnel**

Walkable tunnels will be installed to distribute chilled water to the existing and new facilities described within this report. The tunnel will be routed to the north from the new central utility plant (CUP) at the Sam Houston Building (SHB). The tunnel routing is shown on the Chilled Water utility exhibit. There are two options proposed on the exhibit for the tunnel routing. Option 1 is to route the tunnel outside the underground parking garage. Option 2 is to bring the tunnel to the underground parking garage and then route chilled water pipes through the garage. These two options will be further evaluated for viability and cost. Both routing options will allow for existing and future buildings to connect to the chilled water system and the Stephen F. Austin chilled water plant to tie-into the chilled water system for added redundancy.

The tunnels will be sized to accommodate a 10,000 ton chilled water load. To accommodate the 10,000 ton chilled water load, 30" chilled water supply and return piping will be needed. This pipe size is based on a 12 degree temperature difference between the chilled water supply and return. The approximate walkable tunnel will be 12 ft. tall x 12 ft. wide. Refer to the Volume 3 Central Utility Plant for section views of the tunnel.

**Capitol Complex Physical Plant Annex/Tunnel Construction Obstacles**

There are several items that require further review as the design of the CUP and associated tunnels move forward. Below is a list of these items.

1. Existing direct buried 12" chilled water supply/return piping between Stephen F. Austin building and William B. Travis building as well as the direct buried 8" chilled water supply/return piping which taps off the 12" mains to serve the Lyndon B. Johnson building. This piping will need to be maintained during road/utility construction on Congress Ave. or disconnected and temporary chilled water systems be provided at the William B. Travis and Lyndon B. Johnson buildings to backfeed the existing chilled water piping serving each building. When the new tunnel and CUP are operational, both buildings will be tied into the new chilled water loop. The Stephen F. Austin chilled water system will also be tied into the new chilled water loop.

2. Currently located within the footprint of the proposed new CUP are the following items:
   - Existing electrical/battery building.
   - Existing emergency generators (2) and fuel tank.
   - Existing electrical service.
   - Existing condenser water supply/return piping is routed below grade.
   - Existing louvers, doors, and windows on the side of the Sam Houston building where the new CUP may be relocated.
   - Storm water pipes.
   - GAATN duct bank.

All of these items will need to be removed or relocated as design proceeds. The parking area on the south side of the existing cooling towers is the proposed area to move the electrical/battery building, emergency generators (2), and fuel tank.
2.2 Infrastructure Analysis
Transportation
Transportation
General

The 2016 Texas Capitol Complex Master Plan completed a planning-level analysis of the roadway network to evaluate operations and develop recommendations for the transportation network. The Master Plan proposed substantial transportation modifications to facilitate vehicular and pedestrian connectivity within the study area. The Master Plan study area included the transportation network from 15th Street on the south to Martin Luther King Jr. Boulevard on the north and Lavaca Street on the west to Trinity Street on the east. Since that time, a Traffic Impact Analysis has been prepared to further define traffic operations. Additionally, the Master Plan provided recommendations for phasing of building construction. Phase 1 includes the development of two proposed buildings on Congress Avenue, the underground parking structure on Congress Avenue, and development of the Texas Mall. The purpose of this document is to summarize the existing transportation infrastructure and define the transportation infrastructure enhancements recommended for Phase 1 of the Capitol Complex Master Plan.
Transportation

Roadway Improvements

The Capitol Complex is served by a grid of urban arterials and collector streets. Phase 1 of the Capitol Complex development includes major modifications to the vehicular network as follows:

− Close Congress Avenue, between 16th Street and 18th Street to vehicular traffic. Emergency vehicle access will remain through this section of Congress Avenue.

− Modify Congress Avenue, between 18th Street and Martin Luther King Jr. Boulevard, from a four-lane, o-way roadway to a one-lane, one-way southbound roadway with wide median.

− Convert 16th Street, between San Antonio Street and San Jacinto Boulevard from a one-way, westbound roadway to a two-way roadway.

− Convert 17th Street, between San Antonio Street and Trinity Street from a one-way, eastbound roadway to a two-way roadway. 17th Street is proposed to serve as access to the Capitol Complex Parking Garage at Congress Avenue and will not serve as a through street.

− Convert 18th Street, between Guadalupe Street and Trinity Street from a one-way, westbound roadway to a two-way roadway.

Detailed intersection recommendations are provided in the Traffic Impact Analysis.

The Capitol Complex roadway network provides parallel parking along the east/west collector roads. Parallel parking will be provided with the proposed roadway cross-sections along at least one side of each roadway.
### Phase 1 Roadway Infrastructure Improvements

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Limits</th>
<th>Existing Directionality</th>
<th>Proposed Directionality</th>
<th>Right of way</th>
<th>Existing Travel Lane</th>
<th>Proposed Travel Lane</th>
<th>Existing Parking Type</th>
<th>Proposed Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>16th Street</td>
<td>San Antonio Street to Colorado Street</td>
<td>One-Way</td>
<td>Two-Way</td>
<td>62'</td>
<td>14'</td>
<td>11'</td>
<td>Parallel (Both Sides)</td>
<td>8' (Both Sides)</td>
</tr>
<tr>
<td>16th Street</td>
<td>Colorado Street to San Jacinto Boulevard</td>
<td>One-Way</td>
<td>Two-Way</td>
<td>62'</td>
<td>14'</td>
<td>11'</td>
<td>Parallel (Both Sides)</td>
<td>8' (Both Sides)</td>
</tr>
<tr>
<td>17th Street</td>
<td>San Antonio Street to Trinity Street</td>
<td>One-Way</td>
<td>Two-Way</td>
<td>60'</td>
<td>16'</td>
<td>12'</td>
<td>Parallel (Both Sides)</td>
<td>8' (Both Sides)</td>
</tr>
<tr>
<td>18th Street</td>
<td>Guadalupe Street to Trinity Street</td>
<td>One-Way</td>
<td>Two-Way</td>
<td>60' (Improvements extend beyond ROW)</td>
<td>16'</td>
<td>12'</td>
<td>Parallel (Both Sides)</td>
<td>8' (Both Sides)</td>
</tr>
<tr>
<td>MLK Jr Boulevard</td>
<td>Congress Avenue to Brazos Street</td>
<td>Two-Way</td>
<td>No Change</td>
<td>80'</td>
<td>10', 10.5', 11'</td>
<td>No Change</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Congress Avenue</td>
<td>16th Street to 18th Street</td>
<td>Two-Way</td>
<td>Closed</td>
<td>120'</td>
<td>15'</td>
<td>None</td>
<td>Parallel (Both Sides)</td>
<td>10'</td>
</tr>
<tr>
<td>Congress Avenue</td>
<td>18th Street to MLK Jr Boulevard</td>
<td>Two-Way</td>
<td>One-Way</td>
<td>120'</td>
<td>24'</td>
<td>12'</td>
<td>None</td>
<td>-</td>
</tr>
<tr>
<td>Brasos Street</td>
<td>18th Street to MLK Jr Boulevard</td>
<td>Two-Way</td>
<td>No Change</td>
<td>80'</td>
<td>11'</td>
<td>No Change</td>
<td>Parallel (Both Sides)</td>
<td>8' (Both Sides)</td>
</tr>
</tbody>
</table>

The following signalized intersections within the study area require traffic signal modifications required to accommodate the Phase 1 roadway modifications and two-way conversions:

- Martin Luther King Jr. Boulevard and Congress Avenue
- 17th Street and Guadalupe Street
- 17th Street and Lavaca Street
- 16th Street and Lavaca Street

The intersection of Martin Luther King Jr. Boulevard and Colorado Street will be monitored for installation of a traffic signal in the future.
Transportation

Pedestrian and Bicycle Improvements

**Pedestrian Network**

The pedestrian realm within the Capitol Complex project will undergo improvements as part of Phase 1 of the Capitol Complex development. The proposed pedestrian realm will provide a 4’ minimum curb zone, a 6’ minimum pedestrian circulation zone, and a 5’ minimum frontage zone. These were defined as follows in the Master Plan:

- **Curb Zone**: minimum 4-feet wide containing the elements that separate the sidewalk from the street and provide the necessary infrastructure to support pedestrian and motorist activity, including lighting, signage, furnishings, street trees, and other vertical elements.

- **Pedestrian Circulation Zone**: minimum of 6-feet wide and clear of obstruction.

- **Frontage Zone**: immediately adjacent to the building wall. Depending on the width of the overall sidewalk, the frontage zone may contain amenities such as seating, outdoor dining, planting, or architectural elements of the building as long as these do not interfere with pedestrian movement (minimum 5-feet wide).

With the roadway modifications proposed as part of Phase 1, the roadside pedestrian environment will be enhanced along the following roadways:

- **Texas Mall (Congress Avenue between 16th Street and 18th Street)**

- **Congress Avenue, between 18th Street and Martin Luther King Jr. Boulevard**

Phase 1 buildings are proposed on Congress Avenue and Martin Luther King Jr. Boulevard as part of the Capitol Complex project. With construction of these buildings, the adjacent roadside pedestrian environment will be improved at the following locations:

- **Martin Luther King Jr. Boulevard (south side), between Congress Avenue and Brazos Street**

- **Brazos Street (west side), between 18th Street and Martin Luther King Jr. Boulevard**

- **18th Street (north side) between Congress Avenue and Brazos Street**

- **17th Street (south side) east of Congress Avenue along the building frontage**

- **16th Street (north side) east of Congress Avenue along the building frontage**

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Limits</th>
<th>Pedestrian Realm Existing</th>
<th>Pedestrian Realm Proposed</th>
<th>Midblock Crossings Existing</th>
<th>Bike Facilities</th>
<th>Bike Lanes Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>16th Street</td>
<td>Congress Avenue east along Building Frontage</td>
<td>North: 24’ South: 8’ (no Sidewalks on South Side: partly between San Jacinto Blvd. and Congress Ave.)</td>
<td>North: 24’ South: 8’ None - -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17th Street</td>
<td>Congress Avenue east along Building Frontage</td>
<td>North: 19’ South: 8’</td>
<td>North: 19’ South: 10’ None - -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18th Street</td>
<td>Congress Avenue to Brazos Street</td>
<td>North: 21’ South: 7’ (no sidewalks on North Side between Trinity St. and San Jacinto Blvd.)</td>
<td>North: 12’ (&amp; 6’ Planting) South: 15’ None - Sharrows</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MLK Jr Boulevard</td>
<td>Congress Avenue to Brazos Street</td>
<td>North: 19’ South: 8’</td>
<td>North: 19’ South: 10’ - Bike Lane 5’ No Change</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Congress Avenue</td>
<td>16th Street to 18th Street</td>
<td>Varies</td>
<td>20’ - None - -</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Congress Avenue</td>
<td>18th Street to MLK Jr Boulevard</td>
<td>Varies</td>
<td>37’ - None - -</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazos Street</td>
<td>18th Street to MLK Jr Boulevard</td>
<td>East: 23.5’ West: 16.5’</td>
<td>East: 10’ (&amp; 5’ Planting) West: 16.5’ - None - -</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Phase 1 Pedestrian and Bicycle Infrastructure Improvements**

Sidewalks exist along the majority of the roadway network within the Capitol Complex. Pedestrian curb ramps and crosswalks are available at most intersections within the Phase 1 study area. Pedestrian push buttons are present at some of the signalized crossings within the network. Improved pedestrian crosswalks with enhanced crosswalk striping, pedestrian signage, and ADA-compliant curb ramps will be provided as part of the Phase 1 project. The enhancements will provide an improved pedestrian experience. The existing push-buttons will be replaced with Accessible Pedestrian Signal units at the following signalized intersections:

- **Martin Luther King Jr. Boulevard and Congress Avenue**

- **Martin Luther King Jr. Boulevard and Brazos Street**

- **17th Street and Guadalupe Street**

- **17th Street and Lavaca Street**

- **16th Street and Lavaca Street**
### Existing Intersection Infrastructure

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing Control</th>
<th>Existing Pedestrian Facilities</th>
<th>Existing Pedestrian Facilities</th>
<th>Crosswalks</th>
<th>Crosswalk Stripping</th>
<th>Crosswalks on Uncontrolled Vehicular Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>15th Street at San Jacinto Boulevard</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for Crossing 15th Street</td>
<td>Yes</td>
<td>Striped</td>
<td>-</td>
</tr>
<tr>
<td>15th Street at Brazos Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for Crossing 15th Street</td>
<td>Yes</td>
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<tr>
<td>15th Street at Congress Avenue</td>
<td>Signalized</td>
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<td>Push Buttons for Crossing 15th Street</td>
<td>Yes</td>
<td>Striped</td>
<td>-</td>
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<tr>
<td>15th Street at Colorado Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for Crossing 15th Street</td>
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<td>Striped</td>
<td>-</td>
</tr>
<tr>
<td>15th Street at Lavaca Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for Crossing 15th Street</td>
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<td>Striped</td>
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<tr>
<td>15th Street at Guadalupe Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for Crossing 15th Street</td>
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</tr>
<tr>
<td>16th Street at San Jacinto Boulevard</td>
<td>Free</td>
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<td>North, South, and West Side</td>
<td>Striped</td>
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<tr>
<td>16th Street at Congress Avenue</td>
<td>Two-Way Stop Control</td>
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<td>All Sides</td>
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<tr>
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<td>16th Street at Guadalupe Street</td>
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<td>West Side</td>
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</tr>
<tr>
<td>17th Street at San Jacinto Boulevard</td>
<td>Two-Way Stop Control</td>
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<td>All Sides</td>
<td>Striped</td>
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</tr>
<tr>
<td>17th Street at Brazos Street</td>
<td>Two-Way Stop Control</td>
<td>-</td>
<td>North and West Side</td>
<td>Striped</td>
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<td>17th Street at Congress Avenue</td>
<td>All-Way Stop Control</td>
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<td>All Sides</td>
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<tr>
<td>17th Street at Colorado Street</td>
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<td>All Sides</td>
<td>Striped</td>
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<tr>
<td>17th Street at Lavaca Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for all crossings</td>
<td>All Sides</td>
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<tr>
<td>17th Street at Guadalupe Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for all crossings</td>
<td>All Sides</td>
<td>Striped</td>
<td>-</td>
</tr>
<tr>
<td>18th Street at Trinity Street</td>
<td>Free</td>
<td>-</td>
<td>South and West Side</td>
<td>Striped</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>18th Street at San Jacinto Boulevard</td>
<td>Two-Way Stop Control</td>
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<td>All Sides</td>
<td>Striped</td>
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</tr>
<tr>
<td>18th Street at Brazos Street</td>
<td>All-Way Stop Control</td>
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<td>All Sides</td>
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<tr>
<td>18th Street at Congress Avenue</td>
<td>All-Way Stop Control</td>
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<td>All Sides</td>
<td>Stripped</td>
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<tr>
<td>18th Street at Colorado Street</td>
<td>All-Way Stop Control</td>
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<td>All Sides</td>
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<tr>
<td>18th Street at Lavaca Street</td>
<td>Two-Way Stop Control</td>
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<td>All Sides</td>
<td>Only Striped on East Side</td>
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<tr>
<td>18th Street at Guadalupe Street</td>
<td>Two-Way Stop Control</td>
<td>-</td>
<td>All Sides</td>
<td>No Striping</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MLK Jr Boulevard at Brazos Street</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for all crossings</td>
<td>All Sides</td>
<td>Striped</td>
<td>-</td>
</tr>
<tr>
<td>MLK Jr Boulevard at Congress Avenue</td>
<td>Signalized</td>
<td>Pedestrian Heads all Approach</td>
<td>Push Buttons for crossing MLK Jr Boulevard</td>
<td>All Sides</td>
<td>Striped</td>
<td>-</td>
</tr>
</tbody>
</table>

**Bicycle Network**

Bicycle facilities (e.g., bike lanes) are provided on the roadway network along Guadalupe Street, Lavaca Street, San Jacinto Boulevard, and 15th Street. These facilities will be maintained in their current configuration as part of Phase 1 of the Capitol Complex Project. The City of Austin Bicycle Plan does not recommend any modifications to the existing bicycle facilities within the Phase 1 limits of the Capitol Complex project. An east/west bike facility (shared lane) was recommended on 17th Street as part of the Capitol Complex Master Plan. 17th Street is currently proposed to provide garage access only. Discussions with the City of Austin should continue to determine whether the east/west shared lane should be relocated from 17th Street to 18th Street due to the discontinuous nature of 17th Street.
Transportation

Bus Network

The following bus routes along Congress Avenue will be impacted by the Phase 1 closure - Routes 103, 110, 142, and 464. Coordination with Capital Metro will be required to determine alternate routes.

Bus staging and drop-off zones are proposed as part of Phase 1 of the Capitol Complex project at the following locations:

- Congress Avenue, between Martin Luther King Jr. Boulevard and 18th Street – this drop-off zone will accommodate a variety of buses (eg. school buses, charter buses).

- 18th Street, between Colorado Street and Congress Avenue – this drop-off zone will accommodate a variety of buses (eg. school buses, charter buses) and is not intended for the exclusive use of Capital Metro buses.

During construction in Congress Avenue between Martin Luther King Jr. Boulevard and 18th Street, school bus access will be provided on Colorado Street on the west side of the Texas State History Museum. School buses may be staged in state parking lot 19 located across Colorado Street behind the museum (to be confirmed).
Texas Capitol Complex Phase 1
Pre-Conceptual Design Report
Volume 3
Pre-Conceptual Design Analysis

Date
2 February 2017

Texas Facilities Commission
TCC Master AE Design Services

Project Number
116019
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3.0 Pre-Conceptual Design Analysis

General
General

Code Analysis

CODE SUMMARY

PROJECT DESCRIPTION:

Applicable codes
- All code references below are for the 2015 International Building Code
- Please reference the Owners Project Requirements for complete list of applicable codes

Use and occupancy classification
- B occupancy has been determined per OPR for both 1801 Congress and 1601 Congress Buildings
- S-2 occupancy for Underground Parking Garage
- Type A – Assembly Occupancy shall be applied to breaks rooms, conference rooms, huddle rooms or areas of congregation subject to the applicable code per section 2.5 of the OPR

Special detailed requirements based on use and occupancy
- 1801 Congress and 1601 Congress Buildings must comply with Section 403 High-Rise Buildings
- 403.3 Automatic sprinkler system, Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 403.3.3.
- Minimum 48” clear between handrails at stairs
- 403.3.4 Fire pump room. Fire pumps shall be located in rooms protected in accordance with Section 913.1.2.
- 403.4.4 Emergency voice/alarm communication system. An emergency voice/alarm communication system shall be provided in accordance with Section 907.5.2.2.
- 403.4.5 Emergency responder radio coverage. Emergency responder radio coverage shall be provided in accordance with Section 510 of the International Fire Code.
- 403.4.6 Fire command. A fire command center complying with Section 911 shall be provided in a location approved by the fire department.
- Smoke Removal: Mechanical or natural ventilation for removal of products of combustion must be provided for in accordance with section 403.4.7 for high-rise buildings
- 403.5.5 Luminous egress path markings. Luminous egress path markings shall be provided in accordance with Section 1025.
- 403.6.1 Fire service access elevator. In buildings with an occupied floor more than 120 feet above the lowest level of fire department vehicle access, no fewer than two fire service access elevators, or all elevators, whichever is less, shall be provided in accordance with Section 3007. Each fire service access elevator shall have a capacity of not less than 3,500 pounds (1588 kg) and shall comply with Section 3002.4.

General building heights and areas
- Minimum Construction Type: 1A per section 504 (Refer to Building Separation Strategy Option A Located in this report)
- Maximum building height: Unlimited: Reference Table 504.3
- Maximum number of stories allowed above grade: Unlimited: Reference Table 504.4
- Maximum allowable area: Unlimited: Reference Table 506.2
- 508.3.1 Occupancy classification. Nonseparated occupancies shall be individually classified in accordance with Section 302.1. The requirements of this code shall apply to each portion of the building based on the occupancy classification of that space. In addition, the most restrictive provisions of Chapter 9 that apply to the nonseparated occupancies shall apply to the total nonseparated occupancy area. Where nonseparated occupancies occur in a high-rise building, the most restrictive requirements of Section 403 that apply to the nonseparated occupancies shall apply throughout the high-rise building.

Types of construction
- Type 1A – sprinklered construction for the 1801 Congress Building, the 1601 Congress Building, and Underground Parking Garage
- Per section 403.2.1.1 Type of Construction. For buildings not greater than 420 feet in building height, the fire-resistance rating of the building elements in Type IA construction shall be permitted to be reduced to the minimum fire-resistance ratings for the building elements in Type IB. Exception: The required fire-resistance rating of columns supporting floors shall not be reduced.

Fire protection systems
- Buildings will be protected throughout with an automatic sprinkler system designed and installed in accordance with NFPA 13
- 907.2 Where required—new buildings and structures. An approved fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through 907.2.23 and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code. Not fewer than one manual fire alarm box shall be provided in an approved location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of fire alarm box
- 907.2.13 High-rise buildings. High-rise buildings shall be provided with an automatic smoke detection system in accordance with Section 907.2.13.1, a fire department communication system in accordance with Section 907.2.13.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

Means of egress
- Egress Width:
  - Stairs: 0.3 inches per occupant
  - Other egress components: 0.2 inches per occupant
  - Per OPR, stair and door exit width sizing should assume an additional 15 percent reserve capacity beyond applicable code.
- 1016.1.1 Two exits or exit access doorways. Where two exits, exit access doorways, exit access stairways or ramps, or any combination thereof, are required from any portion of the exit access, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall
diagonal dimension of the building or area to be served measured in a straight line between them. Interlocking or scissor stairways shall be counted as one exit stairway.

- Exception #2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

- Per Table 1017.2 Exit Access Travel Distance, maximum travel distance for Type B occupancy with Automatic Sprinkler System is 300 feet.
- Per Table 1017.2 Exit Access Travel Distance, maximum travel distance for Type S-2 occupancy with Automatic Sprinkler System is 400 feet.

- Common Path of Egress Travel: Reference Table 1006.2.1 for Maximum Common Path of Egress Travel Distances:
  - B Occupancy with sprinkler system = 100’
  - S Occupancy with sprinkler system = 100’

- Section 1020.4 Dead-end corridors: In occupancies in Groups B and S, where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of the dead-end corridors shall not exceed 50 feet.

- Per section 1028.1, Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide a direct path of egress travel to grade. The exit discharge shall not reenter a building.

Interior environment

- Refer to the Acoustical, Noise and Vibratrition Criteria narrative in this report for the complete interior environment requirements.
- Air-borne sound shall have a minimum sound transmission class (STC) of 50 or an STC of 45 if field tested Section 1207.2.
- Structure-borne sound shall have a minimum sound transmission class (STC) of 50 or an STC of 45 if field tested Section 1207.3.

Electrical systems

- Reference the NFPA 70 National Electrical Code (NEC) - 2017 Edition, which will be adopted by the State of Texas on September 1, 2017.

Emergency & standby power

- The following codes will apply to this project: NEC Article 700 - Emergency System; NEC Article 701 - Legally Required Standby Systems; NFPA 110 - Standard for Emergency and Standby Power Systems.

Plumbing systems

- Reference the minimum plumbing fixture count in the Building Data section of this report.
- Per section 2902.3 Exception: Public toilet facilities shall not be required in: 1. Open or enclosed parking garages where there are no parking attendants.

Elevators and conveying systems

- 3007.3 Water protection. An approved method to prevent water from infiltrating into the hoistway enclosure from the operation of the automatic sprinkler system outside the enclosed fire service access elevator lobby shall be provided.
- 3007.6 Fire service access elevator lobby. The fire service access elevator shall open into a fire service access elevator lobby in accordance with Sections 3007.6.1 through 3007.6.5. Egress is permitted through the elevator lobby in accordance with Item 1 of Section 1016.2.
- 3007.6.2 Lobby enclosure. The fire service access elevator lobby shall be enclosed with a smoke barrier having a fire resistance rating of not less than 1 hour, except that lobby doorways shall comply with Section 3007.6.3. Exception: Enclosed fire service access elevator lobbies are not required at the levels of exit discharge.
- 3007.6.4 Lobby size. Regardless of the number of fire service access elevators served by the same elevator lobby, the enclosed fire service access elevator lobby shall be not less than 150 square feet in an area with a dimension of not less than 8 feet.
General
Code Analysis

Minimum Plumbing Fixture Summary - 1801 Congress Building (C18)

<table>
<thead>
<tr>
<th>LEVELS</th>
<th>WATER CLOSET TOTALS (1)</th>
<th>LAVATORIES TOTALS</th>
<th>DRINKING FOUNTAIN TOTALS (2)</th>
<th>SERVICE SINKS (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MALE</td>
<td>FEMALE</td>
<td>MALE</td>
<td>FEMALE</td>
</tr>
<tr>
<td>C18-LEVEL 01</td>
<td>7</td>
<td>9</td>
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<td>6</td>
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<tr>
<td>C18-LEVEL 02</td>
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<tr>
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<td>C18-LEVEL 08-14</td>
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<td>96</td>
<td>70</td>
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</tbody>
</table>

1. Reference IPC section 419.2 for reduction of required water closets for urinals
2. Reference IPC section 410.4 for reduction of required drinking fountains for use of water dispensers
3. Except for occupancy types I-2, R-2 and R-3, only one service sink is required for the entire building. The service sink must be available from all portions of the building
4. Public toilets are not required in parking garages. If parking garage will have attendants, then you must provide the appropriate plumbing fixtures within the travel limitations of Section 2902.3.2
## Minimum Plumbing Fixture Summary - 1601 Congress Building (C16)

<table>
<thead>
<tr>
<th>LEVELS</th>
<th>WATER CLOSET TOTALS (1)</th>
<th>LAVATORIES TOTALS</th>
<th>DRINKING FOUNTAIN TOTALS (2)</th>
<th>SERVICE SINKS (3)</th>
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<tr>
<td></td>
<td>MALE</td>
<td>FEMALE</td>
<td>MALE</td>
<td>FEMALE</td>
</tr>
<tr>
<td>C16-LEVEL B1</td>
<td>5</td>
<td>5</td>
<td>5</td>
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<td>C16-LEVEL 01</td>
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2. Reference IPC section 410.4 for reduction of required drinking fountains for use of water dispensers
3. Except for occupancy types I-2, R-2 and R-3, only one service sink is required for the entire building. The service sink must be available from all portions of the building
4. Public toilets are not required in parking garages. If parking garage will have attendants, then you must provide the appropriate plumbing fixtures within the travel limitations of Section 2902.3.2
Building Separation Strategy
All code references below are from the 2015 International Building Code and per the OPR.

- Refer to Building Data Table in this report for building areas, building height and stories above grade for 1801 the Congress Building, the 1601 Congress Building, and Underground Parking Garage (UPG) Buildings
- Per definition in Chapter 2: HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22.860 mm) above the lowest level of fire department vehicle access
- The 1801 Congress and 1601 Congress Buildings must comply with Section 403 High-Rise Buildings
- B occupancy has been determined per OPR for both the 1801 Congress and 1601 Congress Buildings
- S-2 occupancy for Underground Parking Garage
- Per Table 504.3 limited to construction Type IA or Type IB (depending on code options below) based on maximum allowable stories above grade
- Per section 403.2.1.1 Type of Construction. For buildings not greater than 420 feet in building height, the fire-resistance rating of the building elements in Type IA construction shall be permitted to be reduced to the minimum fire-resistance ratings for the building elements in Type IB. Exception: The required fire-resistance rating of columns supporting floors shall not be reduced.
- Per Table 1017.2 Exit Access Travel Distance, maximum travel distance for Type B occupancy with Automatic Sprinkler System is 300 feet.
- Per Table 1017.2 Exit Access Travel Distance, maximum travel distance for Type S-2 occupancy with Automatic Sprinkler System is 400 feet.

Option A - One Big Building
Must be compliant with Type 1A construction because Type 1B construction limits the number of stories above grade to 12.

The 1801 Congress Building is currently designed with 14 levels.
Type 1A, subject to UL (unlimited) areas, UL height and UL stories above grade per Table 504.3
Underground Parking Garage (UPG) B3 level is approximately 251,000 GSF and is not compliant with Type 1B construction per Table 504.3
UPG B3 level is approximately 251,000 GSF @ 200 SF / occupants = 1,260 occupants. This requires 4 exit stairs per 1006.2.1.1 Four exits or exit access doorways shall be provided from any space with an occupant load greater than 1,000 per Section 1007.1.1.
Maximum travel distance of 400’ for a sprinklered S-2 parking garage per Table 1017.2 Exit Access Travel Distance

Option B - Horizontal Separation
Refer to Section 510.2 (3 hour horizontal fire separation with construction Type 1A below)
Locate 3 hour horizontal fire separation either at level B1 or level 1. This establishes new level for maximum allowable stories, but does not change maximum allowable building height.

The 1801 Congress Building will need to comply with Type 1A construction because the number of stores above grade are greater than that allowed with Type 1B
Per section 403.2.1.1 Type of Construction. For buildings not greater than 420 feet in building height, the fire-resistance rating of the building elements in Type IA construction shall be permitted to be reduced to the minimum fire-resistance ratings for the building elements in Type IB. Exception: The required fire-resistance rating of columns supporting floors shall not be reduced.
The 1601 Congress Building could be considered for Type 1B construction if the building is less than 180’ above the grade plane and less than 12 stories above the horizontal separation.
Max height: per Table 504.3 for Type 1B construction (sprinklered) = 180’
Max # of stories for Type 1B = 12 (currently PH is on level 13)
Max Area = UL (unlimited) for B Occupancy per Table 506.2
Stairways required to be 2 hour construction per 1009.3.1.2 (note: section 510.2 #3 requires shafts that penetrate the 3 hours horizontal separation to be 2HR construction)
The building or buildings above the horizontal assembly shall be permitted to have multiple Group A occupancy uses, each with an occupant load of less 300, or Group B, M, R or S occupancies per section 510.2
Additional Separation Issues Summary

Current design at the 1801 Congress has a 300 occupant auditorium. Design at the 1601 Congress has a large conference room with a 339 occupant load. These two rooms are limited to a maximum occupant load of 300 per section 510.2

If a fire wall is needed to address building area issues in the upper building or buildings, the fire wall construction can stop at the 3-hour fire-resistance-rated horizontal assembly and does not need to extend to the foundation.

The UPG complies with section 405 Underground Buildings per Exception #2. The provisions of Sections 405.2 through 405.9 apply to building spaces having a floor level used for human occupancy more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge. Exceptions: The provisions of Section 405 are not applicable to the following buildings or portions of buildings: Exception #2. Parking garages provided with automatic sprinkler systems in accordance with Section 405.3.

The building below the horizontal assembly shall be protected throughout by an approved automatic sprinkler system in accordance with Section 405.3.

Recommendation

It is our recommendation that the 1801 Congress Building, the 1601 Congress Building, and Underground Parking Garage Buildings be considered as one large building outlined in Option A. Although Option B does have some advantages by possibly being able to classify the 1601 Congress Building as Type 1B construction, taking into account the reduced fire-resistance ratings per section 403.2.1.1, there are negligible cost savings between construction Type 1A and Type 1B. The Exception in section 403.2.1 does not allow there to be a fire-resistance reduction in columns that are supporting floors. However, per Table 721.1 for columns, the reinforcing steel concrete coverage shall be 1 ½" for both 2 and 3 hour rated columns. This essentially aligns the construction cost requirements for both Type 1A and Type 1B construction types. The other limiting factor in Option B is the maximum allowable occupant load of 300 occupants in any Assembly space. Both the 1801 Congress and the 1601 Congress Buildings have large assembly spaces that could prohibit the design requirements within Option B. Type 1A construction discussed in Option A allows for UL (unlimited) floor areas, building heights and number of stories above grade for Occupancy types B (Business) and S-2 (Parking Garages) as defined in the OPR. Type 1A construction ultimately allows for the most flexibility for any future or change of use the Texas Facilities Commission may desire.
General

Code Analysis

Fire Lane Access Site Plan
The Phase 1 site and buildings are located and served by typical city grid streets which provide access to the majority of the sides of the project. Martin Luther King Jr. Boulevard, Brazos Street, 18th Street, 17th Street, and 16th Street provide fire apparatus and emergency vehicle access to the north, east, and south faces of both 1801 Congress and 1601 Congress Buildings. Refer to the adjacent diagram showing these fire lanes in solid red. While entrances to the garages may not provide adequate vertical clearance for all types of emergency vehicles, the parking garage’s vehicular entrances can be accessed from these fire lanes and other code-required fire protection systems will be provided to assist fire fighters within the garages. Access to the underground parking garage can also be gained through distributed stair and elevator portals. Refer to the Fire Protection section of this report for more information.

Coverage to the western faces of these buildings are complicated by the vacation of Congress Avenue and its redevelopment as the Texas Mall. An analysis of Austin Fire Department’s (AFD) approved 200 feet hose lay down lengths determined that the west faces of both buildings could be covered by apparatus locations on the adjacent west-east side streets. However, the Master Plan requirements include providing emergency vehicle access on the Mall. Since the primary north-south paved paths on the Texas Mall are 20 feet wide, this width should be reviewed with the State Fire Marshal’s Office (SFMO) and AFD for acceptance, since they are narrower than the typical 24 feet provided for fire lanes. Per typical City of Austin standards, these access paths should be provided with 14 feet minimum overhead clearance, which shall be coordinated with landscape, lighting, and other site elements for compliance. Accordingly, the structural loading criteria for these paths and the open areas of the Mall and associated plazas have been set to allow unrestricted access to all areas for emergency vehicles. Refer to the Structural section of this report for more information. Access to these pedestrian-only areas of the site will occur where the Mall’s primary paved paths intersect Martin Luther King Jr. Boulevard, 18th Street, and 16th Street. At each intersection of the Mall with these cross streets, removable or hydraulic bollards should be provided to facilitate vehicle access at the designated locations.

Per AFD, it is expected that the sidewalks in the Texas Mall that will be used for emergency vehicle access will need to remain clear at all times. Accordingly, events and other activities cannot block the sidewalks with tents, tables, exhibits, or other obstructions. The Master A/E Design Team will continue to review this requirement, while noting the entire footprint of the Texas Mall has been engineered to allow emergency vehicle access. The primary north-south pedestrian paths have been identified to receive vehicular structured paving, while other areas will contain pedestrian pavers or landscaped areas not suitable for vehicles.
General
Transportation Diagrams

Vehicular Traffic Study
The Phase 1 buildings are served by the arterials of Martin Luther King Jr. Boulevard to the north, 15th Street to the south, the west couplet of Lavaca Street / Guadalupe Street, and the east couplet of San Jacinto Boulevard / Trinity Street. Under current conditions, the west-east traffic on both Martin Luther King Jr. Boulevard and 15th Street are heavily congested during peak commute times. Our analysis of the traffic flows demonstrates the desire to keep traffic off Martin Luther King Jr. Boulevard and 15th Street by sending west-east traffic to internal cross streets, such as 18th and 17th Streets, to eventually use the west couplet of Lavaca Street / Guadalupe Street and the east couplet of San Jacinto Boulevard / Trinity Street. These couplets, while functioning as major north-south arterials, also serve as collectors that can eventually feed Martin Luther King Jr. Boulevard and 15th Street for west-east arterial traffic.
General
Transportation Diagrams

Vehicular Entry Points
In order to properly serve the quantity of desired vehicles, it is important to provide several dispersed garage entrances that allow for a variety of traffic flows into and out of the parking garages, preferably on different cross streets. The entry points must also be located an appropriate distance from major intersections to prevent traffic from queueing and backing up into the Phase 1 garages and blocking surrounding streets, such as Brazos Street. Accordingly, separate entrances for employees and visitors will be provided. Since each population has a different impact on traffic depending on the time of day and day of the week, certain locations with the Phase 1 garage are better suited for employee over visitor, and vice versa. It is also important to note that during evenings and weekend events, entry points that are typically dedicated to employees will be used by visitors. Based on typical protocols at state-owned garages, visitors will typically pay to park at these times and cashier/pay stations will need to be provided.

1. Visitor to Underground Garage
2. Employee to Above-grade Garage
3. Employee to Underground Garage

Vehicular Drop-Off
Cultural Entry

Drop-off Points
Ground Level Access to Cultural Institutions, Texas Mall, and Office Lobbies

Garage Entrances
Above-grade and Underground Parking Garage - Employee and Visitor
General
Transportation Diagrams

Vehicular Entry Points
At the 1801 Congress Building site, two parking garage entrances will be provided — one for the above-grade garage and one for the below-grade garage. The above-grade garage at the 1801 Congress Building will be dedicated during the workday to employees and accessed from the south off 18th Street to keep traffic off of Brazos Street. The entrance to the below-grade garage will be predominantly for visitors and is accessed from the east off of Brazos Street. This entrance could also be used by employees for both limited entry and exit although exiting through this portal should be discouraged due to the anticipated congestion at the Martin Luther King Jr. Boulevard and Brazos Street intersection.

Two more garage entrances are required, dedicated to serving the Underground Parking Garage, for a total of four parking garage entry and exit points. These two points will be dedicated for employees during the workday and located directly off 17th Street with one west and one east of the Texas Mall. These locations provide good overall distribution as a primary cross-connector to gradually filter traffic back into the major arterials. An updated traffic impact analysis will be performed to confirm that 17th Street will be able to properly handle the additional vehicles anticipated as part of the Phase 1 build-out.

Master Plan Requirements Phase 1

1801 Congress Building (C18)
- 605,000 GSF of building area

1601 Congress Building (C16)
- 420,000 GSF of building area
- Relocated state employees’ child care facility (CCF)

Above-grade and Underground Parking Garage (UPG)
- 2,550 Parking Spaces near 1801 Congress Site
- 2,050 Parking Spaces near 1601 Congress Site
- 240 Parking Spaces near Texas Mall Connector
- 1,000 Parking Spaces in 5 below-grade parking levels near 1601 Congress Site
- 4,840 Total Additional Parking
- (-389) Total Displaced Parking
- 4,451 Total Net Addition Parking Spaces
- During the Master Planning process, approximately 1,064 spaces are being provided via surplus parking from adjacent garages and parking lots, including Garages G, Q, and R. Thus the total count of new parking spaces will be reduced by this amount.
- 3,387 Total New Parking to be provided in Phase 1
General
Parking Systems

PARKING DESIGN

The Underground Parking Garage is expected to function as a single-use structure accommodating State employees in the north section of the Capitol Complex and its visitors. The program calls for a five level below-grade parking structure to support the new office buildings and other existing on-campus State office buildings.

Circulation Pattern

To increase the internal circulation and provide operational characteristics appropriate to office-type garage users, ramp and parking bays are to be two-way circulation, appropriate to low-turnover, repeat office parkers. A two-way circulation pattern is more appropriate for daily users and offers the greatest flexibility. Daily users will create habits, learn where the available spaces are, and find which inbound and outbound paths are the quickest.

Entry/Exit Portals

The office user will have the opportunity to enter or exit the below-grade garage at three (3) different locations, West 17th Street, East 17th Street, and Brazos Street State employees will access the 1801 Congress Building above-grade parking via the 18th Street entry/exit portal. Each of these entry/exit portals will have three (3) lanes to increase the vehicle throughput of the garage. One lane will be dedicated for entry only, one lane will be dedicated for exit only, and the third lane will be a multipurpose lane with the ability to change directions during traffic peak times (i.e. during AM peak, the center lane will be an entry lane and during PM peak, the center lane will be an exit lane). This configuration will provide a two-portal capacity with a single portal location. Capitol Complex visitors can access the below-grade visitor parking via the Brazos Street portal.

Ramping

Once the State employee has entered the underground parking garage, the user will access the parking levels via a series of express ramps. The express ramps are aligned in a linear layout along the west side of the underground parking garage. This ramp alignment allows a user to drive the length of the garage to access all parking levels without having to make a turn. Typical garages have a series of 360 degree turning cycles to maneuver up/down a garage. The linear ramp alignment increase the level of service for the user and reduces the time spent on the ramp.

Express ramps are part of the pre-design ramping solution over a park-on ramp. A park-on ramp allows 700 vehicles per hour whereas an express ramp provides 1800 vehicles per hour allowing for greater flow. The express ramps also allow for 100% flat floor parking, improving the user level of service by increasing sight lines, walkability, and passive security items.

PARKING EQUIPMENT

Parking Access Control System

The list below represents the pre-design concept for parking control equipment operations for the Underground Parking Garage and 1801 Congress Building garage.

1. Locations:
   a. West 17th Street
   b. East 17th Street
   c. Brazos Street
   d. 18th Street

2. Users
   a. State employees
   b. Visitors (Brazos Street portal only)

3. Entry Access Options
   a. Automated Vehicle Identification (AVI) sticker, RECOMMENDED AS PRIMARY
   b. Proximity card, RECOMMENDED AS BACKUP
   c. License Plate Recognition (LPR), ALTERNATE
   d. Ticket (Visitors)

4. Entry Gate Options
   a. Arm gate

5. Entry Monitoring
   a. Intercom

6. Exit Access Options
   a. Automated Vehicle Identification (AVI) sticker, RECOMMENDED AS PRIMARY
   b. Proximity card, RECOMMENDED AS BACKUP
   c. License Plate Recognition (LPR), ALTERNATE
   d. Validation (provided by others or payment at Pay on Foot Station)
   e. Pay-In-Lane Station (visitor without validation)

7. Exit Gate Options
   a. Arm gate

8. Exit Monitoring
   a. Intercom
Parking Systems

Parking Operations
The parking control equipment for the State employee parkers will be controlled by an Automated Vehicle Identification (AVI) system. Using the same technology as various Toll Tag systems, the AVI tag located on the patron’s vehicle will send a signal to a strategically placed reader allowing the vehicle access into the parking garage. The use of AVI readers increase the vehicles per hour (VPH) from 600 VPH to 800 VPH. An AVI system and the three (3) multilane portals are required to manage the number of underground garage vehicles to minimize queuing during peak times.

To gain entry into the visitor parking area, visitors at the Brazos Street portal will pull a ticket from the ticket dispenser upon entry. When the visitor is ready to leave the facility, they will drive to the Brazos Street garage exit and stop at the exit lane pay station (auto cashier). Visitors will pay their parking fee by inserting the ticket they received upon entry and paying the fee shown (based on amount of time in the facility) by credit card or by inserting a validated ticket received from a State agency. Once payment is made or validation verified, the gate arm will raise and they will be able to exit the facility. The pay-in-lane station will accept payment by cash or credit card. A pay-on-foot station, located in other pedestrian lobby locations, will accept payment by bill, coin or credit, and all change is returned via coins. The pay-on-foot station provides a validated ticket once payment is made.

Parking Access Control System Basis of Design

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<tr>
<th>Use</th>
<th>Product</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm Gate</td>
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<tr>
<td>Entry Station</td>
<td>Amano McGann OPUS-2000 Ticket Dispenser with Flex Scan</td>
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<tr>
<td>Exit Station</td>
<td>Amano McGann OPUS-4700 Credit Card Exit Terminal</td>
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<td>Pay-on-Foot</td>
<td>Amano McGann OPUS-7800 Central Pay-on-Foot Terminal</td>
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<td>AVI Reader</td>
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<tr>
<td>Intercom</td>
<td>Viking Telephone E30IP</td>
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<tr>
<td>Traffic Controller</td>
<td>Direct View LED TCL1818RG-175TS</td>
<td>30</td>
</tr>
<tr>
<td>Validation</td>
<td>Amano McGann eParc Suite Online Validation Solution</td>
<td>1</td>
</tr>
</tbody>
</table>

All manufacturers listed above are provided as a basis of design and are subject to change as the design progresses.

Parking Guidance System (PGS)
The purpose of the Parking Guidance System (PGS) is to improve the user experience by guiding self-parkers to the location of available spaces, therefore reducing the amount of time required to find parking. A PGS is an electronic way-finding system to inform drivers of parking availability and help direct them to the best parking location. Parking guidance systems can get as detailed as showing a driver the individual space availability, parking availability by level, or as wide-range as just to display the parking availability of an entire parking garage.

Since the Underground Parking Garage has a perimeter express ramp system, this will allow a ‘by level’ parking guidance system to show the availability of parking by level and allow the State employee to decide to exit the express ramp to park or continue on the express ramp to the next parking level. As users enter the parking facility, a variable display indicates the number of available spaces on each level of the facility via a signage. As users approach each level, a ceiling mounted variable display indicates the number of available spaces on that level and lower levels. A PGS will improve the level of service for the State employee to help them find available parking easier and quicker.

At a minimum, the PGS shall provide the following features:

- Automatic acquisition of counting information from parking sensors
- Control of the parking facility status and field signs
- A central server / database for full system control
- Capability of manual count correction
- Comprehensive statistical reporting system
- Components of the PGS include, but are not limited to:
  - Vehicle directional/occupancy sensors
  - Electronic dynamic message signs
  - Zone controllers
  - Central management system

The system shall be upgradeable and scalable to allow future system expansion that can accommodate the addition of future parking facilities and additional system components.

Parking Guidance System Basis of Design (by level)

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<td>Sensor</td>
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<tr>
<td>Software</td>
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</table>
General
Vertical Transportation

Definitions and Methodologies
The intent of the elevator study is to validate the elevator system(s) as planned to accommodate the building population and anticipated uses. The fundamental approach to determining the correct elevator scheme and level of service for the office component is to consider the project as a Class A multi-tenant office application.

Level 1 is “ground” level with seven levels of above grade parking (P2-P8) and nine levels (Level 07-14) of multi-tenant office space.

Supporting Documents
- Elevator Stacking Diagram
- Parking Counts - 10/07/2016
- GSF Office Tabulations - 10/7/2016
- Concept Design Documents - 10/7/2016

Performance
Elevator performance for Class A office application is judged on its ability to handle the most demanding peak period of traffic. The peak period for a Class A office application will occur in the morning during the “up peak” period of incoming tenants. A second and third peak period(s) occur later in the day, but are often less intense. These include a lunch two-way traffic period and a late afternoon “down peak” for outbound tenants. Often during lunch, there is a heavy “two-way” traffic pattern over a 1-1.5 hour time period.

There are two main performance requirements that must be satisfied: quality and quantity of service.

- Quantity of service is related to the number of passengers the elevator system can handle during a critical five minute period of traffic. Handling capacity is expressed as a percentage of the population the system can accommodate during five minutes. Five minutes is the industry standard of measurement to determine meaningful results; there are 12 five-minute periods per hour.
- Quality of service is the interval of elevators during the peak period of time considered. The interval is the increment of time between successive elevators being dispatched from the lobby floor. Interval relates to how long someone waits for an elevator to arrive once they have pushed a hall button or entered the queue. The waiting time of someone pushing a hall button is 60-70% of the design interval.

The vertical circulation intent is to have shuttle parking elevators supporting the parking and dedicated office tower elevators. Tenants will shuttle to Level 1 and then to the elevated office floors. This arrangement allows for a central dispatch level for the office occupant distribution.

The central dispatch level will allow office occupants to utilize retail offerings at Level 1/lobby prior to going up to the office floors. This design will reduce the morning up peak counter flow foot traffic from the office floors back to Level 1/lobby.

A simulation method is used to determine the anticipated results which provides an average passenger wait time for the morning up peak period.

The long standing and industry standard measurement of required interval for Class A office service is 30 seconds or less, which relates to an average passenger wait time in the 18-21 second range based on the quality of service measurement. This standard does not apply to parking shuttle elevators.

Both conventional dispatch and destination dispatch results are provided. Due to the anticipated occupancy levels, destination dispatch will provide superior results with less number of elevators.

General Summary
- Multi-agency office and parking structure
- Ground level includes retail, parking, and main entry
- B1-B7 is below grade parking
- Tenants utilize parking shuttle elevators to Level 1 / office building
- Per floor population based on 1:230 GSF (Gross Square Feet)

1801 Congress Building (C18) Summary
- Above grade parking - Level G2 through G8
- Visitor parking on Level B3
- Tenant elevators from Level 1 to upper office floors L2-L14
  - Thirteen (13) typical Office floors: Level 2-14
  - Level 15 mechanical penthouse
  - 8 passenger elevators - office tower
  - Passenger elevators (PE) - 3500 lbs @ 700 FPM
  - 1 service elevator
    - Service elevator - 4500 lbs @ 350 FPM
    - Service elevator (SE1) is the designated stretcher elevator - IBC, Rule 3002.4
  - SE1 and PE8 are the designated Fire Service Access Elevators - IBC, Rule 3007.1
- Parking shuttles - 3500 lbs @ 350 FPM

1601 Congress Building (C16) Summary
- Tenant elevators from Level 1 to upper office floors L2-L14
  - Eleven (11) typical Office floors: Levels 2-12
  - Level 13 mechanical penthouse
  - 6 passenger elevators (PE) - office tower
  - Passenger elevators - 3500 lbs @ 500 FPM
  - 1 service elevator
    - Service elevator - 4500 lbs @ 350 FPM
    - Service elevator (SE1) is the designated stretcher elevator - IBC, Rule 3002.4
  - SE1 and PE6 are the designated Fire Service Access Elevators - IBC, Rule 3007.1
### General

#### Vertical Transportation

#### Elevator Study Results

<table>
<thead>
<tr>
<th>Floor</th>
<th>F-F</th>
<th>Use</th>
<th>Population</th>
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<td>No. PE1-5</td>
<td>No. PE6</td>
<td>No. SE 1</td>
<td>No. SE 2</td>
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<td>*</td>
<td>*</td>
<td>*</td>
<td>O/Head</td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>14'-0&quot;</td>
<td>Office</td>
<td>33,790/147</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L-1/Lobby</td>
<td>20'-0&quot;</td>
<td>Lobby</td>
<td>33,790/0</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>17'-0&quot;</td>
<td>Parking</td>
<td>Pit</td>
<td>*</td>
<td>*</td>
<td>L/Dock*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>Pit</td>
<td>*</td>
<td>*</td>
<td>Pit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B3</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B4</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B5</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B6</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7</td>
<td>9'-6&quot;</td>
<td>Parking</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,537 Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1601 Congress Building - Elevator Stacking Diagram**

* Indicates floors served

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**TCC Phase 1 Pre-Conceptual Design Report**

Texas Facilities Commission

Volume 3

Pre-Conceptual Design Analysis

General
### General

#### Vertical Transportation

### 1601 Congress Building - Elevator Study Results

**Office Morning Up-Peak Period**

**Simulation Method Analysis**

<table>
<thead>
<tr>
<th>Conventional Dispatch</th>
<th>Destination Dispatch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. Elevators</strong> 7</td>
<td><strong>No. Elevators</strong> 6</td>
</tr>
<tr>
<td><strong>Type</strong> Overhead Penthouse Gearless</td>
<td><strong>Type</strong> Electric Traction - Penthouse</td>
</tr>
<tr>
<td><strong>Capacity</strong> No. 1-7: 3500 lbs</td>
<td><strong>Capacity</strong> No. 1-6: 3500 lbs</td>
</tr>
<tr>
<td><strong>Platform</strong> 6'-8&quot; W x 5'-5&quot; D (inside)</td>
<td><strong>Platform</strong> 6'-8&quot; W x 5'-5&quot; D (inside)</td>
</tr>
<tr>
<td><strong>SE1:</strong> 4500 lbs</td>
<td><strong>SE1:</strong> 4500 lbs</td>
</tr>
<tr>
<td>**5'-8&quot; W x 7'-10&quot; D (inside)</td>
<td>**5'-8&quot; W x 7'-10&quot; D (inside)</td>
</tr>
<tr>
<td><strong>Speed</strong> No. 1-7: 500 FPM</td>
<td><strong>Speed</strong> No. 1-6: 500 FPM</td>
</tr>
<tr>
<td><strong>SE1:</strong> 350 FPM</td>
<td><strong>SE1:</strong> 350 FPM</td>
</tr>
<tr>
<td><strong>Doors</strong> No. 1-7: 3'-6&quot; x 8'-0&quot; Center Opening</td>
<td><strong>Doors</strong> No. 1-6: 3'-6&quot; x 8'-0&quot; Center Opening</td>
</tr>
<tr>
<td><strong>SE1:</strong> 4'-6&quot; x 8'-0&quot; 2 / Speed Side Opening</td>
<td><strong>SE1:</strong> 4'-0&quot; x 8'-0&quot; 2 / Speed Side Opening</td>
</tr>
<tr>
<td><strong>Floors Served</strong> No. 1-7: Level 1 through Level 12</td>
<td><strong>Floors Served</strong> No. 1-6: Level 1 through Level 12</td>
</tr>
<tr>
<td><strong>Stops</strong> 12</td>
<td><strong>Stops</strong> 12</td>
</tr>
<tr>
<td><strong>Net Travel</strong> Approximately 160'-0&quot;</td>
<td><strong>Net Travel</strong> Approximately 160'-0&quot;</td>
</tr>
<tr>
<td><strong>Population</strong> 1537</td>
<td><strong>Population</strong> 1537</td>
</tr>
<tr>
<td>1384 for Elevator Analysis; 10% Absenteeism; Morning Up-peak period</td>
<td>1384 for Elevator Analysis; 10% Absenteeism; Morning Up-peak period</td>
</tr>
<tr>
<td><strong>Average Passenger Wait Time</strong> 16-21 seconds</td>
<td><strong>Average Passenger Wait Time</strong> 14-19 seconds</td>
</tr>
<tr>
<td><strong>Average Time to Destination</strong> 7 seconds</td>
<td><strong>Average Time to Destination</strong> 53-58 seconds</td>
</tr>
<tr>
<td><strong>Passenger Handling Capacity</strong> 13% per 5 minutes for the peak period considered</td>
<td><strong>Passenger Handling Capacity</strong> 13% per 5 minutes for the peak period considered</td>
</tr>
</tbody>
</table>

**Arrival rate is the industry standard for single-tenant applications or a minimum of 13% per 5 minutes for the morning up-peak period**

### 1601 Congress Underground Parking Garage - Elevator Study Results

**Morning Inbound Traffic**

<table>
<thead>
<tr>
<th>Conventional Dispatch</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. Elevators</strong> 3</td>
</tr>
<tr>
<td><strong>Type</strong> Machine Room Less Traction (MRL)</td>
</tr>
<tr>
<td><strong>Capacity</strong> 3500 lbs</td>
</tr>
<tr>
<td><strong>Platform</strong> 6'-8&quot; W x 5'-5&quot; D (inside)</td>
</tr>
<tr>
<td><strong>Speed</strong> 350 FPM</td>
</tr>
<tr>
<td><strong>Doors</strong> 3'-6&quot; x 7'-0&quot; Center Opening</td>
</tr>
<tr>
<td><strong>Floors Served</strong> Level1 and B1 through B5</td>
</tr>
<tr>
<td><strong>Stops</strong> 6</td>
</tr>
<tr>
<td><strong>Net Travel</strong> Approximately 58'</td>
</tr>
<tr>
<td><strong>Total Spaces:</strong> ± 800</td>
</tr>
<tr>
<td><strong>Population</strong> 800 x 1.1 = 880 first hour; ± 458 (80% of total first hour population)</td>
</tr>
<tr>
<td><strong>Average Passenger Wait Time</strong> 18-23 seconds</td>
</tr>
<tr>
<td><strong>Passenger Handling Capacity</strong> 8.33% per 5 minutes for the peak period considered</td>
</tr>
</tbody>
</table>

**Based on the entry/exit parking ramps, drive aisles and angle of parking, it is estimated that 65% of the parking garage can be loaded/unloaded in 1 hour of time.**

**Consider 65% tenants arrive at same hour 100% inbound**
### General

#### Vertical Transportation

<table>
<thead>
<tr>
<th>1801 Congress Building - Elevator Study Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Morning Up-Peak Period</td>
</tr>
<tr>
<td>Simulation Method Analysis</td>
</tr>
</tbody>
</table>

#### Destination Dispatch

<table>
<thead>
<tr>
<th>No. Elevators</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Electric Traction Penthouse</td>
</tr>
<tr>
<td>Capacity</td>
<td>No. 1-8: 3500 lbs</td>
</tr>
<tr>
<td>Platform</td>
<td>6'-8&quot; W x 5'-5&quot; D (inside)</td>
</tr>
<tr>
<td></td>
<td>SE1: 4500 lbs</td>
</tr>
<tr>
<td></td>
<td>5'-8&quot; W x 7'-10&quot; D (inside)</td>
</tr>
<tr>
<td>Speed</td>
<td>No. 1-6: 500 FPM</td>
</tr>
<tr>
<td></td>
<td>SE1: 350 FPM</td>
</tr>
<tr>
<td>Doors</td>
<td>No. 1-8: 3'-6&quot; x 8'-0&quot; Center Opening</td>
</tr>
<tr>
<td></td>
<td>SE1: 4'-0&quot; x 8'-0&quot; 2 / Speed Side Opening</td>
</tr>
<tr>
<td>Floors Served</td>
<td>No. 1-8: Level 1 through Level 14</td>
</tr>
<tr>
<td>Stops</td>
<td>14</td>
</tr>
<tr>
<td>Net Travel</td>
<td>Approximately 102'-0&quot;</td>
</tr>
</tbody>
</table>

| Population     | 2433  |
|                | 2190 for Elevator Analysis, 10% Absenteeism Morning Up-peak period  |

| Average Passenger Wait Time | 12-17 seconds  |
| Average Time to Destination | 54-59 seconds  |
| Passenger Handling Capacity | 13% per 5 minutes for the peak period considered  |

#### 1801 Congress Underground Parking Garage - Elevator Study Results

<table>
<thead>
<tr>
<th>1801 Congress Underground Parking Garage - Elevator Study Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Inbound Traffic</td>
</tr>
</tbody>
</table>

#### Conventional Dispatch

<table>
<thead>
<tr>
<th>No. Elevators</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Machine Room Less Traction (MRL)</td>
</tr>
<tr>
<td>Capacity</td>
<td>3500 lbs</td>
</tr>
<tr>
<td>Platform</td>
<td>6'-8&quot; W x 5'-5&quot; D (inside)</td>
</tr>
<tr>
<td>Speed</td>
<td>350 FPM</td>
</tr>
<tr>
<td>Doors</td>
<td>3'-6&quot; x 7'-0&quot; Center Opening</td>
</tr>
<tr>
<td>Floors Served</td>
<td>Level 1 and B1 through B7</td>
</tr>
<tr>
<td>Stops</td>
<td>6</td>
</tr>
<tr>
<td>Net Travel</td>
<td>Approximately 58'</td>
</tr>
<tr>
<td>Total Spaces</td>
<td>+/- 1646</td>
</tr>
<tr>
<td>Population</td>
<td>1646 x 1.1 = 1811 first hour: 11811 x 65=177 +/- 942 (80% of total first hour population)</td>
</tr>
</tbody>
</table>

| Average Passenger Wait Time | 45-50 seconds  |

| Passenger Handling Capacity | 8.33% per 5 minutes for the peak period considered  |

*Based on the entry/exit parking ramps, drive aisles and angle of parking, it is estimated that 65% of the parking garage can be loaded/unloaded in 1 hour of time.

**Consider 65% tenants arrive at same hour 100% inbound

<table>
<thead>
<tr>
<th>1801 Congress Above Ground Parking Garage - Elevator Study Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Inbound Traffic</td>
</tr>
</tbody>
</table>

#### Conventional Dispatch

<table>
<thead>
<tr>
<th>No. Elevators</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Machine Room Less Traction (MRL)</td>
</tr>
<tr>
<td>Capacity</td>
<td>3500 lbs</td>
</tr>
<tr>
<td>Platform</td>
<td>6'-8&quot; W x 5'-5&quot; D (inside)</td>
</tr>
<tr>
<td>Speed</td>
<td>350 FPM</td>
</tr>
<tr>
<td>Doors</td>
<td>3'-6&quot; x 7'-0&quot; Center Opening</td>
</tr>
<tr>
<td>Floors Served</td>
<td>Level G0 through G8</td>
</tr>
<tr>
<td>Stops</td>
<td>8</td>
</tr>
<tr>
<td>Net Travel</td>
<td>Approximately 87'</td>
</tr>
<tr>
<td>Total Spaces</td>
<td>+/- 661 (G2-G9)</td>
</tr>
<tr>
<td>Population</td>
<td>430 first hour (65% of 661) (661 x 1.1 = 727 x .65 = 472)</td>
</tr>
</tbody>
</table>

| Average Passenger Wait Time | 24-59 seconds  |

| Passenger Handling Capacity | 8.33% per 5 minutes for the peak period considered  |

*Based on the entry/exit parking ramps, drive aisles and angle of parking, it is estimated that 65% of the parking garage can be loaded/unloaded in 1 hour of time.

**Consider 65% tenants arrive at same hour 100% inbound
General
Acoustics, Noise & Vibration Criteria

Acoustical criteria for architectural acoustics and building systems cover a range of conditions, including a) room acoustics reverberation and reflections, b) sound isolation/privacy, c) continuous background noise, d) intrusive and transient events, e) environmental noise crossing property boundaries and transmitting into buildings and f) building impacts and vibration.

ARCHITECTURAL ACOUSTICS

Room Acoustics Reverberation & Reflections

Room Acoustics relates to the reverberation, reflection patterns, and/or noise build-up within an enclosed space. Reverberation Decay Time (T60), the time required for sound to diminish 60 dB, is the criteria used in spaces where speech intelligibility over a distance is a primary consideration, such as auditorium/presentation and conference or teaching/training spaces. In large lobby and/or atrium spaces, reverberation contributes to noise build-up and “boomy” or “brassy” conditions, and amplifies transient noise events. In smaller spaces, reverberant noise build-up (spatial decay, dB/ft) and reflection patterns are of more relevance than reverberation decay time. Disturbing sound reflections, such as those from 90° corners and flutter echoes between parallel surfaces, should be avoided where speech intelligibility is of concern or microphones are used for record or transmit. These concerns are magnified where audio recording or teleconferencing may occur.

Table 1: Reverberation Decay Time (T60)*

<table>
<thead>
<tr>
<th>Space Description</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrium, Lobby, Reception Desk</td>
<td>&lt;1.2 sec</td>
</tr>
<tr>
<td>Public Assembly Pre-Function</td>
<td>&lt;1.1 sec</td>
</tr>
<tr>
<td>Auditorium, &gt;100 seats</td>
<td>&lt;1.0 sec</td>
</tr>
<tr>
<td>Large A/V Conference, &lt;100 seats</td>
<td>&lt;0.8 sec</td>
</tr>
<tr>
<td>Medium Conference, &lt;50 seats</td>
<td>&lt;0.6 sec</td>
</tr>
<tr>
<td>Small Conference, Exec. Office</td>
<td>&lt;0.5 sec</td>
</tr>
<tr>
<td>Video/Audio Teleconferencing</td>
<td>&lt;0.5 sec</td>
</tr>
</tbody>
</table>

* Time in seconds for sound to diminish 60 dB.

Sound Isolation & Privacy

Sound isolation relates to airborne sound transmission between rooms and/or between floors, with respect to freedom from intrusive noise as well as speech privacy. Conversely, sound isolation provides source noise containment to minimize transmission to sensitive adjacent spaces. In addition, structure borne vibration and impact transmissions contribute to airborne sound.

Acoustical speech privacy and control of airborne noise intrusion via demising assemblies considers: (i) typical source noise levels, (ii) receiving room ambient noise levels, (iii) sound transmission through room envelope and (iv) source and receiver sound spectra. Partitions are rated by Sound Transmission Class (STC) value, a single number laboratory rating system that quantifies sound transmission loss performance across a series of 1/3 octave bands between 125 Hz and 4000 Hz. In-situ or field-measured conditions are rated by Apparent STC (ASTC) or Noise Isolation Class (NIC), which is anticipated to be 5 or more points lower. Ceiling attenuation class (CAC) rates room-to-room noise reduction (2 passes through ceiling plus plenum loss).

Sound isolation criteria are used for demising partitions, floor-ceiling assemblies, windows, doors and other separations. By definition, they refer to partitions that extend from floor up to structural deck above or for wall-to-wall floor-ceiling. For partitions that are discontinued above ceiling (open ceiling plenum), have doors or windows, or for floors with partial ceilings, the composite STC, which accounts for different sound transmission losses via various elements of the assembly, should be considered.

For example, the ceiling as a sound barrier, the partition and the door openings are all components of the office of conference enclosure. If a nominal STC 40–45 type of partition extends from floor to ceiling, the room ceiling should be CAC 35–40 and doors should have acoustical seals to maintain desired sound separation between spaces. If there are loudspeakers or other loud elements in or above the ceiling, partitions should extend up to deck to enclose ceiling plenum. Penetrations for return air, light fixtures, sprinklers, etc. should be treated to maintain the sound barrier performance of the demising assemblies.

Table 2: Sound Transmission Class (STC)*

<table>
<thead>
<tr>
<th>Spaces Demised</th>
<th>Criteria**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrium, Lobby, Reception Desk</td>
<td>STC 45</td>
</tr>
<tr>
<td>Exhibit Spaces (assumes A/V)</td>
<td>STC 50</td>
</tr>
<tr>
<td>Public Assembly Pre-Function</td>
<td>STC 50</td>
</tr>
<tr>
<td>Auditorium, &gt;100 seats</td>
<td>STC 65</td>
</tr>
<tr>
<td>Video/Audio Teleconference</td>
<td>STC 65</td>
</tr>
<tr>
<td>Large A/V Conference, &lt;100 seats</td>
<td>STC 60</td>
</tr>
<tr>
<td>Medium Conference, &lt;50 seats</td>
<td>STC 60</td>
</tr>
<tr>
<td>Small Conf, Exec. Office</td>
<td>STC 55</td>
</tr>
<tr>
<td>Private Office,</td>
<td>STC 50</td>
</tr>
<tr>
<td>Work, Copy, Mail, Utility</td>
<td>STC 50</td>
</tr>
<tr>
<td>Break, Lounge, Dining, Reception</td>
<td>STC 55</td>
</tr>
<tr>
<td>Fitness Facility with Music Capability</td>
<td>STC 60</td>
</tr>
<tr>
<td>State Employees’ Child Care</td>
<td>STC 55</td>
</tr>
<tr>
<td>Toilet Block non-plumbed / plumbed</td>
<td>STC 55/60</td>
</tr>
<tr>
<td>Elec., IDF, Mech., Elev. Equip Room</td>
<td>STC 60</td>
</tr>
<tr>
<td>Server/Digital Equip Room / GRAC</td>
<td>STC 55/65</td>
</tr>
<tr>
<td>Floor-Ceiling Demising</td>
<td>STC 50</td>
</tr>
</tbody>
</table>

* STC is a laboratory rating. In practical application, field-measured values are normally de-rated 5-10 points.
** Recommended criteria between occupied spaces. Room entry/corridor partitions may be de-rated.
General
Acoustics, Noise & Vibration Criteria

Transient & Intrusion Event Limits
It is desirable to limit how much transient or intrusive sound events can increase noise levels in rooms. Regardless whether sound transmits room-to-room, floor-to-floor or outside-to-inside, transient sounds can interfere with speech intelligibility and can be distracting and annoying, as well. Intrusive continuous noise can make allowable noise criteria conformance difficult. Tonal, intermittent or modulating (changing with time) sounds increase perceptibility and annoyance distraction.

Continuous or transient broadband sounds should not be permitted to increase room sound level more than 5 dB. Tonal, intermittent and modulating sounds should be limited to 2 dB overall room increase.

Determination of noise intrusion conditions should consider maximum source sound level outside room, continuous background sound within room and intrusive spectrum, i.e., smooth or with prominent frequency tones.

BUILDING SYSTEMS NOISE & VIBRATION
Allowable Continuous Background Sound
Continuous Allowable Background Sound Criteria for building systems (MEP/HVAC) noise are published by ASHRAE, a widely accepted and used reference standard. Two principal systems, Room Criteria (RC) and Noise Criteria (NC) are used to specify building noise, exclusive of occupant and user-installed equipment noise.

Room Criteria (RC; 5 dB/octave slope) are preferred for sensitive spaces with low frequency or speech intelligibility requirements. For less critical spaces, Noise Criteria (NC; curved lines) are acceptable. RC and NC criteria are equal in the 500 Hz band, but more permissive NC curves diverge at lower and higher frequencies.

NC curves are also in common use by manufacturers to rate HVAC component noise. Both systems specify continuous background sound levels in each audible octave due to building systems operations to form appropriate background sound spectra with balanced spectrum and limited tonality. ASHRAE also indicates dBA and dBC criteria equivalents, which may be referenced where NC ratings are not provided by equipment manufacturers. Requirements vary based on space functions and occupancies.

Transient disturbances, including exterior intrusions and other occupant-generated noise are not included in noise criteria, but are anticipated to add to the continuous background level. Various functions in the building have different speech communication, privacy or annoyance expectations.

Table 3: Continuous Background Noise (RC/NC)*

<table>
<thead>
<tr>
<th>Occupancy</th>
<th>Criteria**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrium, Lobby, Reception Desk</td>
<td>RC/NC 40</td>
</tr>
<tr>
<td>Corridors, Lobbies and Circulation</td>
<td>RC/NC 45</td>
</tr>
<tr>
<td>Exhibit Spaces (assumes A/V)</td>
<td>RC/NC 35</td>
</tr>
<tr>
<td>Public Assembly Pre-Function</td>
<td>RC/NC 35</td>
</tr>
<tr>
<td>Auditorium, &gt;300 seats</td>
<td>RC 25</td>
</tr>
<tr>
<td>Video/Audio Teleconference</td>
<td>RC 25</td>
</tr>
<tr>
<td>Large A/V Conference, Training</td>
<td>RC/NC 30</td>
</tr>
<tr>
<td>Medium Conference, &lt;50 seats</td>
<td>RC/NC 30</td>
</tr>
<tr>
<td>Small Conf, w/o A/V, Exec. Office</td>
<td>RC/NC 30</td>
</tr>
<tr>
<td>Private Office</td>
<td>RC/NC 35</td>
</tr>
<tr>
<td>Open Office Office</td>
<td>RC/NC 40</td>
</tr>
<tr>
<td>Work, Copy, Mail, Utility</td>
<td>RC/NC 40</td>
</tr>
<tr>
<td>Break, Lounge, Dining, Reception</td>
<td>RC/NC 35</td>
</tr>
<tr>
<td>Fitness Facility with Music Capability</td>
<td>RC/NC 40</td>
</tr>
<tr>
<td>State Employees’ Child Care</td>
<td>RC/NC 35</td>
</tr>
<tr>
<td>Toilet Block</td>
<td>NC 45</td>
</tr>
<tr>
<td>Elec., IDF, Mech., Elev. Equip Room</td>
<td>NC 50</td>
</tr>
<tr>
<td>Server/Digital Equip Room / CRAC</td>
<td>NC 50/60</td>
</tr>
<tr>
<td>Parking Garage (ventilation)</td>
<td>NC 60</td>
</tr>
</tbody>
</table>

* Continuous building systems noise, excluding transients, occupant or user equipment noise.
** RC or dBC is preferred for sensitive spaces or for low frequency noise may acoustically induce vibration.
**General Acoustics, Noise & Vibration Criteria**

**Vibration Isolation**

Selection and sizing of vibration isolators for mechanical and electrical building systems equipment shall be based on equipment operating speed (RPM) or disturbing frequency (Hz) and span length for suspended structures (column-supported beam/floor span). Use reference standard ASHRAE, HVAC Applications Handbook, 2015, Ch 48, Selection Guide, Table 47.

**Perceptible Vibration**

Structure borne vibration may be “feelable” or perceptible to human tactile senses. Structures should be designed to limit vibration amplitude to “imperceptible” (see acceleration and velocity charts on this page).

Vibration can generate perceptible audible surface-radiated airborne sound. Loud low frequency sound can also induce lightweight structures into vibration, resulting in re-radiated sound reinforcement. The Room Criteria (RC) curves, in Building Systems Noise & Vibration (previous page), have regions on the upper left labeled A and B, representing low frequency airborne sound levels that can acoustically induce vibration into lightweight materials, such as drywall partitions, suspended ceilings and glass windows. Very low frequency rumble from HVAC must be avoided in spaces below. Impact Insulation Class (IIC) is a single-number laboratory rating for floor-ceiling assembly radiated noise caused by impact or vibration, somewhat like STC for airborne sound transmission. In-situ or field measured impact insulations are expected to be approximately 5 points less than laboratory ratings.

**Audible Sound Caused by Vibration**

Floor impacts due to footfall, aerobic or fitness activities, dropped items, reciprocating building machinery or user-installed equipment should be limited to prevent audible radiated noise in occupied spaces below. Impact Insulation Class (IIC) is a single-number laboratory rating for floor-ceiling assembly radiated noise caused by impact or vibration, somewhat like STC for airborne sound transmission. In-situ or field measured impact insulations are expected to be approximately 5 points less than laboratory ratings.

**Audible and Feelable Vibration Perceptibility**

Perceptible vibration can reinforce primary source propagation and can also “cue” human receiver senses to increase perception.

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Floor impacts due to footfall, aerobic or fitness activities, dropped items, reciprocating building machinery or user-installed equipment should be limited to prevent audible radiated noise in occupied spaces below. Impact Insulation Class (IIC) is a single-number laboratory rating for floor-ceiling assembly radiated noise caused by impact or vibration, somewhat like STC for airborne sound transmission. In-situ or field measured impact insulations are expected to be approximately 5 points less than laboratory ratings.

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Perceptible vibration can reinforce primary source propagation and can also “cue” human receiver senses to increase perception.

**Table 4: Impact Insulation Class (IIC)**

<table>
<thead>
<tr>
<th>Occupied Space Function</th>
<th>Criteria**</th>
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<tbody>
<tr>
<td>General Use Occupied Spaces</td>
<td>IIC 40-50</td>
</tr>
<tr>
<td>Active Spaces with frequent impacts</td>
<td>IIC 50-60</td>
</tr>
<tr>
<td>Auditorium, &gt;100 seats</td>
<td>IIC 60-65</td>
</tr>
</tbody>
</table>

* Impact Insulation Class (IIC) is a laboratory rating. In practical application, field measured IIC will normally be 5-10 points lower than laboratory IIC rating.

**ENVIROMENTAL NOISE**

**Outside to Inside Sound Transmission**

Outside-to-Inside Noise Reduction: In addition to interior demising assembly sound transmissions, exterior walls or building shell should limit intrusion of environmental noise. Actual noise reductions should be determined based on the difference between (receiving room) indoor background noise criteria and actual or anticipated typical outdoor sound spectrum levels at the building façade (during hours of use), so that intrusive transients do not exceed continuous ambient more than 5 dB for sound sensitive spaces, or up to 10 dB for non-sensitive corridor, work or utility spaces.

Control of airborne noise intrusion via exterior wall and roof assemblies considers source-path-receiver factors similar to STC, but with loss performance across a broader range of 1/3 octave bands, 80 Hz to 5000 Hz, to account for anticipated urban sound sources. In-situ or field-measured conditions may be anticipated to be 5 or more points lower. Outside-Indoor Transmission Class (OITC) criteria recommended below are based in part on environmental noise measurements that have been made near the Capital Complex.

**Volume 3**

Pre-Conceptual Design Analysis

General
General

Acoustics, Noise & Vibration Criteria

Table 5: Outdoor-Indoor Transmission Class (OITC)*

<table>
<thead>
<tr>
<th>Interior Spaces Demised</th>
<th>Criteria**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrium, Lobby</td>
<td>OITC 27</td>
</tr>
<tr>
<td>Exhibit Spaces (assumes AV)</td>
<td>OITC 27</td>
</tr>
<tr>
<td>Public Assembly Pre-Function</td>
<td>OITC 27</td>
</tr>
<tr>
<td>Auditorium, &gt;100 seats</td>
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<tr>
<td>Video/Audio Teleconference</td>
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<tr>
<td>Large A/V Conference, &lt;100 seats</td>
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<tr>
<td>Medium Conference, &lt;50 seats</td>
<td>OITC 33</td>
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<tr>
<td>Small Conf., Exec. Office</td>
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</tr>
<tr>
<td>Private Office,</td>
<td>OITC 27</td>
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<tr>
<td>Work, Copy, Mail, Utility</td>
<td>OITC 25</td>
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<tr>
<td>Break, Lounge, Dining, Reception</td>
<td>OITC 25</td>
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<tr>
<td>Toilet Block</td>
<td>OITC 23</td>
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<tr>
<td>Elec., IDF, Mech., Elev. Equip Room</td>
<td>OITC 20</td>
</tr>
<tr>
<td>Server/Digital Equip Room / CRAC</td>
<td>OITC 20</td>
</tr>
<tr>
<td>Fitness Facility</td>
<td>OITC 25</td>
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<tr>
<td>State Employees’ Child Care</td>
<td>OITC 30</td>
</tr>
<tr>
<td>Floor-Ceiling Demising</td>
<td>OITC 50</td>
</tr>
</tbody>
</table>

* OITC is a laboratory rating. In non-ideal conditions application values are normally de-rated 5 points.
** Recommended criteria between occupied spaces. Room entry/corridor partitions may be de-rated.

Property Boundary Limits

Environmental or outdoor sound levels may be limited by practical considerations, or by regulatory ordinance or code. A practical limit may be the sound level at the building façade that would increase interior sound level over allowable noise criteria. City of Austin codes and ordinances provide an example of good practices to follow, though the State is not directly subject to these regulations. These limit building systems equipment noise and amplified music or speech. They may be absolute or maximum instantaneous levels or they may be integrated average or equivalent levels (Leq), which recognize levels varying over time. Maximum instantaneous limits may be preferred for amplified music or other non-continuous, transient sources. Equivalent levels may be preferred for outdoor mechanical equipment, such as cooling towers, air-cooled condensing units or other continuous or slowly-modulating sources.

Sound level limits at property boundaries (sources):
- Good-Neighbor Policy: 75 dBC (preferred), 65 dBA (with designer or operational discretion)
- Austin code: outdoor building equipment, 70 dBA
- Austin ordinance: amplified music, speech at a business: varies by zoning and time of day.

STC criteria may also be used for the exterior shell if specific minimum frequency band transmission losses (TL) are specified for typically prominent frequencies. For example, low frequency bus, motorcycle and truck noise and amplified music (bass) tends to be greatest in 80 Hz and 100 Hz 1/3-octave bands, respectively. Therefore, one would specify STC values 3-5 points greater than the OITC values shown above and place minimum 1/3 octave TLs not less than 20 dB at 80 and 100 Hz, or alternately, full (1/1) octave TL not less than 23 in 125 Hz band (which incorporates the 100 Hz 1/3 octave). Lack of very low frequency glazing performance data may limit usefulness of 63 Hz octave (50, 63 and 80 Hz 1/3 octaves) performance specification.
General SWPPP
Stormwater and Drainage

Texas Commission on Environmental Quality (TCEQ)
For limits of construction areas 1.0 acres or greater, the Texas Pollutant Discharge Elimination System program implements the federal National Pollutant Discharge Elimination System program in the State of Texas. On March 5, 2003, the Texas Commission on Environmental Quality became the permitting authority for these discharges.

Stormwater Pollution Prevention Plan (SWPPP)
Construction activities are required to obtain coverage under the General Permit TXR150000, which includes the preparation of a Stormwater Pollution Prevention Plan (SWPPP) for the project.

Construction Activities That Disturb At Least 1 Acre But Less Than 5 Acres
Small construction activities that disturb at least 1 acre but less than 5 acres, and are not part of a larger common plan of development, require stormwater permits. The requirements include:
− Prepare and implement a Stormwater Pollution Prevention Plan.
− Post a Construction Site Notice.
− Provide a copy of the Site Notice to the operator of any Municipal Separate Storm Water Sewer System (MS4) into which storm water will be discharged.
− No Notice of Intent (NOI), Notice of Termination (NOT), or fee is required under this option.

Construction Activities Greater Than 5 Acres
Large construction activities that disturb greater than 5 acres, whether on their own or part of a larger common plan of development, require stormwater permits before discharging storm water to any surface water in the state of Texas. The requirements include:
− Prepare and implement a Stormwater Pollution Prevention Plan
− Submit a Notice of Intent (NOI)
− Post a Construction Site Notice
− Submit a Notice of Termination (NOT) within 30 days after final stabilization has occurred

“Common Plan of Development”
A construction activity is part of a larger common plan of development if it is completed in one or more of the following ways:
− In separate stages
− In separate phases
− In combination with other construction activities

Recommendation
The Texas Capitol Complex project is considered a common plan of development. Since each of the 6 Packages will be performed under separate projects with potentially different contractors for each one, our recommendation is for each Package to prepare a separate SWPPP Report. Because the six packages are part of one overall larger project, each individual package will be classified under the Large Construction Activities, even if the limits of construction are less than 5 acres. In addition, an Overall SWPPP report may be prepared for the entire project.

Timeline/Schedule
The preparation of the SWPPP report should not affect the project schedule. The SWPPP report is not reviewed and approved by TCEQ. The Contractor is responsible for submitting the NOI to TCEQ prior to starting construction. The NOI may be submitted electronically, which allows for immediate provisional coverage.

Schedule considerations may be needed if TFC wants to include a review and approval of the SWPPP document to meet TFC standards.
Permitting
City of Austin
City of Austin permitting will be required for any construction activities or improvements proposed within City of Austin right-of-way, easements, or that impact existing City of Austin infrastructure or the function of City infrastructure such as utilities or roadways.

General Permit
The City of Austin General Permit is used for construction activities associated with public utility construction and other construction work by public agencies in City of Austin right-of-way. Depending on the extent and nature of the work in City right-of-way, this can be done as part of the City’s General Permit program. The applications require submittal of full construction plans for the work in the right-of-way including any traffic control or other associated design drawings required to complete the construction. The General Permit process is a slightly reduced review process and would typically be more in the two to three month approval time frame.

Site Development Permit
Site Development Permit is used for construction activities in the City of Austin. Depending on the extent and nature of the work in City right-of-way, this can be done as a standard site development permit. The applications require submittal of full construction plans for the work in the right-of-way including any traffic control or other associated design drawings required to complete the construction. The typical site development permit process can be a four to six month process depending on the extent of the work. Coordination with the City of Austin for scheduling permitted activities will be required of the six anticipated packages.

Site Plan Exemption
A Site Plan Exemption is a simplified process to address small improvements that meet the qualifications for an exemption, which include added impervious cover of less than 1,000 square feet, and may not include new buildings or improvements that result in water quality changes. There is an application, and construction documents are required to show the proposed improvements. It is submitted to the City of Austin through the Development Assistance Center. Review time is typically 2 weeks.

License Agreement
A City of Austin License Agreement is required for any improvements proposed within the City right-of-way that are private or non-standard improvements. Typical improvements requiring a license agreement include tie back retention systems for excavation, tower cranes, and non-standard sidewalk zone improvements such as hardscape, street trees, irrigation, lighting, and furniture. The license agreement application is usually processed in conjunction with a General Permit or Site Development Permit for the improvements in the right-of-way and typically must be approved prior to approval of the associated permit. The license agreement ultimately results in a legal agreement between the City and the property owner where by the owner agrees to an annual fee for use of the right-of-way occupied by the proposed improvements. The typical license agreement process is approximately a four to six-month process and corresponds to the same approval time of the permit.

Encroachment Agreement
A City of Austin Encroachment Agreement is required for any permanent improvements proposed in City of Austin right-of-way that cannot be removed within 90-days as required by license agreements. Typical improvements requiring an Encroachment Agreement would be building protrusions, canopies, or overhangs, pedestrian bridges, and utility tunnels. The general process for an Encroachment Agreement is similar to the License Agreement except that an Encroachment Agreement requires approval by the Land Use Commission and City Council and must be permitted through a Site Development Permit, not a General Permit. The timeline for the Encroachment Agreement is also typically closer to twelve (12) months instead of the typical six (6) months for a License Agreement.

Easement Vacation
The easement vacation process includes an application that is submitted to the City of Austin Real Estate Department for review and approval. Depending on the type of easement, Austin Water Utility, Watershed Protection Department, and any other related departments, will review the request. The review period is two weeks, and after comments are received, applicants have four weeks to clear any outstanding negative comments or objections. Typically, when an easement is being vacated due to City-owned utilities being relocated, a conditional approval may act as the interim approval until construction of the relocated lines is complete and the lines are accepted by the City.

Service Extension Request (SER)
If a property does not have adequate water and wastewater service available to it, the City of Austin requires the submittal of an SER application to determine what improvements are required to provide adequate service. The submittal includes available information on existing surrounding utilities and the proposed use and density for the development. The Austin Water Utility department will review the application and make recommendations for improvements needed to serve the proposed development. These construction and associated cost of the improvements are usually the responsibility of the property owner unless another project in the area requires the same improvements. In that case the City will work with both projects to negotiate a cost participation agreement. This application is required prior to or in conjunction with any associated site development permit applications.

Temporary Use of Right-of-Way
This permit is obtained by the Contractor when temporary closure within the right-of-way is needed on a project. Typically a Traffic Control Plan is required to be submitted with the request, to define how traffic flows will be modified and how traffic will be diverted around the closed area. Traffic Control Plan approval can take one to two months. Obtaining the Temporary Use Permit can be done in one day if all required documents are provided.
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<th>Criteria</th>
<th>General Permit</th>
<th>Lic Agrmt</th>
<th>Site Plan Exp</th>
<th>Site Dev. Permit</th>
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<th>SWPPP</th>
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**Package 3A (Long lead equipment procurement) and Packages 4B, 4C, 5B, 5C (Interior fit-outs in a state building) do not include work that will require permitting for City of Austin.**
Permitting
Texas Commission on Environmental Quality

Stormwater Pollution Prevention Plan (SWPPP)
The Texas Commission of Environmental Quality regulates stormwater discharges from construction activity through its General Permit. Coverage under the General Permit requires implementation of a SWPPP, the submittal of a Notice of Intent (NOI) for the primary operator, and or posting of a Construction Site Notice, depending on the size of the area disturbed.

Where there is more than one SWPPP for a site, permittees must coordinate to ensure that the Best Management Practices (BMPs) and controls are consistent and do not negate or impair the effectiveness of each other. Regardless of whether a single comprehensive SWPPP is developed or separate SWPPPs are developed for each operator, it is the responsibility of each operator to ensure compliance with the terms and conditions of the General Permit in the areas of the construction site where that operator has control over construction plans and specifications or day-to-day operations.
**Grading**

**General - Concept**

The project site is on existing developed land, and is surrounded by developed land. The proposed improvements will be matching existing grades at the perimeter of the project site area. This includes the intersection of Congress Avenue and Martin Luther King Jr. Boulevard, 17th Street near Brazos Street and Colorado Street, Congress Avenue and 16th Street, and existing buildings including the Texas State History Museum. Generally, the site slopes from west to east, towards Waller Creek, with elevations changing from approximately 550’ down to 510’.

The following sections expand on some specific concepts for the project. Each is further expanded on for each package on the following pages.

**Areas Adjacent to Buildings**

Generally, the proposed buildings’ finished floor elevation (FFE) should be approximately six (6) inches to one (1) foot above finished grade outside the building. Positive drainage should be achieved going away from the building.

**Tree Zones**

The tree zones adjacent to the Texas Mall will be low points to capture runoff from the adjacent areas.

**Underground Parking Garage**

The garage slab under the Texas Mall is sloped, or stepped, as the ground surface slopes to the north.
Grading
General - Concept

Mall Drainage Cross Section
Stormwater and Drainage

General Requirements

Impacts to Existing Infrastructure
There is an existing storm sewer system in place within the project area. The proposed improvements will specifically affect existing storm infrastructure in 17th Street, 18th Street, and Congress Avenue. The storm sewer system in these areas will be re-routed.

Stormwater Detention
The Texas Government Code requires that proposed improvements do not increase the runoff rate from existing conditions. To achieve this requirement, some form of detention is required. In addition, the City of Austin requires an analysis which includes drainage calculations for existing conditions and proposed conditions to show that there is no increase in runoff.

The City of Austin requires that stormwater runoff peak rates shall not be increased at any point of discharge from a site for the two (2), ten (10), 25, and 100-year storm frequency events.

Due to the unique nature of the project, alternative options may be proposed and discussed with the City of Austin.

Approximate Volume
The approximate volume of detention required is a function of the increase in impervious cover. The existing project area is predominantly impervious. The total project limits of construction is approximately 8.6-acres. Existing impervious cover area is approximately 7-acres (82%). The proposed improvements will increase the amount of impervious cover. It is our assumption that the landscape areas above the underground parking structure will be considered impervious area by the City of Austin. Proposed improvements increase the impervious cover to approximately 8-acres (93%).

An increase in impervious cover of approximately 15% will require a detention volume on the order of magnitude of 20,000 to 40,000 cubic feet. A more detailed analysis is necessary as the project develops and buildings and site improvements are finalized.

Stormwater Quality
To minimize the effect of non-point source pollutants in stormwater, the City of Austin requires stormwater control measures to improve water quality by removing suspended solids. Due to the project being located on State land, stormwater detention should be discussed with the City of Austin.

The minimum volume required is the first one-half (0.5) inch of runoff plus an additional one-tenth (0.1) inch for each ten (10) percent increase of impervious cover over twenty (20) percent within the drainage area to the control.

Recommendation
It is our recommendation that the Texas Capitol Complex project attempt to comply with the City of Austin water quality requirements.

Owner’s Project Requirements (OPR)
The project shall be designed in accordance with A/E Guidelines and the Owner’s Project Requirements (OPR), which includes the following:

1. State Energy Conservation Office (SECO) – Water efficiency/conservation standards which provide guidelines for effective conservation measures that are achievable, implementable and practical. Addresses landscape irrigation, HVAC, plumbing, rainwater harvesting, and others.
2. Sustainability Goals
3. Rainwater harvesting – includes the capture and storage of rainwater for use in landscape irrigation.
Stormwater and Drainage

Best Practices

Rainwater Harvesting
Rainwater harvesting is the capture and storage of rainwater for use in landscape irrigation and stormwater control. There are opportunities for a single or multiple rainwater harvesting systems on the project site. Runoff can be captured from the building roofs and contained in a cistern or tank until it is distributed. To meet the detention requirements, a total of approximately 150,000 to 300,000 gallons would need to be provided. The proposed cistern is to be located in the parking structure at the level under the ground floor of the building to allow capture of roof drainage.

Rain Gardens
The proposed tree zones adjacent to the Texas Mall provide an opportunity to gain storage in the soil between the ground and the underground parking structure. Preliminary calculations indicate that there is an area of approximately 12,000 to 25,000 square feet of the tree zone that may be designed as a rain garden. This assumes a soil depth of six (6) feet and a void ratio of 30%.

Recycled Water
In addition to rainwater harvesting, the use of recycled water is a source of water for irrigating landscape areas to aid in water conservation and sustainability. It is used in sustainable landscape irrigation, to recharge groundwater aquifers, etc. Sources of reclaimed water on this project include the City of Austin reclaimed water system, condensate from mechanical equipment, and possibly groundwater.

The City of Austin requires approved construction plans and valid permits to connect to the reclaimed water system. Plans are submitted to Austin Water Utility and the City’s Plumbing Department. Reclaimed water irrigation plans require review and approval for a plumbing permit. Yearly building testing is required for connection to the City of Austin reclaimed water system.

Recommendations
We would recommend to extend the existing reclaimed water system (from the intersection of San Jacinto and Martin Luther King Jr. Boulevards) to the project site for use as makeup water to supplement rainwater harvesting.
Excavation

Prerequisites

The Package 1 project site is located within existing developed land. An existing wastewater line will need to be relocated in order to begin excavation of the entire site for the 1801 Congress (C18) building site. Similarly, several existing utilities will need to be relocated in order to begin excavation for the entire 1601 Congress (C16) building site. In order to start the excavation for the Underground Parking Garage site, the right-of-way for Congress Avenue and portions of 17th Street must be vacated by the City of Austin, which is anticipated to be a longer process than the utility relocations for the 1601 and 1801 Congress building sites. For that reason, the excavation will occur in three phases: the 1801 Congress site first, then the 1601 Congress site, and the Texas Mall site last.

Right-of-Way (ROW) Vacation

Since the Congress Avenue right-of-way needs to be vacated prior to excavation beginning, the Site Services Engineer is in the process of preparing the right of way vacation application to be submitted to the City of Austin as soon as possible. In order to obtain final approval of the right-of-way vacation request, either all existing public utilities will need to be relocated from within the right-of-way being vacated or the right-of-way will need to be replaced with utility easements to cover all existing public utilities. The proposed strategy is to proceed with the utility easement approach, because it results in the shortest time to begin excavation. The vacation of the utility easement(s) will then be handled in conjunction with the utility relocation in Package 2 and should not hold up excavation beginning as long as the utilities have been physically relocated and any new easements required have been dedicated.

Bus Access

Bus access for the Texas State History Museum along Congress Avenue will be removed during the excavation. A temporary bus drop off and accessible route to the front entry will be required. A temporary bus loading area will be provided on the west side of the building along Colorado Street with a temporary accessible pedestrian route along 18th Street to the front entry of the museum.

Emergency Vehicle Access

The emergency vehicle access for the Texas State History Museum, Stephen F. Austin, and William B. Travis buildings will be impacted by the removal of Congress Avenue and portions of 17th Street. Temporary fire truck access lanes may be required to provide adequate fire coverage of the existing buildings during the excavation of Congress Avenue. Refer to the code analysis section for more information.
Excavation
Demolition

The project site is on existing developed land, and to start the excavation for the underground parking structure, there are existing improvements that will need to be demolished.

1801 Congress Building Site (Package 1A)
Existing surface improvements to be demolished on this site include:
- Asphalt Pavement
- Concrete Curb & Gutter
- Small Trees
- Signage
- Landscape Islands
- Wheel Stops
- Light Poles

1601 Congress Building Site (Package 1B)
Existing surface improvements to be demolished on this site include:
- Asphalt Pavement
- Concrete Driveways
- Concrete Sidewalk
- Concrete Curb
- Signage
- Wheel Stops
- Landscaping
- Trees
- Light Poles

Texas Mall Site (Package 1C)
Existing surface improvements to be demolished on this site include:
- Asphalt Pavement
- Concrete Curb & Gutter
- Concrete Sidewalk
- Trees
- Street Lights
- Bicycle Parking (Austin B-cycle Station)
- Bicycle Parking (COA Standard)
- Parking Meters (controlled by Texas State Preservation Board)
Excavation
Impacts to Existing Conditions

Parking
The excavation for the underground parking garage will remove a large number of existing parking spaces in the existing surface lots. The estimated number of parking spaces to be removed are:
- 1801 Congress Building Site +/- 300 parking spaces
- 1601 Congress Building Site +/- 126 parking spaces
- Texas Mall +/- 42 metered parking spaces

Building Loading Access
Access to loading spaces and driveways for the existing adjacent buildings shall be maintained.

Fire Access
Fire access to the existing adjacent buildings shall be maintained. Fire coverage for all adjacent buildings will be analyzed for compliance during construction. Alternate means of access may be required to maintain fire access. In addition, after construction is complete, the new Texas Mall is expected to accommodate fire and emergency vehicles.

Existing Trees
There are several existing trees to be removed. Existing trees located on State land may be removed without mitigation. Existing trees located in the-of-way (City of Austin) typically require mitigation. Prior to Package 1 construction, the right-of-way vacation for Congress Avenue and 17th Street must be submitted and approved by the City of Austin Real Estate Department. We anticipate that the right-of-way vacation will be approved pending the completion of all required utility relocations. This will be a conditional approval until the new improvements are installed and accepted by the City. Since the completion of the right-of-way vacation will result in the entire Package 1 site area becoming State-owned land, we do not anticipate any required mitigation through the City of Austin.
Excavation
Storm Sewer System

The excavation of the 1801 Congress Building site, 1601 Congress Building site, and Texas Mall (Congress Avenue) for the underground parking structure will require the relocation of existing storm sewer utilities.

The storm sewer utilities are shown on the graphic on this page and the areas hatched identify the storm utilities that will be relocated during this project. For additional storm relocation information, see Volume 2.
Excavation
City of Austin Permits

Refer to General Permitting section for additional information.

1801 Congress Building
The relocation of the existing City of Austin wastewater line located on the 1801 Congress Building site, proposed improvements extending beyond the property line, and any construction activities within the right-of-way or that impact the right-of-way, will require permitting through the City of Austin. Proposed improvements located within City of Austin right-of-way include tie backs for the excavation and shoring around the perimeter of the site. Other potential construction activities within the City of Austin right-of-way include the site construction entrances and excavation haul route access points. The relocation of the existing wastewater line would typically be permitted through the City’s General Permit assuming relocation to a proposed location within the City’s right-of-way.

The General Permit for the utility relocation also includes any construction entrances for site construction access and traffic control plans for the excavation haul route traffic impacts. The excavation shoring tie backs require either a license agreement if temporary or an encroachment agreement if permanent.

1601 Congress Building
The relocation of existing City of Austin utilities within the 1601 Congress Building site, if required, and any work extending beyond the property line into City of Austin right-of-way will require permitting. The relocation of the existing City of Austin utilities is outlined in the Site Utilities section.

Potential improvements located within City of Austin right-of-way include tie backs for the excavation and shoring around the perimeter of the site. Construction activities within the City of Austin right-of-way include the site construction entrances and excavation haul route access points. The excavation shoring tie backs require either a license agreement if temporary or an encroachment agreement if permanent. The General Permit or Site Development Permit for the excavation shoring tie backs would also include any construction entrances for site construction access and traffic control plans for the excavation haul route traffic impacts.

Texas Mall and Underground Parking Garage
The excavation within Congress Avenue for the Texas Mall and Underground Parking Garage will have impacts on City of Austin street right-of-way, existing utilities, the roadway network and traffic flow, emergency vehicle access and pedestrian access to existing buildings, as well as visitor bus access to the Texas State History Museum. These impacts will have potential permitting requirements through the City of Austin.

The vacation of Congress Avenue and portions of the 17th Street right-of-way will be the first and most critical element of the City of Austin permitting process for the Texas Mall and Underground Parking Garage excavation. Based on information provided by TFC’s Site Services Engineer from meetings with the City of Austin, the current strategy is to fully vacate the right-of-way of Congress Avenue and 17th Street through the right-of-way vacation process prior to the relocation of the existing utilities within the right-of-way. Since existing public utilities will remain within the vacated Congress Avenue right-of-way at the time of the vacation, a utility easement will be retained for all or portions of the vacated right-of-way containing existing public or City of Austin utilities.

If excavation is required to commence prior to the completion of the right-of-way vacation, this would need to be negotiated with the City through an Inter-Local Agreement (ILA), Memorandum of Understanding (MOU), or similar agreement. These processes will require review and approval by several boards and commissions and City Council. The right-of-way vacation process also includes the negotiation of compensation for the monetary value of the land transfer of ownership that occurs at the completion of the process. For a typical right-of-way vacation, payment is given to the City for the appraised value of the land area being vacated. However, this may also be negotiated with the City as part of the vacation process or through the ILA, since this project is unique.

The impacts of the right-of-way vacation and excavation need to be addressed prior to commencing any work in the Congress Avenue right-of-way. This is handled through one of several permitting processes in parallel with the right-of-way vacation. The first component of this is addressing traffic impacts resulting from the removal of the portions of Congress Avenue and 17th Street from the City’s street network. Any street or intersection improvements required to mitigate traffic impacts will be identified through the City’s review and approval of a Traffic Impact Analysis (TIA). Once the TIA is reviewed and approved by the City, the design and permitting for any required improvements can commence. These improvements are typically permitted through the General Permit process.

The excavation of Congress Avenue in front of the Texas State History Museum will require a temporary location for bus loading and unloading as well as pedestrian access to the museum. The location of this temporary bus loading area may require temporary improvements or modifications within the City right-of-way on 18th Street or Colorado Street. Any temporary improvements or modifications within City right-of-way will require permitting and could be accomplished through a Site Plan Exemption or the General Permit process depending on the extent and scope of the improvements.

The excavation of Congress Avenue and 17th Street will temporarily modify emergency vehicle access to the existing buildings adjacent to the excavation. These modifications are typically reviewed by the City of Austin Fire Department (AFD) in addition to the State Fire Marshal’s office since AFD is the agency that would respond to any fire emergency calls. If the removal of Congress Avenue and 17th Street require temporary fire access improvements provided by AFD, those improvements are typically permitted through a Site Plan Exemption or the General Permit process depending on the extent and location of the improvements.

The next element of the City of Austin permitting process will be permitting for any proposed improvements or construction activities associated with the excavation extending into the remaining City of Austin right-of-way after the vacation of Congress Avenue. Potential improvements located within City of Austin right-of-way include the tie back retention system for the Congress Avenue excavation at the line where the 16th Street and 18th Street rights-of-way meet the vacated Congress Avenue right-of-way. The excavation tie back retention system would require either a license agreement if temporary or an encroachment agreement if permanent. Potential construction activities within the City of Austin right-of-way include the site construction entrances and excavation haul route access points. Any construction entrances for site construction access and traffic control plans for the excavation
Excavation
City of Austin Permits
haul route traffic impacts would be included with the General Permit or Site Development Permit for the excavation tie back retention system.

The completion of the right-of-way vacation and addressing its impacts would allow excavation to commence in portions of Congress Avenue without existing utility obstructions. To commence the full excavation of the entire Congress Avenue project area, all existing utilities will need to be relocated and the easement vacated that was retained following the Congress Avenue right-of-way vacation. The permitting approach for this element is outlined in Site Utilities section. As the scope and schedule of each element of the project requiring permitting is developed further, the permit packages for each element can be bundled based on the critical path of the schedule and required timing of each element to minimize the number of permit packages required.

Excavation
TCEQ Permits
Stormwater Pollution Prevention Plan (SWPPP)
The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to General SWPPP and Permitting section for additional information.
Site Utilities
Utility Relocations

Package 2 includes the relocation of all existing utilities that conflict with the proposed improvements associated with the excavation for the underground parking structure, Utility Tunnel, and new buildings.

Building Services
In addition to relocated utilities, new utility services for the 1801 Congress Building and 1601 Congress Building will be provided. The contractor shall extend building utility services up to 5-feet from the building. The building, mechanical, electrical, and plumbing plans will provide the continuation of utility service inside of 5-feet.

Reclaimed Water
Recycled water, or reclaimed water, is proposed as a method of water conservation and sustainability. Sources of reclaimed water on this project include the City of Austin reclaimed water system, condensate from mechanical equipment, and possibly groundwater. Yearly building testing is required for connection to the City of Austin reclaimed water system.

Recommendations
We would recommend to extend the existing reclaimed water system (from San Jacinto and Martin Luther King Jr. Boulevards) to the project site for use as makeup water to supplement rainwater harvesting.

Traffic
The scope for this package includes traffic re-striping of 16th Street, 17th Street, and 18th Street, to address the change from one-way to two-way streets.
Site Utilities
City of Austin Permits

A City of Austin permit is required for any construction work in City of Austin right-of-way.

1801 Congress Building
The proposed new utility services connections for the building as well as the relocation of the existing overhead electric from overhead to underground will require permitting through the City of Austin. The addition of new buildings typically requires submittal of a Services Extension Request (SER) through Austin Water Utility to confirm whether the existing infrastructure is adequate to supply the increased capacity required to serve the proposed project. Any offsite system improvements required by the approved SER, the new utility services connections for the building, and relocation of the overhead electric underground would typically be permitted through the City’s General Permit. The new service connections for water and wastewater could potentially be done through an Austin Water Utility Tap Plan & Site Plan Exemption. This may be separate from the General Permit work due to schedule or other reasons and provided there are not offsite system improvements required by the approved SER.

1601 Congress Building
Any required relocation of existing City of Austin utilities within the 1601 Congress Building site as well as the new utility service connections for the proposed building will require permitting through the City of Austin. The Services Extension Request (SER) for the 1601 Congress Building could be combined with that of the 1801 Congress Building and processed as one SER. Any offsite system improvements required by the approved SER, the new utility services connections for the building, and any relocations of the existing utilities would typically be permitted through the City’s General Permit.

The relocation of private or Texas Facilities Commission owned utilities would not require permitting if they are not relocated to a location within City of Austin right-of-way. If private Texas Facilities Commission owned utilities are to be relocated in or partially within City of Austin right-of-way, a License Agreement or Encroachment Agreement would be required. If a License Agreement is required, it can be processed through the General Permit process. If an Encroachment Agreement is required, it must be processed as a Site Development Permit because it requires approval by the Land Use Commission and City Council.

Utility Tunnel
The relocation of any existing City of Austin utilities in conflict with the proposed tunnel will require permitting through the City of Austin. The relocation of the existing City of Austin utilities would typically be permitted through the City’s General Permit assuming they are relocated to a proposed location within the City’s right-of-way.

Texas Mall and Underground Parking Garage
The relocation of existing utilities within the Congress Avenue excavation site will require permitting through the City of Austin. The relocation of the existing utilities would typically be permitted through the City’s General Permit assuming they are relocated to a proposed location within the City’s right-of-way. However, due to the complexity of relocation of the existing utilities crossing perpendicular to Congress Avenue, the proposed location of the utilities being relocated will likely be over the top of the proposed Underground Parking Garage (UPG) structure just north or south of the existing crossings locations at 16th and 18th Streets.

Special consideration and approval by the City of Austin will be required to allow the relocated public utilities to be placed over the top of a subterranean parking structure on State-owned land since the proposed locations of the relocated utilities would be within the area of Congress Avenue that was vacated to begin excavation within Congress Avenue. For the proposed utilities being relocated to remain public utilities that are owned and maintained by the City of Austin, some form of easement or shared use agreement will also be required to allow the relocated utilities over the parking structure to be accessed, maintained, and or replaced by the City of Austin, if necessary, since they will be located on State property after the vacation of the Congress Avenue right-of-way.

The strategy for this will need to be developed further through continued discussions with the City of Austin as this potential solution for the rerouted utilities is presented to the City.

Site Utilities
TCEQ Permits

Stormwater Pollution Prevention Plan (SWPPP)
The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to General SWPPP and Permitting section for additional information.
Central Utility Plant and Tunnel (CUP) Site

The Package 3 project site is on existing developed land, located at the southwest corner of 14th Street and San Jacinto Boulevard. The proposed improvements include a central utility plant (CUP) to serve the overall Capital Complex project. Also included in Package 3 is a utility tunnel which is routed from the CUP up to the 1801 Congress Building at Brazos Street and 18th Street. The estimated Limits of Construction (LOC) for the Central Utility Plant site and Utility Tunnel is 4.28 acres.

Impervious Cover
The existing site area for the proposed Central Plant is entirely impervious.

Austin Energy Access to Electrical Equipment
Austin Energy requires vehicular access to its electrical equipment. The equipment must be located adjacent to the street and have appropriate vertical and horizontal clearances to allow for trucks to access the space. During excavation for the CUP, access to the switchgear shall be maintained.

Loading Access
The CUP facility will require loading access.

Demolition
The project site is on existing developed land, and to start the excavation for the underground parking structure, there are existing improvements that will need to be demolished. These include:
- Wood Fencing
- Chain-link Fencing/Gates
- Bollards
- Concrete
- Equipment
- Asphalt Pavement
- 1 Story Maintenance Building
- Generators and Fuel Storage
- UPS Battery Building
- Abandoned Cooling Tower Basin
Central Utility Plant and Tunnel (CUP)
Grading & Drainage

Grading
The existing site slopes from southwest to northeast, with existing elevations ranging from 540' to 515' respectively.

Storm Sewer System/Drainage
There are existing storm sewer lines, which serve the adjacent existing building, that conflict with the proposed CUP.

The existing site is entirely impervious; therefore, the proposed CUP improvements are not anticipated to increase the peak runoff leaving the site. Therefore, onsite detention is not required.
Central Utility Plant and Tunnel (CUP)
Permitting

CITY OF AUSTIN
A City of Austin permit is required for any improvements or construction activity in City of Austin right-of-way.

Utility Tunnel
The majority of the proposed tunnel extending from the new CUP to the 1601 Congress and 1801 Congress Buildings will be located within City of Austin right-of-way. Since the tunnel is a permanent structure being placed in the City of Austin right-of-way, an Encroachment Agreement will be required. The Encroachment Agreement will also require that the proposed tunnel and associated construction within the City right-of-way be permitted through a Site Development Permit because the Encroachment Agreement requires approval by the City Council.

Central Utility Plant
The relocation of any existing City of Austin utilities and any proposed improvements or construction activities within the City of Austin right-of-way will require permitting through the City of Austin. Potential improvements within City right-of-way include the tie back retention system for excavation of the site. Potential construction activities within the City of Austin right-of-way include the site construction entrances and excavation haul route access points.

The relocation of any existing utilities would typically be permitted through the City’s General Permit assuming it is relocated to a proposed location within the City’s right-of-way. The General Permit for the utility relocation would also include any construction entrances for site construction access and traffic control plans for the excavation haul route traffic impacts.

The excavation tie back retention system, if required, would require either a License Agreement if temporary or an Encroachment Agreement if permanent. If a License Agreement is required, it can be processed through the General Permit process and included as part of the utility relocation General Permit. If an Encroachment Agreement is required, it must be processed as a Site Development Permit because it requires approval by the City Council and would therefore be separate from the General Permit for any utility relocation or other improvements in the right-of-way. It is the preference of TFC to avoid the Site Development Permit process.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Stormwater Pollution Prevention Plan (SWPPP)
The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to the General SWPPP and Permitting Section for additional information.
1801 Congress Building (C18)

Site
The Package 4 project site is an existing parking lot, located at the southwest corner of Martin Luther King Jr Boulevard and Congress Avenue. The proposed improvements include a new building, loading dock, parking garage, and associated site improvements.

Impervious Cover
The existing site area for the proposed 1801 Congress Building is almost entirely impervious, aside from pervious landscape parking islands. There is currently a surface parking lot on the site. The proposed improvements include grass lawn areas; however, the underground parking garage extends under the entire site area.

Trees
Refer to Landscape Section for more information.

Accessible Routes
The proposed improvements include modifications to existing curb ramps on and adjacent to the site.

Grading
The existing site slopes from west to east, with the elevations ranging between 530’ at the southwest corner and 514’ at the southeast corner.

Drainage/Stormwater Management
The existing site is entirely impervious; therefore, the proposed improvements are not anticipated to increase the peak runoff leaving the site. Therefore, onsite detention is not anticipated.

Utilities
There is an existing City of Austin 12-inch concrete pipe wastewater line crossing the 1801 Congress Building site. It will be relocated as part of Package 1 prior to the excavation for this site. We anticipate that when the existing overhead electric (OHE) conflict at 18th Street is relocated to Martin Luther King Jr. Boulevard, the existing OHE along Martin Luther King Jr. Boulevard (adjacent to the 1801 Congress Building) will be relocated into the new duct bank. The OHE work is anticipated to be completed as part of Package 2.
1801 Congress Building (C18)
Site Plan

Truck Access to Electrical Equipment
Austin Energy requires vehicular access to its electrical equipment. The equipment must be located adjacent to the street and have appropriate vertical and horizontal clearances to allow for trucks to access the space.

Loading Access
The Martin Luther King Building will require loading access. A truck turn analysis was performed to evaluate the loading dock area. The maximum truck size for this loading dock is 62’ long (AASHTO WB-62).
City of Austin
A City of Austin permit is required for any proposed improvements or construction activities within the City of Austin right-of-way. Potential proposed improvements associated with the 1801 Congress Building that would require permitting include the addition or modification of utility service connections, any pedestrian zone sidewalk or street tree improvements around the perimeter of the building along Martin Luther King Jr. Boulevard, Brazos Street, or 18th Street, and the tower crane for the building construction. The current proposed scope of the Package 2 - Utilities package includes the proposed utility services for the 1801 Congress and 1601 Congress Buildings and the current proposed scope of the Package 6 - Texas Mall and Underground Parking Garage package includes proposed surface improvements up to and around the 1801 Congress & 1601 Congress Buildings. The only remaining item in Package 4 requiring permitting would be the tower crane.

Tower cranes that have a swing radius extending into the City of Austin right-of-way require a License Agreement. License Agreements typically are processed in conjunction with a General Permit or Site Development Permit. Since there are no other improvements currently anticipated to require permitting for the 1801 Congress Building Package, the Tower Crane License Agreement could be included as part of one of the other permits for the Package 6 improvements.

Texas Commission on Environmental Quality Permits
Stormwater Pollution Prevention Plan (SWPPP) - The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to the General SWPPP and Permitting Section for additional information.
1601 Congress Building (C16)

Site

The Package 5 project site is on existing developed land, located at the southwest corner of 17th Street and Congress Avenue. The proposed improvements include a new building, loading dock, parking garage, and associate site improvements.

Impervious Cover

The existing site area for the proposed 1601 Congress Building is mostly impervious. There is currently a surface parking lot on the site, with some grass lawn areas to the east. The proposed truck turnaround will extend out into the existing grass lawn area.

Trees

There is an existing tree near the adjacent existing building that is to remain. Its size, canopy, and proximity to the proposed loading dock and parking garage entrance requires caution. The Critical Root Zone of the tree shall remain intact. Refer to Landscape Section for additional information.

Accessible Routes

The proposed improvements include modifications to existing curb ramps and stairs adjacent to the site.

Grading

The existing site slopes from southwest to northeast, with elevations ranging from 545' to 528' respectively.

Drainage/Stormwater Management

The existing site is mostly impervious; therefore, the proposed improvements are not anticipated to significantly increase the peak runoff leaving the site. We anticipate that a small amount of on-site detention mitigation may be required.

Utilities

There are existing public and private utilities crossing the project site that shall be removed and relocated as part of Package 2 prior to the start of excavation for the underground parking structure.
1601 Congress Building (C16)

Site

Truck Access to Electrical Equipment
Austin Energy requires vehicular access to its electrical equipment. The equipment must be located adjacent to the street and have appropriate vertical and horizontal clearances to allow for trucks to access the space.

Loading Access
The 1601 Congress Building will require loading access. A truck turn analysis was performed to evaluate the loading dock area. The maximum truck size for this loading dock is 40' long (AASHTO WB-40 truck).
1601 Congress Building (C16)

Permitting

City of Austin

A City of Austin permit is required for any proposed improvements or construction activities within the City of Austin right-of-way. Potential proposed improvements associated with the 1601 Congress Building that would require permitting include the addition or modification of utility service connections, any pedestrian zone sidewalk or street tree improvements on 16th Street, and the tower crane for the building construction. If 17th Street is not vacated, any pedestrian zone sidewalk or street tree improvements on 17th Street will also require permitting. The current proposed scope of the Package 2 - Utilities package includes the proposed utility services for the 1801 Congress and 1601 Congress Buildings and the current proposed scope of the Package 6 - Texas Mall and Underground Parking Garage package includes proposed surface improvements up to and around the 1801 Congress and 1601 Congress Buildings. The only remaining item in Package 5 requiring permitting would be the tower crane.

Tower cranes that have a swing radius extending into the City of Austin right-of-way require a License Agreement. License Agreements typically are processed in conjunction with a General Permit or Site Development Permit. Since there are no other improvements currently anticipated to required permitting for the 1601 Congress Building Package, the Tower Crane License Agreement could be included as part of one of the other permits for the Package 6 improvements.

Texas Commission on Environmental Quality

Stormwater Pollution Prevention Plan (SWPPP) -
The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to the General SWPPP and Permitting Section for additional information.

Texas Commission on Environmental Quality

Stormwater Pollution Prevention Plan (SWPPP) -
The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to the General SWPPP and Permitting Section for additional information.
Texas Mall and Garage (TXM)

Site

The Texas Mall project includes the conversion of Congress Avenue from a vehicular street to a pedestrian corridor between 16th Street and Martin Luther King Jr. Boulevard. The scope includes hardscape and surface improvements up to the 1801 Congress Building (Package 4) and the adjacent existing buildings.

Master Plan Guidelines

The Texas Mall shall have no curbs per the Master Plan Guidelines.

Impervious Cover

The area of the Texas Mall is over 50% impervious cover from the pavement of the existing Congress Avenue. While the proposed Texas Mall includes large areas of lawn and tree zones at the surface, the Underground Parking Garage extends under the majority of the Texas Mall and should be considered impervious for any area over the proposed underground structure.

Bus Access

Existing bus loading access along Congress Avenue will be permanently replaced and incorporated into Texas Mall paving along the west edge closest to the Texas State History Museum. The walk areas of this proposed bus route will require a pavement design adequate to support the bus traffic loading.

Accessible Routes

The proposed improvements include modifications to existing curb ramps and stairs adjacent to the site. For example, there are existing steps on 18th Street that will require a temporary ramp to provide an accessible route during construction.

Trees

Refer to Landscape Section for additional information.

Utilities

Several existing utilities within Congress Avenue are to be relocated.
Grading
The existing site slopes down from south to north, with elevations ranging from 547' at 16th Street to 528' at Martin Luther King Jr. Boulevard.

Drainage/Stormwater Management
It is anticipated that the area above the underground parking garage will be considered impervious due to the structure limiting infiltration. The existing area is mostly impervious. The proposed improvements include tree zones, which include rain garden elements to address the increase in runoff due to the proposed improvements. Refer to Landscape Section for additional information.
Texas Mall and Garage (TXM)
Permitting

City of Austin
A City of Austin permit is required for any proposed improvements or construction activities within the City of Austin right-of-way. Potential proposed improvements associated with the Texas Mall and Underground Parking Garage that would require permitting include utility service connections, pedestrian zone sidewalk or street tree improvements, and tower cranes for the Underground Parking Garage construction. Other improvements that have been indicated to be part of Package 6 include roadway and traffic improvements.

The roadway and traffic improvements potentially include restriping of the existing streets to convert them to two-way traffic flow, any traffic improvements required by the Traffic Impact Analysis for the addition of the proposed buildings and mall, and potentially a pedestrian connection across Martin Luther King Jr. Boulevard to the Blanton Museum to the north. The master plan indicates restriping of the east-west streets within the north Capitol Complex area to convert them from one-way to two-way traffic flow. Stripping and signage work on private roads (TFC state-owned land) will be performed as part of this project. These improvements would typically be done under a General Permit. This General Permit would also include any improvements associated with the pedestrian connection across Martin Luther King Jr. Boulevard, and any traffic mitigation improvements required by the approved Traffic Impact Analysis from the additional traffic resulting from the addition of the two new buildings. The improvements included in this General Permit could also potentially be combined with the General Permit for any traffic improvements required in conjunction with the vacation of Congress Avenue and 17th Street indicated in the Package 1 section if the timing and schedules were not prohibitive of the improvements being permitting together.

Tower cranes will be required for the construction of the 1801 Congress Building, 1601 Congress Building, and the Underground Parking Garage. Tower cranes that have a swing radius extending into the City of Austin right-of-way require a License Agreement. License Agreements typically are processed in conjunction with a General Permit or Site Development Permit. Depending on the timing of these and the sidewalk and street tree improvements permit, they could be combined and processed under one permit or kept separate if required.

Texas Commission on Environmental Quality
Stormwater Pollution Prevention Plan (SWPPP)
- The project will follow the requirements of a SWPPP for Large Construction Activities under the common Plan of Development for the entire project. Refer to General SWPPP and Permitting section for additional information.
3.2 Pre-Conceptual Design Analysis
Landscape
Texas Mall and Garage (TXM)

Circulation

Vehicular Circulation

Everyday vehicular circulation on the Mall is limited to at grade east-west crossings on 16th and 18th Streets. As per the Master Plan, these crossings will be elevated approximately six inches so pedestrians have a continuous, curbless, accessible path along the Mall. Buses will circulate between Martin Luther King Jr. Boulevard and 18th Street along a one-way southbound dedicated drop-off loop in front of the TSHM (Texas State History Museum). This route will be flush—not curbed—and defined by bollards to enhance its dual function as a pedestrian plaza. Bicycles riders will circulate along a shared lane on 18th Street.

Emergency vehicular access is described in the Fire Lane Access section of this report and access points to it will be defined by hydraulic or retractable bollards. Due to the potential for emergency and special event vehicles to access the paved and lawn areas of the Mall, much of the open space in the plan shall be structured to support vehicular loading.
Texas Mall and Garage (TXM)
Circulation

Pedestrian Circulation
Per the Master Plan, pedestrians shall enjoy continuous access along the Mall uninterrupted by curbs. The primary direction of travel is expected to be north-south along the Mall, which connects the University of Texas Austin Campus with the Capitol and downtown. Pedestrian access and entries to each of the existing and proposed buildings along the Mall will encourage its use as the primary north-south connector.

As noted in the Master Plan, mall paving shall be predominately Texas pink granite to match the Capitol building. Secondary mall paving shall be high quality pavement in keeping with the granite pavement within the existing Capitol complex.

Streetscape improvements along 18th, 17th, and 16th—including 15’ sidewalks paved with concrete unit pavers—will improve pedestrian comfort, and encourage use of each as east-west pedestrian corridors.
Texas Mall and Garage (TXM)
Grading Strategy

The grading of the Mall landscape will maintain the design intent of the Master Plan, meet existing grades at the project limit of work, and provide accessible connections to existing and proposed buildings. This diagram is intended to begin the coordination process between the finished floor elevations of proposed buildings and the Mall surface grades. Provides both accessible connections and surface drainage, and the subsurface garage and utilities.
Excavation activities for the proposed buildings, underground parking structures, and the Utility Tunnel and pathways of Phase 1 will require demolition of existing site elements, shown in red on this diagram. Hardscape and site elements beyond the proposed Phase 1 scope of work that are to be demolished—e.g., planters and terrace at William B. Travis (WBT), and paving and planters at TSHM (Texas State History Museum)—shall be rebuilt to match existing.
Texas Mall and Garage (TXM)
Landscape Framework

18th Street to Martin Luther King Jr. Boulevard Block

In accordance with the Master Plan’s principle of creating open space that is iconic and memorable and that reinforces the scale and importance of the Capitol of Texas, the defining element along all three blocks of the mall is the continuous central lawn, 50 feet wide, which provides an open view corridor to the Capitol building. The double allée that frames the lawn for much of its length terminates near the south end of this block, where the new cultural venue’s plaza opens up, picking up on the geometries of the Texas State History Museum (TSHM) plaza to the west and the Blanton plaza to the north, creating, in effect, one continuous culturally-oriented open space. The new plaza will contain an amphitheater, performance lawn, and spill out cafe seating associated with the new cultural venue. The bus drop-off route runs along the west side of the Mall, and is defined by bollards—rather than a typical street curb—to enhance the sense of this as a pedestrian environment. Monuments will be sited opposite the TSHM Lone Star sculpture and adjacent to the building’s southwest pedestrian entry. Integrated play elements may be incorporated at the northern end of the allée. A B-Cycle station is planned to be located along Martin Luther King Jr. Boulevard.
Precedent Images

1 - Similar to the performance lawn adjacent to the cultural venue at the 1801 Congress Building, the lawn panel at Schenley Plaza accommodates an informal audience for musical performances.

2 - A raised speed table with patterned pavement helps to delineate a pedestrian crossing zone along the Boston Greenway. A similar approach could be used at the Martin Luther King Jr. Boulevard pedestrian crossing between the Mall and the UT campus.

3 - The tilted lawn at Lincoln Center serves both as a green roof and as a seating area overlooking the plaza.

4 - An occupiable grove populated with sculptural benches and movable tables and chairs provides a shaded, social and human-scale seating area within the Lincoln Center Plaza. A similar approach could be taken for the tree groves around the 1801 Congress plaza.
Texas Mall and Garage (TXM)
Landscape Framework

17th to 18th Street Block
This stretch of the Mall, where the Stephen F. Austin and William B. Travis Buildings face each other, consists of a single continuous panel of lawn, suitable for passive use and flexible programming. The defining allée of live oaks breaks at and defines the entry stair for the Stephen F. Austin Building to the west. Pedestrian connections through the allée on the east side connect to William B. Travis Building points of entry. Bicycle parking is located along 18th Street on the north ends of the allée. Integrated play elements are tucked into the east and west sides of the allée, creating moments of interest along the primary pedestrian corridor. Monuments are to be located off the central mall, within the forecourts of proposed buildings. Exact numbers and locations will be developed though the concept phase of the project.
Precedent Images

1 - The central lawn panel can accommodate large events, similar to this outdoor fitness class on Boston’s Rose Kennedy Greenway.

2 - Seating and sculptures within a young tree grove at Klyde Warren Park.

3 - Benches and other amenities will line the Mall tree allée, as at Discovery Green.

4 - Shaded seating will be similar to that in the Brochstein Pavilion.

1 Boston Greenway Lawn, Boston, MA

2 Jane’s Lane at Klyde Warren Park, Dallas, TX

3 Live Oak Tree Allée at Discovery Green, Houston, TX

4 Brochstein Pavilion landscape, Rice University, Houston, TX
Texas Mall and Garage (TXM)
Landscape Framework

16th to 1st Street Block
The southernmost block of the Phase 1 Mall also consists of a single continuous panel of lawn. Given the slope of the grade here, from south to north, as well as the break in 17th Street created by the proposed garage entries, this is an ideal location for an event lawn, capable of holding up to 500 people, and an event plaza suited for holding a stage. The allée breaks at and defines the entry to the Catholic Diocese Chancery building on the west and proposed main Garage entries to the 1601 Congress Building on the east. Monument spaces are planned for in the forecourt areas of both the 1601 Congress Building and the Phase 3 building, where a public play area is also planned. Private play areas associated with the 1601 Congress Building state employees’ child care facility flank the building, along with a dining terrace to the north. Bicycle parking is located along 16th Street to the east and west of the central event lawn. Again, integrated play elements are tucked into the east and west sides of the allée, creating moments of interest along the primary pedestrian corridor.
Precedent Images

1 - There is an opportunity to provide shaded seating areas on the raised terrace along the 1601 Congress building overlooking the Mall, such as the Grove Restaurant terrace at Discovery Green.

2 - A transparent facade animates the landscape at the Grove Restaurant terrace at Discovery Green.

3 - Publicly accessible play elements integrated into the landscape at the Boston Children’s Museum include a maze, boulder park, pyramid, milk bottle-shaped food pavilion, and nature walk. A similar play landscape could be developed adjacent to the Phase 3 building between 16th and 17th Streets.

4 - Play elements, similar to the sound sculptures at Discovery Green, can be integrated into the tree allées lining the Mall.
Texas Mall and Garage (TXM)

Programming

Events - Texas Book Festival
Per the Master Plan, the Mall—and on occasion, adjacent streets—shall comfortably accommodate regular programming and major events for the public, such as the Texas Book Festival. In this diagram, the quantity and size of tents required for the annual event have been laid out in the proposed space, while still allowing clear corridors for service and emergency access, pedestrian movement, and flexible green open space. Utility hookups, including power and water, shall be provided along the mall in locations that accommodate events such as the Texas Book Festival. Temporary closure of east-west streets adjacent to the Mall provide additional space for portable toilets and tents as needed.

Statistics
- # of People: 40,000
- Festival Tents
  - Small: 20
  - Medium: 3
  - Large: 8
  - X-Large: 4
Texas Mall and Garage (TXM) Programming

Play + Monument Strategy
In keeping with the Master Plan’s goal of creating a destination that celebrates the Texas State Capitol and is symbolic of the great State of Texas, the Mall will accommodate both elements of play and historic and other interpretive monuments.

Code-compliant enclosed areas treated with play surfacing will be provided both for dedicated private use by the complex’s state employees’ child care facility, and for public use, in the buffer zone adjacent to Phase 3 future improvements.

In addition to these concentrated play areas, there will be distributed elements of play integrated throughout the Mall’s grand allée. Such elements will be of a civic scale and character befitting the grounds of the State Capitol.

Monuments that celebrate the history of Texas will be located just off the Mall, in forecourts of the proposed buildings. Exact numbers and locations will be developed through the Concept Phase of the project.
Texas Mall and Garage (TXM)

Lighting Strategy

Per the 2016 Master Plan, site lighting shall be compatible with the lighting of the existing Capitol grounds. Light sources shall be energy efficient, such as light emitting diode (LED) lamps, and shall comply with dark-sky principles to minimize glare and light pollution (per International Dark-Sky Association). Light sources shall be shielded and shall be white in color.

Cam-lock connectors shall be located along the mall for event electrical service. Two connectors, flush with the paving, shall be provided on each side of every block.

Light fixtures on 16th, 17th, 18th and Martin Luther King Jr. Boulevard shall have a maximum height of twenty feet.

Light fixtures for pedestrian areas shall be pole-top luminaires with a maximum height of fifteen feet. Light fixtures shall line both sides of the mall in alignment with the inner row of live oaks. The light fixtures employed on 15th Street shall match those along the Mall.

It is anticipated that landscape areas may employ additional light fixtures, whether building-mounted fixtures at building entrances, on roof terraces, or in gathering areas adjacent to building facades or accent lighting integrated into site furnishings and planting zones.
Texas Mall and Garage (TXM)
Lighting Strategy

Texas Mall and Garage (TXM)

Lighting Strategy

Existing building
Phase 1 building
Phase 2 or 3 building
Limit of work

15' max pole mounted lights spacing 20'-25' on center
20' max pole mounted lights spacing 50' on center
Accent lighting integrated into site furnishings and planting zones
Texas Mall and Garage (TXM)

Site Furnishing Strategy

Per the 2016 Master Plan, the Texas Mall and 15th Street site furnishings shall be compatible with the site furnishings of the existing Capitol Complex, and may include:

- Benches along both sides of the mall at appropriate locations
- Trash and recycling receptacles
- Drinking fountains
- Tree grates or guards where trees are planted in paving
- Wayfinding signage
- Bicycle racks located on cross streets at appropriate intervals

Drinking fountains, tree guards, and other furnishings that do not exist on the Capitol grounds shall be similar in character, color, and finish. Tree grates shall be a minimum of four feet by four feet in size, with four feet by six feet preferable.

Streetscape Furnishings on all other complex streets should be more contemporary and different in color than the historic streetscape elements on the mall and 15th Street. They should be readily available from established manufacturers. Specific characteristics should include:

- Seating should be user-friendly but not encourage long-term use and sleeping
- Trash receptacles should be provided at two diagonally opposite corners of each intersection in areas with high pedestrian circulation
- Recycling options should be provided
- Bicycle racks should be placed in the Curb Zone such that locked bicycles do not obstruct the sidewalk pedestrian path of travel. Where possible, secure bicycles shall be provided near entrances to garages, elevator entrances or stairs
- Tree grates should be provided for all new trees that are located in paved pedestrian areas in order to increase the usable sidewalk area and protect the tree’s roots
- All tree grates shall meet American with Disabilities Act (ADA) and Texas Accessibility Standard (TAS) accessibility standards
- Tree guards should be installed on all new trees in heavy pedestrian areas
- Tree guards should be strong and durable, appropriately sized to avoid damage to the tree as it reaches maturity, and compatible with the design of the tree grate
- The Master Plan proposes transit shelters throughout the larger district, however Phase 1 does not include any shelters within our limit of work. Later phases of work should include transit shelters at bus transit stops to the extent feasible and coordinated with CapMetro

Shelter facilities may include the following features:

- Shelter from wind and rain
- Seating
- Lighting
- Information related to area wide wayfinding, transit routes, scheduling, and costs
- Transparent design to allow users to be visible from the surrounding streets and to feel secure
- Construction and siting to minimize visual obstruction of adjacent businesses
- ADA- and TAS-compliant, both in design and siting
- Compatible with the character of the street and surrounding built environment
Texas Mall and Garage (TXM)

Site Furnishing Strategy

- Existing building
- Phase 1 building
- Phase 2 or 3 building
- Limit of work
- Extents of underground parking

- Bike Parking Zone
- Amenity Zone (Benches/Drinking Fountains/Trash and Recycling)
- Movable Site Furnishings
- Amphitheater Seating
- Play Equipment/Landscape

- B-Cycle Station

WILLIAM B. TRAVIS BUILDING
STEPHEN F. AUSTIN BUILDING
TEXAS STATE HISTORY MUSEUM
1801 CONGRESS
LYndon B. johnson state office building
Robert E. johnson building
TEXAS MALL AND GARAGE (TXM)

TCC Phase 1 Pre-Conceptual Design Report
Texas Facilities Commission

Volume 3
Pre-Conceptual Design Analysis
Landscape
Texas Mall and Garage (TXM)
Planting Areas

Lawn and Tree Allée
The planting design for the Mall defines a central open lawn panel that visually connects from the Capitol grounds to the University of Texas at Austin campus. This event lawn is framed by a double allée of live oak trees. The live oak allée will be underplanted with native, shade-tolerant ground covers.

Perennial, Shrub and Understory Tree Areas
The areas adjacent to the buildings lining the Mall will be planted with a resilient mix of native perennials, shrubs, and understory trees. The design of these secondary landscapes should support and relate to the programs within those facilities.

Green Roofs
The 1801 Congress and the 1601 Congress Building roofs include areas designed as green roofs. The 1801 Congress Building includes both an intensive green roof, partially accessible to building occupants, and two extensive non-accessible green roofs. The 1601 Congress Building includes one non-accessible extensive green roof.
Texas Mall and Garage (TXM)

Soil Depth

Soil depths above the underground structures are planned to correspond to the planting areas described above with adequate volumes of growing media for each type of planting to thrive over the life of the project. The Lawn area will have a one-foot soil depth; the Tree Allée area will have a six-foot soil depth; the Perennial, Shrub and Understory Tree areas will have three-foot soil depth.
Texas Mall and Garage (TXM)  
Trees

Excavation activities for the proposed buildings, underground parking structures, and the Utility Tunnel and pathways of Phase 1 will require the removal of existing trees both in and near the extents of underground parking, as shown in dark red. A tree’s root system tends to mirror the size of the canopy, shown accurately in this diagram, so those on the edge of the future structure will be impacted and unable to be preserved. Tree protection measures, including fences at driplines, will be required to preserve the trees shown to be retained during construction activities.

TREE LEGEND
1-3 Lagerstroemia (Crape Myrtle)  
4-7 Taxodium distichum (Bald Cypress)  
8-11 Dermatophyllum secundiflorum (Mt Laurel)  
12-13 Quercus virginiana (Live Oak)  
14-18 Magnolia (Magnolia)  
19-20 Ulmus americana (Elm)  
21 Quercus virginiana (Live Oak)  
22 Lagerstroemia (Crape Myrtle)  
23-25 Pinus (Pine)  
26-27 Quercus virginiana (Live Oak)  
28-31 Quercus Laceyi (Lacey Oak)  
32 Quercus virginiana (Live Oak)  
33 Carya illinoinensis (Pecan)  
34 Quercus virginiana (Live Oak)  
35-54 Ulmus crassifolia (Cedar Elm)  
55 Quercus virginiana (Live Oak)  
56 Ilex vomitoria (Yaupon)  
57 Carya illinoinensis (Pecan)  
58 Ulmus crassifolia (Cedar Elm)  
59 Ulmus americana (Elm)  
60 Ulmus crassifolia (Cedar Elm)  
61 Ulmus americana (Elm)  
62 Quercus shumardii (Red Oak)  
63 Ulmus crassifolia (Cedar Elm)
Texas Mall and Garage (TXM) Trees

Per the Master Plan, a staggered double allée of live oak trees will frame the Mall, and views to and from the Capitol, while east-west streets will be planted with red oaks, and north-south streets outside of the mall will be planted with cedar elms. Tree spacing details for the live oaks follow in a later section of this report. Street tree spacing on other streets shall not exceed fifty feet on center, and where space permits, trees shall be planted in a double row, as per the Master Plan.
Texas Mall and Garage (TXM)
Planting - Mall Allée Tree Spacing

1. Plan view of live oak allée tree spacing - At installation
2. Plan view of live oak allée tree spacing - At 20 years
3. Plan view of live oak allée tree spacing - At 100 years
4. Section of live oak allée - At installation
Many factors, including availability of water and nutrients, compaction, and soil volume contribute to a tree’s longevity and size at maturity. As a rule of thumb, tree trunk and canopy diameters at maturity can be roughly calculated in proportion to soil volume provided per tree (approximately 1 cubic feet of soil : 0.016” Trunk Diameter).

At 4 ft deep, spacing at right results in 2260 cubic feet of soil per tree, which will allow an approximately 36in diameter trunk, equivalent to an approximate 68ft canopy diameter. At 6 ft deep, spacing at right results in 3390 cubic feet of soil per tree, which will allow an approximately 54in diameter trunk, equivalent to an approximately 100 ft canopy diameter, the full potential canopy of a live oak tree.

In addition to providing optimal soil volume per tree, a 6 ft planting depth allows for the retention of additional moisture in the soil, providing stormwater management benefits, and reducing heat island effect.

Most absorbing roots are in the upper few inches of soil. The root systems of trees are quite shallow, and they spread well beyond the dripline when unrestricted. To provide additional horizontal area for the live oak tree roots, the tree planting section can be extended below the adjacent Mall walkway pavement, as specified in the Master Plan. Structural soil or a suspended pavement system would be used under the walkways.

Tree roots will be planted 5’ from path edge to ensure healthy growth of tree roots and to prevent conflicts with pavements. Pathways will be constructed on slab structure to meet firelane requirements, which will protect the pavements above.
Species: Quercus virginiana (live oak)
Mature Height: 40-80 ft
Mature Spread: 60-100 ft
Planting Size: 5.5" caliper, container grown

Notes: Trees to be locally grown (from an area that extends from San Antonio to Waco and from Interstate 35 to Uvalde) in an alkaline soil and water environment for a minimum of five years.

Consideration should be made of contract growing recommended tree species to ensure adequate quantity and quality of specimens at implementation.
Texas Mall and Garage (TXM)
Planting Details on Structure

EXTENSIVE GREEN ROOF PLANTING DETAIL (TYP.)

INTENSIVE GREEN ROOF PLANTING DETAIL (TYP.)

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

Texas Facilities Commission

TCC Phase 1 Pre-Conceptual Design Report
Volume 3
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Landscape
Texas Mall and Garage (TXM) Green Roof Strategies

1 - A recently installed extensive green roof next door at the University of Texas at Austin. Extensive green roofs require a minimal soil profile and are accessible for maintenance only.

2 & 4 - Intensive green roofs are accessible and may include areas with pavement or decking, guard rails, site furnishings, lighting and shade structures. Deeper soil profiles, up to three feet, allow for varied plantings.

3 - The soil medium and planting palette of red yucca (Hesperaloe parviflora) and spineless prickly pear (Opuntia ellisiana) on this extensive green roof are designed for hot, windy and dry rooftop conditions in Austin. A geofiber grid protects the soil from wind at installation.
Texas Mall and Garage (TXM)
Soil Depths

The majority of the Mall landscape is located above the parking garage structure. Coordination between garage slab elevations and surface grades is required to ensure a high quality landscape while minimizing structural loads. The planting details on the previous pages describe minimum planting depths required to support the different planting typologies shown in the planting plan.

The Mall live oak tree allees will be planted in a continuous trench of six foot deep minimum soil that will extend below the adjacent walkway to provide additional soil volume to support tree success. As described in the Master Plan, in order for trees to be able to take advantage of the additional soil volume beneath paving, structural soil, silva cells, or some other suspended paving system will be required to support vehicular loading of the Mall paving, without compressing tree roots.

The perennial, shrub and understory tree planting areas will be planted in three feet minimum of soil.

The event lawn requires less than one foot of soil depth. It is anticipated that the top of the garage slab may step up at column lines in areas where a deeper soil profile is not required to support planting above, such as below the event lawn. As shown in the planting detail, the soil profile for lawns will include geofibers for reinforcing so that lawns can withstand the occasional travel by emergency or event-related vehicles.

Additional factors will create variations in soil profile depth above the garage in certain areas. Surface grade will slope across the site to meet existing grade at the project limit of work, and to provide accessible connections at building entrances and throughout the Mall pedestrian landscape. Soil depths in some areas may also be deeper to accommodate utility crossings.
Texas Mall and Garage (TXM)

Soil Depths
Texas Mall and Garage (TXM)
Soil Depths
Texas Mall and Garage (TXM)

Soil Depths

Texas Mall and Garage (TXM)

Soil Depths

Mall Section - Planting Soil Depths
Texas Mall and Garage (TXM)

Soil Depths
Texas Mall and Garage (TXM)

Irrigation

Irrigation Strategies
The need for irrigation will be minimized through the use of native and adapted plant species. Irrigation shall be provided within all planting areas, including at green roofs. For tree, shrub and perennial planting areas, a water-efficient system (e.g., drip irrigation systems and bubblers at trees) will be used. Green roofs will also employ drip irrigation. Turf grass will be irrigated with a rotary system.

Site irrigation shall use reclaimed water to the greatest practical extent. Options for sources of reclaimed water may include the use of captured and stored stormwater runoff and/or, the City of Austin “Purple Pipe” reclaimed water system or mechanical condensate.

The table below estimates irrigation demand for the site. The numbers are based on the LEED irrigation method and evapotranspiration rates for Austin. We assume we will be irrigating about 9-10 months a year (all months other than January and February). For the peak month (August), overall irrigation demand would be around 520,800 gallons of water.

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<th>Month</th>
<th>Monthly Evapotranspiration Rate* (ET) [in/mo]</th>
<th>Unit Irrigation Rate [gal/in Eto]</th>
<th>Monthly Water Applied [gal/mo]</th>
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<td>Annual</td>
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Option 1 - Garage Blue Roof
A blue roof is a system for capturing and holding rainwater at the building roof structure as a means of reducing runoff rate and volume. This system can also be used to store rainwater for reuse as irrigation. Evaporation of the retained stormwater on the roof will cool and moisten planting soil above. The reservoir could be a gravel layer or a lightweight structural system, such as Hydrotech’s Permavoid, which provides 95% void space.

Option 2 - Stormwater Cisterns
Capture and store stormwater in cisterns within garage or buildings or in building service areas. Recycle stored stormwater as irrigation to plantings.

Option 3 - Purple Pipe
Utilize the City of Austin’s reclaimed water system for irrigation.
Texas Mall and Garage (TXM)

Irrigation

- Drip irrigation at green roof
- Drip irrigation at planting area
- Rotary irrigation at lawn

Irrigation Areas

1801 CONGRESS
WILLIAM B. TRAVIS BUILDING
STEPHEN F. AUSTIN BUILDING
TEXAS STATE HISTORY MUSEUM

BRAZOS ST
LYndon Baines Johnson State Office Building
ROBERT E. JOHNSON BUILDING

WILLIAM B. TRAVIS BUILDING
1601 CONGRESS

Irrigation Areas

TEXAS MALL AND GARAGE (TXM)

1801 CONGRESS
WILLIAM B. TRAVIS BUILDING
STEPHEN F. AUSTIN BUILDING
TEXAS STATE HISTORY MUSEUM

BRAZOS ST
LYndon Baines Johnson State Office Building
ROBERT E. JOHNSON BUILDING

WILLIAM B. TRAVIS BUILDING
1601 CONGRESS

Irrigation Areas

TEXAS MALL AND GARAGE (TXM)

1801 CONGRESS
WILLIAM B. TRAVIS BUILDING
STEPHEN F. AUSTIN BUILDING
TEXAS STATE HISTORY MUSEUM

BRAZOS ST
LYndon Baines Johnson State Office Building
ROBERT E. JOHNSON BUILDING

WILLIAM B. TRAVIS BUILDING
1601 CONGRESS

Irrigation Areas
Texas Mall and Garage (TXM)

Planting

Tree Species per Master Plan

Mall Allée + Congress Avenue
Quercus virginiana (Live oak)
Possible cultivars: Highrise (‘QVTIA’) ideal selection for placement in restricted canopy areas
Mature Height: 40-80 ft
Mature Spread: 60-100 ft
Character:
picturesque horizontal habit
Maintenance:
spring leaf drop requires leaf pickup
Resilience:
moderately drought-tolerant once established
Issues:
Susceptible to Oak wilt, which can be avoided/managed through proper pruning and tree maintenance by certified arborist.

East-West Streets
Quercus shumardii (Red oak)
Mature Height: 50-70 ft
Mature Spread: 40-60 ft
Character:
large oval crown
Maintenance:
leaf drop can be left to self-compost
Resilience:
drought-tolerant, can handle poor soils
Issues:
Susceptible to Oak wilt, which can be avoided/managed through proper pruning and tree maintenance by certified arborist.

North-South Streets
Ulmus crassifolia (Cedar elm)
Mature Height: 50-90 ft
Mature Spread: 50-60 ft
Character:
pyramidal habit
Maintenance:
Resilience:
drought-resistant, can handle inundation
Issues:
susceptible to Dutch Elm Disease, but has more resistance than the American elm.
List of Recommended Plants

The plant list is intended to strengthen the resiliency of and ecosystem services provided by the Mall landscape. The plants on this list are all hardy in Austin, are reasonable to maintain (although maintenance requirements vary), are relatively free from chronic disease and pest problems, and most will not become pests themselves.

The list includes both native and introduced species, however, most of the plants are native to the Edward’s Plateau and Blackland Prairie bioregions. There are some conditions on the Mall where the types of uses will limit the ability to use native plants, such as in the heavily used Mall event lawn panels.

The plant list offers information on sun exposure, moisture needs, and general resiliency. Resiliency is based on the maintenance requirements and irrigation needs of each specific plant species. For example, a species with low water requirement and low maintenance requirements is labeled as HIGH resiliency.

This list was developed in partnership between the University of Texas at Austin, the Lady Bird Johnson Wildflower Center, and Sasaki Associates. In the next phase of work, the plant list will be reviewed for compliance with xeriscaping requirements issued pursuant to Texas Government Code section 2166.404. Plant species will be selected from this list for each planting area according to the design goals for that space.

<table>
<thead>
<tr>
<th>HABIT</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>HEIGHT</th>
<th>NATIVE</th>
<th>SOIL MOISTURE</th>
<th>LIGHT</th>
<th>WATER USE</th>
<th>RESILIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORB/HERB</td>
<td>Aquilegia canadensis</td>
<td>Wild red columbine</td>
<td>2 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☺ ☻</td>
<td>☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Argemone albiflora</td>
<td>White pricklypoppy</td>
<td>3-6 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Asclepias asperula</td>
<td>Antelope horns</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Asclepias tuberosa</td>
<td>Butterfly weed</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
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<tr>
<td>FORB/HERB</td>
<td>Asclepias viridis</td>
<td>Green milkweed</td>
<td>1-2 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Callicarpa involucrata</td>
<td>Winecup</td>
<td>0.5-1 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Calyptocarpus vialis</td>
<td>Horseherb</td>
<td>0.5-1 ft</td>
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<td>DRY - MOIST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Capsicum annuum</td>
<td>Chile pequin</td>
<td>1-2 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Castilleja indivisa</td>
<td>Indian paintbrush</td>
<td>0.5-1 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
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</tr>
<tr>
<td>FORB/HERB</td>
<td>Chamaecrista fasciculata</td>
<td>Partridge pea</td>
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<td>N</td>
<td>DRY - MOIST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Dalea diggi</td>
<td>Greg’s dalea</td>
<td>0.5-0.75 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
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<td>FORB/HERB</td>
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<td>Silver ponyfoot</td>
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<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Dietes bicolor</td>
<td>Bicolor iris</td>
<td>1.5 - 2 ft</td>
<td>MOST</td>
<td>☻</td>
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<tr>
<td>FORB/HERB</td>
<td>Echinacea purpurea</td>
<td>Purple coneflower</td>
<td>2-6 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Equisetum hyemale</td>
<td>Horsetail</td>
<td>3 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Gaillardia pulchella</td>
<td>Indian blanket</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Helianthus maximiliani</td>
<td>Maximilian sunflower</td>
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<td>DRY - MOIST</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
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<tr>
<td>FORB/HERB</td>
<td>Liatris mucronata</td>
<td>Gayfeather</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Linopis muscari</td>
<td>Lylurf</td>
<td>1-1.5 ft</td>
<td>MOST</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
<td></td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Lupinus texensis</td>
<td>Texas bluebonnet</td>
<td>0.5-1.5 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Monarda citriodora</td>
<td>Lemon bee balm</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Oenothera speciosa</td>
<td>Pink evening primrose</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Phyla nodiflora</td>
<td>Texas frog fruit</td>
<td>6-1 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Rudbeckia hirta</td>
<td>Black eyed Susan</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>HIGH</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Salvia farinacea</td>
<td>Mealy blue sage</td>
<td>2-3 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻</td>
<td>☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Salvia roemerianna</td>
<td>Cedar sage</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☻</td>
<td>☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Scutellaria ovata</td>
<td>Heartleaf skullcap</td>
<td>1-2 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>FORB/HERB</td>
<td>Stenotaphrum asiaticum</td>
<td>Asian jasmine</td>
<td>0.25 - 0.5 ft</td>
<td>N</td>
<td>MOST</td>
<td>☻ ☻</td>
<td>☻ ☻</td>
<td>MEDIUM</td>
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</table>
## Texas Mall and Garage (TXM)
### Planting

#### List of Recommended Plants

<table>
<thead>
<tr>
<th>HABIT</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>HEIGHT</th>
<th>NATIVE</th>
<th>SOIL MOISTURE</th>
<th>LIGHT</th>
<th>WATER USE</th>
<th>RESILIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORB</td>
<td>Tradescantia gigantea</td>
<td>Giant spiderwort</td>
<td>1-3 ft</td>
<td>N</td>
<td>MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Andropogon gerardii</td>
<td>Big bluestem</td>
<td>3-6 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Andropogon glomeratus</td>
<td>Bushy bluestem</td>
<td>2-5 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Aristida purpurea</td>
<td>Purple threeawn</td>
<td>1-2 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Bathochloa barbinodis</td>
<td>Cane bluestem</td>
<td>3-6 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Bouteloua curtipendula</td>
<td>Side oats grama</td>
<td>2-3 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Bouteloua dactyloides</td>
<td>Buffalograss</td>
<td>0.5-1 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Bouteloua gracilis</td>
<td>Blue grama</td>
<td>1-1.25 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Carex cherokeensis</td>
<td>Cherokee sedge</td>
<td>1-1.5 ft</td>
<td>N</td>
<td>MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Carex divulsa</td>
<td>Berkeley sedge</td>
<td>1-1.5 ft</td>
<td>N</td>
<td>MOST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Carex retroflexa</td>
<td>Reflected sedge</td>
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<td>N</td>
<td>DRY - MOIST</td>
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<td><img src="" alt=" " /></td>
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</tr>
<tr>
<td></td>
<td>Carex texensis</td>
<td>Texas sedge</td>
<td>0.75-1 ft</td>
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<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
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</tr>
<tr>
<td></td>
<td>Chasmanthium latifolium</td>
<td>Inland seaoats</td>
<td>2-4 ft</td>
<td>N</td>
<td>MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Cynodon dactylon</td>
<td>Bermudagrass (sterile)</td>
<td>0.25-0.5 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Elymus canadensis</td>
<td>Prairie wildrye</td>
<td>2-4 ft</td>
<td>N</td>
<td>MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Hilaria belangeri</td>
<td>Curly mesquite</td>
<td>0.25-1 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Leptochloa dubia</td>
<td>Green sprangletop</td>
<td>2-3 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Muhlenbergia capillaris</td>
<td>Gulf muhly</td>
<td>1.5-2 ft</td>
<td>N</td>
<td>MOST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Muhlenbergia dubia</td>
<td>Pine muhly</td>
<td>1.3 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Muhlenbergia lindheimeri</td>
<td>Big muhly</td>
<td>2-5 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Nassella leucotricha</td>
<td>Texas wintergrass</td>
<td>1-3 ft</td>
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<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Nolina texana</td>
<td>Texas beargrass</td>
<td>1-3 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
<tr>
<td></td>
<td>Panicum virgatum</td>
<td>Switchgrass (upland)</td>
<td>3-4 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
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<tr>
<td></td>
<td>Poa arachnifera</td>
<td>Texas bluegrass</td>
<td>1-2 ft</td>
<td>N</td>
<td>MOST</td>
<td><img src="" alt=" " /></td>
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<td></td>
<td>Schizachyrium scoparium</td>
<td>Little Bluestem</td>
<td>1.5-2 ft</td>
<td>N</td>
<td>DRY</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
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<tr>
<td></td>
<td>Sorghastrum nutans</td>
<td>Indian grass</td>
<td>3-4 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
<td><img src="" alt=" " /></td>
</tr>
</tbody>
</table>

#### Legend
- **Light**
  - ![ ]( ) Sun
  - ![ ]( ) Sun - part shade
  - ![ ]( ) Sun - part shade - shade
  - ![ ]( ) Part shade - shade

- **Water Use**
  - ![ ]( ) Low
  - ![ ]( ) Low-medium
  - ![ ]( ) Medium
  - ![ ]( ) High

---

This page contains the pre-conceptual design analysis for the landscape of the Texas Mall and Garage (TXM) project. The table lists recommended plants with their scientific names, common names, growing habits, native status, soil moisture requirements, light preferences, water use, and resilience. The legend at the bottom of the page categorizes the light and water use preferences. Further details about the landscape typologies are also provided, including the types of spaces they are suitable for, such as civic, street, courts/quads/plazas, connective space, parkland, service + parking, and Waller Creek. The TCC Phase 1 Pre-Conceptual Design Report from the Texas Facilities Commission serves as the source for this information.
## Pre-Conceptual Design Report
### Landscape

<table>
<thead>
<tr>
<th>HABIT</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>HEIGHT</th>
<th>NATIVE</th>
<th>SOIL MOISTURE</th>
<th>LIGHT</th>
<th>WATER USE</th>
<th>RESILIENCE</th>
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<tr>
<td><strong>GRASS</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tripsacum dactyloides</td>
<td>Eastern gamagrass</td>
<td>3-6 ft</td>
<td>N</td>
<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Zoysia sp.</td>
<td>Zoysia</td>
<td>0.25 ft</td>
<td>N</td>
<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>LOW</td>
</tr>
<tr>
<td><strong>FERN</strong></td>
<td>Thelypteris kunthii</td>
<td>Wood fern</td>
<td>2-3 ft</td>
<td>N</td>
<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td><strong>CACTUS/SUCULENT</strong></td>
<td>Hesperaloe parviflora</td>
<td>Red yucca</td>
<td>2-3 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>Opuntia ellisiana</td>
<td>Spineless prickly pear</td>
<td>3-4 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>Yucca palida</td>
<td>Pale-leaf yucca</td>
<td>2 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>Yucca rupicola</td>
<td>Twistleaf yucca</td>
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<td>DRY</td>
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<td>☀ ☀ ☀</td>
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<tr>
<td></td>
<td>Yucca treculeana</td>
<td>Spanish dagger</td>
<td>4-12 ft</td>
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<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
<td><strong>VINE</strong></td>
<td>Campsis radicans</td>
<td>Trumpet vine</td>
<td>35 ft</td>
<td>N</td>
<td>DRY - MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td>Ficus pumila</td>
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<td>15 ft</td>
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<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Gelsemium sempervirens</td>
<td>Carolina jessamine</td>
<td>10-20 ft</td>
<td>N</td>
<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Jasminum mesnyi</td>
<td>Japanese jasmine</td>
<td>5-10 ft</td>
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<td>MEDIUM</td>
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<tr>
<td></td>
<td>Parthenocissus quinquefolia</td>
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<td>40 ft</td>
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<td>MEDIUM</td>
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<td>Buxus sp.</td>
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<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Callicarpa americana</td>
<td>American beautyberry</td>
<td>3-4 ft</td>
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<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
<td></td>
<td>Dalea candida</td>
<td>White prairie clover</td>
<td>2-3 ft</td>
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<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
<td></td>
<td>Dasylirion wheeleri</td>
<td>Common sotol</td>
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<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
<td></td>
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<td>☀ ☀ ☀</td>
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<tr>
<td></td>
<td>Justicia spicigera</td>
<td>Mexican honeysuckle</td>
<td>3-4 ft</td>
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<td>MEDIUM</td>
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<tr>
<td></td>
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<td>Texas lantana</td>
<td>0.25 - 0.38 ft</td>
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<td>DRY</td>
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<td>☀ ☀ ☀</td>
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<tr>
<td></td>
<td>Leucocephalium frutescens</td>
<td>Senita</td>
<td>2.8 ft</td>
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<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Malvaviscus arboreus var. drummondii</td>
<td>Turk’s cap</td>
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<td>DRY - MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
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<tr>
<td></td>
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<td>Wax myrtle</td>
<td>6-12 ft</td>
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<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
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<tr>
<td></td>
<td>Nolina lindheimiana</td>
<td>Devil’s shoestring</td>
<td>1-3 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
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<td>Pavonia lasiopepala</td>
<td>Rock rose</td>
<td>4 ft</td>
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<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
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<tr>
<td></td>
<td>Sabal minor</td>
<td>Dwarf palmetto</td>
<td>5-10 ft</td>
<td>N</td>
<td>DRY - MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
</tr>
<tr>
<td></td>
<td>Salvia greggi</td>
<td>Autumn sage</td>
<td>2-3 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Sphaeralcea incana</td>
<td>Gray globemallow</td>
<td>3-4 ft</td>
<td>N</td>
<td>DRY - MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Symphoricarpos orbiculatus</td>
<td>Coralberry</td>
<td>4-6 ft</td>
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<td>MOST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
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**Legend**
- Light:
  - ☀: Sun
  - ☀ ☀: Sun - part shade
  - ☀ ☀ ☀: Part shade - shade
- Water Use:
  - ☐: Low
  - ☐ ☐: Low-medium
  - ☐ ☐ ☐: Medium
  - ☐ ☐ ☐ ☐: High
### Texas Mall and Garage (TXM)

#### Planting

<table>
<thead>
<tr>
<th>HABIT</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>HEIGHT</th>
<th>NATIVE</th>
<th>SOIL MOISTURE</th>
<th>LIGHT</th>
<th>WATER USE</th>
<th>RESILIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree/SHRUB</td>
<td>Acer grandidentatum</td>
<td>Bigtooth maple</td>
<td>10-15 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Aesculus pavia</td>
<td>Red buckeye</td>
<td>10-40 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Bauhinia lunarioides</td>
<td>Orchid tree</td>
<td>6-12 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Cercis canadensis var. mexicana</td>
<td>Mexican redbud</td>
<td>6-12 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Diospyros texana</td>
<td>Texas persimmon</td>
<td>15-15 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Ilex vomitoria</td>
<td>Yaupon holly</td>
<td>12-45 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Lagerstroemia indica</td>
<td>Crepe myrtle</td>
<td>4-12 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Senna corymbosa</td>
<td>Flowering senna</td>
<td>4-8 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Sophora secundiflora</td>
<td>Texas mountain laurel</td>
<td>10-15 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Ungnadia speciosa</td>
<td>Mexican buckeye</td>
<td>8-12 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td>Tree</td>
<td>Acacia farnesiana</td>
<td>Huisache</td>
<td>15-25 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Aesculus glabra var. arguta</td>
<td>Texas buckeye</td>
<td>10-25 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Carya illinoinensis</td>
<td>Pecan</td>
<td>70-100 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Celtis laevigata</td>
<td>Hackberry</td>
<td>40-60 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Chilopsis linearis</td>
<td>Desert willow</td>
<td>15-40 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Cornus drummondii</td>
<td>Roughleaf dogwood</td>
<td>16 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Cotinus obovatus</td>
<td>American smoke tree</td>
<td>15-30 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
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<td>Fraxinus albicans</td>
<td>Texas ash</td>
<td>30-45 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Hesperocyparis arizonica</td>
<td>Arizona cypress</td>
<td>50-60 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Juglans nigra</td>
<td>Walnut</td>
<td>50-75 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
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<td>Platanus mexicana</td>
<td>Mexican sycamore</td>
<td>50 ft</td>
<td>N</td>
<td>MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
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<td>Prosopis glandulosa</td>
<td>Mesquite</td>
<td>30 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
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<td>Prunus mexicana</td>
<td>Mexican plum</td>
<td>15-35 ft</td>
<td>N</td>
<td>DRY - MOIST</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td></td>
<td>Quercus buckleyi</td>
<td>Texas red oak</td>
<td>50 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td></td>
<td>Quercus fusiformis</td>
<td>Escarpment live oak</td>
<td>20-40 ft</td>
<td>N</td>
<td>DRY</td>
<td>![ ]</td>
<td>![ ]</td>
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**Legend**

- **Light**
  - ![ ]: Sun
  - ![ ]: Sun - part shade
  - ![ ]: Sun - part shade - shade
  - ![ ]: Part shade - shade

- **Water Use**
  - ![ ]: Low
  - ![ ]: Low-medium
  - ![ ]: Medium
  - ![ ]: High
## Texas Mall and Garage (TXM)

### Planting

<table>
<thead>
<tr>
<th>HABIT</th>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>HEIGHT</th>
<th>NATIVE</th>
<th>SOIL MOISTURE</th>
<th>LIGHT</th>
<th>WATER USE</th>
<th>RESILIENCE</th>
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<tbody>
<tr>
<td>Tree</td>
<td>Quercus laceyi</td>
<td>Lacey oak</td>
<td>60 ft</td>
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<td>DRY</td>
<td>☀</td>
<td>☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Quercus macrocarpa</td>
<td>Bur oak</td>
<td>72-100 ft</td>
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<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Quercus muehlenbergii</td>
<td>Chinkapin oak</td>
<td>72-100 ft</td>
<td>N</td>
<td>DRY</td>
<td>☀</td>
<td>☀ ☀</td>
<td>MEDIUM</td>
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<tr>
<td></td>
<td>Quercus nigra</td>
<td>Water oak</td>
<td>50-100 ft</td>
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<td>MOIST</td>
<td>☀ ☀ ☀</td>
<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
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<tr>
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<td>Quercus polymorpha</td>
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<td>80 ft</td>
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<td>MOIST</td>
<td>☀</td>
<td>☀ ☀ ☀</td>
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<td>Quercus shumardii</td>
<td>Shumard oak</td>
<td>50-90 ft</td>
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<td>☀ ☀ ☀</td>
<td>MEDIUM</td>
</tr>
<tr>
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<td>Quercus sinuata var. breviloba</td>
<td>White shin oak</td>
<td>36-72 ft</td>
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<td>DRY</td>
<td>☀</td>
<td>☀ ☀ ☀</td>
<td>HIGH</td>
</tr>
<tr>
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<td>Quercus stellata</td>
<td>Post oak</td>
<td>40-50 ft</td>
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<td>MEDIUM</td>
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<tr>
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<td>Quercus virginiana</td>
<td>Southern live oak</td>
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<td>MEDIUM</td>
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<tr>
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<td>Rhus lanceolata</td>
<td>Flame-leaf sumac</td>
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<td>☁ ☁ ☁</td>
<td>MEDIUM</td>
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<tr>
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<td>Sabal mexicana</td>
<td>Texas palm</td>
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<td>MEDIUM</td>
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<tr>
<td></td>
<td>Styphnolobium affine</td>
<td>Eve’s necklace</td>
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<td>☁ ☁ ☁</td>
<td>MEDIUM</td>
</tr>
<tr>
<td></td>
<td>Taxodium distichum</td>
<td>Bald cypress</td>
<td>50-75 ft</td>
<td>N</td>
<td>MOIST</td>
<td>☁ ☁ ☁</td>
<td>☁ ☁ ☁</td>
<td>MEDIUM</td>
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<tr>
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<td>Taxodium mucronatum</td>
<td>Montezuma cypress</td>
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<td>MEDIUM</td>
</tr>
<tr>
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<td>Ulmus americana</td>
<td>American elm</td>
<td>60-80 ft</td>
<td>N</td>
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<td>☁ ☁ ☁</td>
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<tr>
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<td>Ulmus crassifolia</td>
<td>Cedar elm</td>
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<td>Ulmus parvifolia</td>
<td>Lacebark elm</td>
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</tr>
<tr>
<td></td>
<td>Viburnum rufidulum</td>
<td>Rusty blackhaw</td>
<td>18 ft</td>
<td>N</td>
<td>DRY</td>
<td>☁ ☁ ☁</td>
<td>☁ ☁ ☁</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

**Legend**

- **Light**
  - ☀ ▁ ☁: Sun
  - ☁ ▁ ☁: Sun - part shade
  - ▁ ☁ ☁: Sun - part shade - shade
  - ☁ ☁ ☁: Part shade - shade

- **Water Use**
  - ▁: Low
  - ☁: Low-medium
  - ☁ ☁: Medium
  - ☁ ☁ ☁: High

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List of Recommended Plants
3.3 Pre-Conceptual Design Analysis

Architecture
Excavation

Description of Work

One of the first major construction activities on site will be to excavate the entire footprint of the Underground Parking Garage, which also includes the sites for the 1801 Congress Building and the 1601 Congress Building. At this time, pertinent geotechnical data is being gathered that will provide more information on subsurface conditions. The exact profile of the subsurface rock strata is to be determined based on these borings and other geotechnical information.

Based on current BIM (Building Information Modeling) model estimates, it is anticipated that approximately 130,000 cubic feet (4,800 cubic yards) of material will be removed from the site during excavation activities. This estimate should not be used for any contractual purposes or cost estimating and is provided here for reference and information only.

While the OPR describes excluding the use of blindside waterproofing to protect basement walls, it is expected that blindside waterproofing will be accepted by TFC given the potential project benefits (as described in the Structural section of this report). Accordingly, the area of excavation shown in the Limit of Excavation diagram describes a limit of excavation that is tight to the perimeter walls.

In addition to the area required to excavate for the full depth of the parking garage, the 17th Street parking garage entrance ramps will also require excavation for the lengths and areas described here. The ramps will descend from undisturbed street grade to the B2 Level of the garage.

Efforts shall be made to mitigate disruption during construction to adjacent building uses and structures during construction, especially at the TSHM (Texas State History Museum), which could experience disruption to daily activities and revenue if not properly planned for. Refer to the Civil and Structural sections of this report for more information on potential impacts and monitoring measures that shall be put in place to limit the impact to adjacent sites.

Limit of Excavation

Refer to the Limit of Excavation diagram which illustrates and helps define the scope of work required for the Package 1 Excavation efforts. Note that the scope of work to excavate the Utility Tunnel will be performed under Package 2 Central Utility Plant and Tunnel (CUP).
Excavation
Sustainability

Materials
Pending the evaluation of the quality of excavated subsurface rock, which is anticipated to contain large amounts of limestone, the potential for repurposing includes limestone portland cement (LPC) replacement for portland cement. LPC is classified as Type 1L cement in the Portland Cement Association’s (PCA) standard and can contain up to 15% limestone. In an effort to reduce concrete construction’s carbon footprint and greenhouse gas emissions, the production of LPC releases 10% less CO$_2$ into the environment than traditional portland cement. This strategy could also result in reduced haul-off resources, depending on the location of the concrete plant. The Master A/E and CM Agent Team will continue to evaluate this during the Concept Design phase and provide a final recommendation.

Select veins of high-quality rock could also be retained and selected for reuse in various landscape site features for this project or other TFC State-funded projects.
Site Utilities

General

The scope of work for site utilities is documented in Volume 2 of this report.
Central Utility Plant & Tunnel (CUP) Building Data

Central Utility Plant
The Central Utility Plant building and cooling tower enclosure project site is bounded by 14th Street to the north, San Jacinto Blvd to the east. The west and south faces are adjacent to the Sam Houston Building. The CUP is sited on the northeast corner of an existing Capitol Complex utility plant next to the Sam Houston Building. While only rising 54 feet from the existing plant surface elevation, the building will extend 24 feet or one level below grade and requires excavating a substantial portion of the site to facilitate construction of the lower level, while minimizing disruption to the existing plant functions and systems. Refer to the Volume 2 and Civil sections of this report for more information regarding the building layout, as well as the district-wide systems, services, and utilities provided in the CUP.

Per the latest engineering design options, the CUP will likely have a footprint of approximately 150 feet by 105 feet (15,750 GSF per level) and require two full enclosed levels, resulting in a current GSF area of 31,500. As noted in the Compliance & Coordination section, the current footprint is being reviewed alongside existing site conditions and might possibly be reduced in size or change in shape. An updated design will be provided for review in early Concept Design.

Tunnel
In order to provide new efficient sources of building cooling, the construction of a new tunnel will be required to link the services from the Central Utility Plant to the Phase 1 buildings to the north. This tunnel will also provide the pathway to link future Phase 2 and 3 buildings, as well as select existing buildings, back to a planned chilled water loop. The tunnel routing will take the most direct feasible path to connect to the southwest corner of 1801 Congress Building site. While the pathway shown here provides the ability to construct the tunnel separately from other Packages in order to provide early chilled water, alternate pathways that route the services inside the garage structure - starting from the southwest corner of the Congress Building and terminating at the southwest corner of 1801 Congress Building - are being studied for feasibility, cost, and schedule.

It is expected that the majority of the tunnel will be constructed using open trench methods. However, due to considerable existing subsurface utilities located just below grade and potential issues obtaining approvals for street closures at 15th Street, it is expected that the portion of tunnel below 15th Street and extending some distance north and south will require tunneling methods to construct. Refer to the Volume 2 and Civil sections of this report for more information regarding the tunnel configuration, as well as the district-wide systems, services, and utilities provided in the tunnel.

As currently planned, the Utility Tunnel is approximately 2,300 linear feet in length as it connects the CUP with the southeast corner of 1801 Congress Building. Refer to the Mechanical section of this Report for more information on the sectional dimensions of the tunnel and for more information on the infrastructural systems contained within.

Central Utility Plant & Tunnel (CUP) Drawings

Project Configuration
To develop the physical design project configuration, several diagrams and drawings were created to study various conditions and potential options. The intent of these drawings is to capture current design thinking and decisions arrived at through consensus building with stakeholder groups during the Design Workshop presentations. The next phase of project development will continue to refine the project drawings, including further coordination with required program and service areas, multi-disciplinary coordination, and other factors influencing the physical design project configuration.

Refer to the Appendices section of this report for a sheet list of 30" x 42" drawings available per Package. These drawings are to scale and should be referenced to provide additional information on project configuration and scope.
Central Utility Plant & Tunnel (CUP)
Drawings
Central Utility Plant & Tunnel (CUP) Drawings

CUP - SITE SECTIONS - TUNNEL

10th Street       REJ       15th Street       14th Street       SHB

SCALE: 1" = 30'-0"

CUP - TUNNEL SECT NO. 35
Central Utility Plant & Tunnel (CUP)
Architectural Design

Massing
The Central Utility Plant’s massing will closely match the envelope required for enclosing and screening the required utility and mechanical systems equipment it is planned to house. Alignments to existing site features, such as site retaining walls, loading dock ramps, and other existing smaller site structures, will be taken under consideration as the footprint of the structure is further developed.

The site is constrained by two Capitol View Corridors (CVC) which will need to be closely monitored as the height of the building responds to the height of the cooling towers. Refer to the architectural elevations which indicate the relative impact of the CVCs on the proposed massing.

Tunnel Routing
The current plan for the tunnel routing is indicated in the Civil section of this report, which also describes adjacent site impacts that should be considered. Prior to the publication of this report, a secondary option is being discussed which would limit the scope of the tunnel to south of 16th Street. The remaining run of chilled water piping would be included in the underground parking garages in other packages. The Master A/E Design Team will continue to evaluate this option and propose recommendations as early as possible during the next phase of project development.

Building Edge
Per the Master Plan, this area of the Capitol Complex specifically does not contain any prescribed build-to lines or building edges, but will be developed based on best practices for alignment with adjacent structures and streetscapes.

Building Materials
Per the Master Plan, the west side of San Jacinto Boulevard is designated as primarily granite for building facades, whereas the short block of 14th Street as primarily other material. In order to create a cohesive architectural design, it is intended to use primarily granite for all faces of the CUP’s building façade. Careful attention will be made to select a granite material that is very compatible with the adjacent Sam Houston Building.

The west façade, which faces the Sam Houston Building in close proximity and will not be outwardly visible from adjacent buildings, streets, or sidewalks, could potentially be clad in another less-expensive yet durable material, such as metal. Acceptable metals would include zinc or copper.

Whether granite or metal, open joint rain screen cladding principles will be utilized where practical with continuous insulation outboard of the wall cavity. Insulation thicknesses and values will be determined through performance energy modeling in order to meet and/or exceed the performance goals required by code.

Durability and Lifespan
As referenced in the adopted OPR, building elements in the CUP will be required to fall into the required design life span categories, including roofing which will also be impacted by the cooling equipment above. In order to meet those guidelines, it is anticipated that modified bitumen roofing will be recommended as the typical roofing assembly.

The structure of the tall parapet walls screening the cooling towers shall be designed to mitigate excessive movement that might cause cracking or other deleterious effects on the predominantly masonry cladding.

Screen Service Areas
According to the Master Plan, the existing Central Plant areas do not adequately screen equipment and service areas and are currently used as a negative example, due to the lack of height in walls to hide equipment and insufficient height in plantings to minimize visual impact from the pedestrian level. For the Central Utility Plant in Phase 1, all equipment will be contained within the building’s enclosure or will be screened with tall parapet walls. Additional site or landscape measures will be evaluated as the footprint and equipment layout of the design progresses.

By providing a tunnel to carry vital infrastructure to additional buildings in the northern part of the Complex, the design avoids unsightly elevated pathways or crossings at streets and walkways.

Fabric and Focus
The existing Sam Houston Building has been identified as a Fabric building and the new CUP Building will also play a supporting role within the Complex. Specifically, the façade will be designed to take cues from the Sam Houston Building so that it is properly integrated into the context.
Central Utility Plant & Tunnel (CUP) Sustainability

General
According to the requirements set forth in the OPR, no certification or rating system is required by code, mandate, or other external arrangement. As a State-funded building project, the design is required to follow the State Energy Conservation Office’s (SECO) guidelines for energy conservation, water conservation, and storm water management.

The design will also be reviewed and assessed for potential impacts the project may have on the surrounding site and amenities. Concept Design will determine if opportunities exist to promote additional program amenities or design features to improve the overall surrounding Complex and community.

Resilient Design
Given the project location in Austin, Texas, certain site risk factors should be taken into consideration, including increased storm power and frequency, tornadoes, and drought. Per the OPR, this project is intended to have a useful life span well into the 50 to 100 year time frame. Incorporating resilient design strategies can help to complement the building element selections to help ensure this time frame.

Site
The site for the Central Utility Plant will sit on an existing paved deck and should not require extensive water management, tertiary cleansing, or infiltration systems on site. The tunnel construction will disrupt existing site work or landscape features. While the typical solution will be to replace what was there previously, consideration should be made to any potential betterments if properly integrated. Accordingly, some additional landscape and/or irrigation may be required as the design progresses. If so, rainwater harvesting, drought-tolerant vegetation, non-permanent irrigation systems, and other strategies will be reviewed.

Energy
The Plant will provide a district-wide source of chilled water, thus reducing the overall energy demand compared to isolated individual building cooling systems. Given the CUP’s relatively small footprint, lack of windows, and other features, opportunities for passive shading strategies, daylighting, utilization of renewable energy systems would not be practical here. The Master A/E Design Team does recommend and request energy performance data for an 18- to 24-month period of continuous operations to review predicted to actual performance for the selected systems and building elements.

Materials
The predominant exterior cladding material will be granite, which provides a very durable and maintenance-free façade. Other interior materials will be selected for their contributions to promoting high indoor air quality, reducing environmental impacts, and reducing health risks.

Water
Given the project’s CUP program, opportunities for reducing water use, implementation of grey water systems, or treating wastewater will be limited.

Central Utility Plant & Tunnel (CUP) Coordination & Compliance

Subsurface Utilities
In order to facilitate excavation and construction of the CUP in the area identified next to the Sam Houston Building, all existing subsurface utilities below the footprint will need to be identified and provided with acceptable alternate routing in order to maintain services. Concurrent with TFC’s procurement of this existing site survey information in early Concept Design, the Master A/E Design Team will review options for locating key components of the CUP outside this zone should be survey indicate that relocating is not feasible or other unavoidable constraints.

Central Plant Footprint
The initial proposed footprint of the CUP is larger than the area identified at the northeast corner of the existing plant. Early Concept Design will begin reconciling the CUP footprint size with the area available for development to prevent encroachments into the loading area ramp and other physical constraints at the existing plant.

Capitol View Corridors
Several Capitol View Corridors (CVC) pass through the current site for the CUP which, despite the relatively low height for the CUP and the cooling tower screen walls, place a limit on the height of the walls close to their currently planned elevation. As the Concept Design progresses, this upper limit on the elevation will be reviewed to ensure compliance at each milestone of project development.

Tunnel Routing
Prior to the conclusion of the Pre-Concept Design phase, an alternate route for the tunnel was suggested by TFC in order to help control costs and reduce potential complications with the current overall length of scope of the tunnel.

This new routing would keep the tunnel exactly as shown up until the point where it reaches the southern edge of the 1601 Congress Building. From there, the piping would be contained within the enclosure of the Underground Parking Garage and continue north to serve 1801 Congress Building. This potential alternate will be explored in early Concept Design to identify associated coordination issues, inter-Package complications, impacts to project schedule, and other items affecting the design.

Foundation Wall Design
Currently, the Design Team is considering the use of blind side waterproofing for sub-grade foundation walls for use at conditioned and unconditioned spaces. The team will review installations currently under construction locally with the Envelope Consultant to garner final approval. The walls constructed as part of this Package will be very close to adjacent structures and care must be taken to mitigate all impacts to the surrounding context. Refer to the Civil and Structural sections in the Report for more information.
### 1801 Congress Building

#### Building Data

The 1801 Congress Building project site is bounded by Martin Luther King Jr. Boulevard to the north, Brazos Street to the east, 18th Street to the south, and the new Texas Mall to the west. The building is approximately 603,000 GSF of office space, 280,000 GSF of above-grade parking garage, and 410,000 GSF of below-grade parking garage.

The office portion rises 14 stories above grade at approximately 214 feet high, while the above-grade garage rises only 8 levels. The above-grade garage is contained entirely within the envelope of the building, while the 5 level deep below-grade garage sits directly below both office and above-grade garage.

The massing for the office portion of the building is defined by two 90 feet wide bars which step back from the Texas Mall at Level 6, are oriented with long faces north and south, and linked together by a building core containing elevators and typical building services. The above-grade garage is located toward the east side of the site on Brazos Street. An east-facing courtyard for employee use is located on top of the garage between the two office bars. The lower ground level is punctuated by an architectural exposed sculptural steel structure that provides an iconic identity for a Cultural Venue, shelters a roof terrace at Level 2, and extends up to Level 6 as a shade structure for upper levels.

### 1801 Congress Building

#### Program

**Cultural Venue**

A cultural venue is planned for the ground and immediately adjacent level(s) of the 1801 Congress Building facing the Texas Mall.

**Wellness Center**

Space for the Wellness Center is allocated on level 6 of the 1801 Congress Building directly off the east facing courtyard above the garage. The Wellness Center will include showers, restrooms, lockers, and fitness studio rooms planned primarily for fitness use and secondarily scheduled for use as meeting rooms. Operational services such as towel service, etc. are expected to be self-serve at this time. Equipment rooms for cardio and/or weights are not anticipated at this time, but should be allowed for in the design and engineering of the core and shell should fitness facility operations change over time.

**Conference Center**

A centralized conference/training center is not required per program at this time. However, depending on which agencies are allocated to this building as the project progresses, a centralized conference facility(s) may be required to support tenant agency functions. Potential locations for centralized conference or training facilities in the 1801 Congress Building include level 2, level 3, or level 6 – where it may potentially be colocated with a wellness center and share access to an occupied green roof as an amenity.

**Office**

Twelve (12) typical levels of office space are located on levels 3 to 14. Each level includes shared male/female restrooms, break room, and quiet room. The core and shell will be designed to support a variety of tenant agency workplace typologies that can be adaptable over time.

**Agency Public-Facing Components**

The ground level of the 1801 Congress Building should be designed to support public-facing functional components of potential tenant agencies. Potential functions identified that are to be evaluated include, but are not limited to the DPS - Public Service Desk, TLC - Claim Center, and TLC - Drawing Studio. Refer to Program Volume 1 for additional information.

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**Office**

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Totals: 214 levels 603,383 GSF 694,834 SF 1,629
To develop the physical design project configuration, several diagrams and drawings were created to study various conditions and potential options. The intent of these drawings is to capture current design thinking and decisions arrived at through consensus building with stakeholder groups during the Design Workshop presentations. The next phase of project development will continue to refine the project drawings, including further coordination with required program and service areas, multi-disciplinary coordination, and other factors influencing the physical design project configuration.

Refer to the Appendices section of this report for a sheet list of 30" x 42" drawings available per Package. These drawings are to scale and should be referenced to provide additional information on project configuration and scope.
1801 Congress Building
Architectural Design

Massing
Two options — an L-shape and a double bar — were presented to the steering committee in Design Workshop 3 for the 1801 Congress Building and both with a typical 45’ lease depth. The benefits and concerns of each option were discussed as follows:

L-Shape
- Provides good flexibility when considered from inside-out
- Minimizes the number of people visible at once in an open office to avoid a “sea of cubicles”
- Allows for more open view to exterior
- Exterior feels very tall and imposing

Double Bar
- Increased flexibility with core pulled out of center of lease space
- Increases scale of open floor plates, greater programmatic flexibility
- Stepbacks help scale the building to plaza and relate to adjacent existing buildings
Due to the variable nature of state agencies, which tend to change size regularly, the committee’s preference was for the double bar option which allowed the most flexibility.
Massing

Building heights have been limited to match the scale of the William B. Travis (WBT) and Stephen F. Austin (SFA) Buildings and out of respect for the preeminence of the Capitol Building. Additionally, the two west-east bars for the double bar option have step backs corresponding to the scale of the Texas State History Museum (TSHM). The 1- and 2-story volumes at the 1801 Congress Building lobby entrance and Cultural Venue activate the ground level experience and give the tall structure pedestrian-oriented scale elements.
Building Edge

Building Edge

Building edges reinforce open space and frame views. The west face of the 1801 Congress Building holds alignment with the west faces of the neighboring Robert E. Johnson (REJ) and William B. Travis (WBT) buildings, as well as the Phase 1 1601 Congress Building. The alignment of these edges imply a greater scale and enforce the uniting public space of the plaza and mall. Additionally, the careful positioning of the Cultural Venue and west edges of the two bars at the 1801 Congress site create a strong, yet dynamic, relationship with the adjacent Texas State History Museum. When considered together, both buildings help to clearly define the newly created Museum Plaza.
1801 Congress Building
Architectural Design

Engaging Public Space
Porous ground-level facades and public-oriented programs, such as the Cultural Venue’s café, activate the ground plane of the 1801 Congress Building to enrich the pedestrian experience of the surrounding public spaces.
Fabric and Focus
Per the Master Plan, the 1801 Congress Building is intended to be a future district focus building. Focus buildings are important within the complex to create landmarks within communities of buildings that have their own identity and character that is related to, but not dominated by, an overall architectural character. Focus buildings create a finer grain within the overall complex scale. The prominence of the 1801 Congress Building, the plaza, and the landmark object fronting the 1801 Congress Building facade all serve to delineate the 1801 Congress Building as a focus building, while using similar key elements that define the Texas State History Museum (TSHM) as a focus building.

Elements to Create Focus Buildings
Landmarks positioned in the plaza act as focal elements for the complex and help frame the Texas Mall as a gateway to the Capital Complex.

Elements to Create Focus Buildings
Strong formal elements of monumental scale anchor both the 1801 Congress Building and the TSHM within Museum Plaza.
Several facade studies of potential material category options (as defined by the Master Plan’s Architectural Design Guidelines) were presented to the steering committee in Design Workshop 5. After reviewing potential implications of the Master Plan minimum requirements and Alternate 1 design, the committee’s preference was for Alternate 2. The option sought to acknowledge the architectural volumes created by the double bar massing by wrapping them consistently with similar materials appropriate to their address on the Texas Mall and surrounding streets, opposed to changing façade materials based solely on their orientation.

Building Material Description

While the opaque cladding material for the building’s façades will be granite, it is envisioned that roughly 70% to 80% of the total surface is clad in unitized 4-sided structural silicone glazed (SSG) aluminum curtainwall panels with low-e insulating glazed units (IGU). Each curtainwall panel will consist of a 2-coat minimum PVDF painted finish aluminum frame, which provides performance-tested air infiltration and water resistant details at all head, jamb, and sill conditions. The exterior envelope system fronting occupied spaces will also be evaluated for compliance with the OPR’s STC-40 requirements. It is anticipated that this will be difficult to achieve without considerable expense. Some cost-effective measures, such as unbalanced exterior and interior lites in IGUs, will be evaluated early in the next design phase by the Master A/E and CM Agent Teams.

The exposed faces of the above-grade parking garage will be clad using similar materials and technology as the office or other portions of the building. While currently planned to be mechanically ventilated, options for natural ventilation to create an open garage will be explored to understand the potential impacts to the façade expression. It is important for the architectural cohesiveness of the project to maintain continuity between the office and garage facades. However, the open garage strategy has the potential to create significant cost savings by eliminating the need for mechanical equipment and reducing longer-term energy costs.
1801 Congress Building
Architectural Design

The sculptural Cultural Venue is envisioned as a composition of architectural exposed structural steel and glass. Exterior steel sections would receive exterior grade high performance coatings to protect them from the elements and excessive weathering. Proper detailing of the connections that span from exterior to interior will help to maximize thermal breaks and minimize thermal transfer at the envelope. Steel fabrication techniques will be researched and discussed with the CM Agent team and various potential fabricators to identify appropriate and cost-effective techniques than can be used to guide the development of unique project geometries. Since this element will form the primary Iconic feature at the 1801 Congress site and associated plaza, commensurate levels of detailing, fabrication, and erection of the steel frame shall be provided. The roof terrace located at Level 2 serving the Cultural Venue will utilize an exterior pedestal paving system, possibly using stone, concrete, or hardwood paver panels. The pedestal system will sit on a waterproofing membrane with a layer of insulation provided below the concrete structural deck.

Roof top mechanical penthouses and other smaller building elements, such as canopies, sun shading devices, trellises, etc., will be clad in acceptable metal materials.

Whether granite or metal, open joint rain screen cladding principles will be utilized where practical. Continuous insulation outboard of the wall cavity will be provided. Insulation thicknesses and values will be determined though performance energy modeling in order to meet and/or exceed the performance goals required by code.

It is anticipated that the below grade garage will be constructed as a cast-in-place concrete structural frame, thereby creating large expanses of exposed concrete in the garage. In conjunction with wayfinding, circulation paths, portal locations, and opportunities for daylighting, certain interior areas of the garage may be considered for upgraded materials or colorful painted finishes. Exposed building cores, stair shafts, mechanical shafts, and other vertical elements within the garage will be constructed with masonry. Finish materials will be reviewed during Concept Design.

Durability and Life Span
As referenced in the adopted OPR, building elements in the 1801 Congress Building will be required to fall into the required design life span categories, including roofing. In order to meet those guidelines, it is anticipated that Modified Bitumen Roofing will be recommended as the typical roofing assembly.

Natural Light and Fenestrations
Maximizing daylighting and views to the outdoors paired with adequate shading techniques can produce better, more productive workspaces. A thinner 90’ depth floor plate coupled with a high percentage of high-performance exterior glazing allows natural light to penetrate deeper into the interior of the building plate to improve the overall indoor quality of space. Glare control will also be taken into consideration to ensure occupant comfort is maintained.

Climate Responsiveness
Due to the existing configuration of the 1801 Congress site, the building will need to respond to the hot Texas climate by mitigating...
1801 Congress Building
Architectural Design

Heat gain with other passive glazing performance measures like fixed shading to reduce cooling loads in the summer. Because of the changing angle of the sun throughout the day and seasons, south-facing facades benefit from sunshades located horizontally while east- and west-facing facades benefit more from vertical sunshades to reduce the amount of sunlight and heat from entering the building in the summer months. Green roof systems can also help alleviate extreme climatic conditions by reducing heat gain and heat island effect as well as improving views down onto roofs. Green roofs are being considered for the step backs on the west side of the building and the east-facing courtyard on level 6 with climate sensitive, drought-tolerant native plants. Austin’s local Ladybird Johnson Wildflower Center is a valuable resource of research on native planting, having consulted with the Master A/E on the development and implementation of a green roof system for the climate.

Screen Service Areas
Unsightly service areas can detract from the street-level appearance of buildings. At the 1801 Congress Building, the loading dock is incorporated into the footprint of the building and entrance openings are screened with a solid overhead coiling gate to limit visibility. The facade fronting the dock and service areas will be designed to match office areas to create a cohesive architectural character. For information regarding loading dock access, refer to the Civil section of this report.

Parking Garages
Below-grade parking is preferred to minimize surface parking and concentrate vehicular storage in properly designed structures. At the 1801 Congress Building, several levels of below-grade parking are being provided along with eight (8) levels of above-grade parking. Similar to loading dock areas, the facades fronting above-grade parking will be integrated into the architectural character of the building and will not be read as distinct from the office areas.

Timelessness and Identity
Buildings should be designed with a timeless style that neither dates nor detracts from the civic character of the complex. Identity should further emphasize the civic magnitude of a state building. Texas-specific iconography celebrates and honors the rich history of our state and its culture. These symbols have been included in civic buildings since the state’s earliest days. Including these elements in the 1801 Congress Building and adjacent Texas Mall is an opportunity to continue a proud tradition and lend the building a unique character. One such instance would be the expression of the spirit and history of Texas through the strong voices and personalities that have helped to define Texas music.
1801 Congress Building
Sustainability

General
According to the requirements set forth in the OPR, no certification or rating system is required by code, mandate, or other external arrangement. As a State-funded building project, the design is required to follow the State Energy Conservation Office’s (SECO) guidelines for energy conservation, water conservation, and storm water management. The design will also be reviewed and assessed for potential impacts the project may have on the surrounding site and amenities. Concept Design will determine if opportunities exist to promote additional program amenities or design features to improve the overall surrounding Complex and community.

Resilient Design
Given the project location in Austin, Texas, certain site risk factors should be taken into consideration, including increased storm power and frequency, tornadoes, and drought, especially as their severity may continue to increase over time. Per the OPR, this project is intended to have a useful life span well into the 50 to 100 year time frame. Incorporating resilient design strategies can help complement the building element selections to help ensure this time frame. TFC can also explore any potential insurance benefits for implementation.

Site
In order to minimize negative environmental impacts on the site and promote remediation in support of the natural environment and resources, this project increases non-paved open space and site vegetation considerably over the current condition through the use of green roof systems and other outdoor terraces. As mentioned previously, native drought-tolerant plant species will be selected to help reduce irrigation demands, which will explore rainwater harvesting as a source for non-potable irrigation water.

Energy
One of the project’s highest priorities is to deliver a high-performing energy efficient building. It is recommended that in early Concept Design the team establish clear goals and expectations for energy efficiency, while encouraging greater use of energy modeling to assist in the project’s design. Creating an energy reduction target and exploring the use of renewables, in addition to the OPR-required solar ready roof design and other passive design strategies, can help promote a cost effective and pragmatic approach to energy efficiency.

Materials
It is recommended that during early Concept Design, the Master A/E team develop guidelines for material selection based on an interest in specifying materials that reduce health risks, reduce environmental impacts, and promote indoor air quality.

Water
As previously identified, opportunities for rainwater harvesting will be analyzed and reviewed during early Concept Design. Additionally, opportunities to manage on site storm water through tertiary cleansing and infiltration will also be explored.

1801 Congress Building
Coordination & Compliance

Floor-to-floor Heights
Each section depicts a consistent floor-to-floor height of 14’-0” and uses a placeholder plenum dimension of 2’-3” from underside of structure to underside of finish ceiling. This plenum provides typical clearances for lighting fixtures, ceiling framing, and mechanical systems.

Structural System 21” Pan Joist System Section
This is an option for a 21” pan joist system given the building’s 90’ width and 30’ x 30’ x 30’ bay system. Based on the current dimensions, this system provides a 10’-0” ceiling height.

Structural System 24” Beam System Section
This is an option for a 24” beam system given the building’s 90’ width and 30’ x 30’ x 30’ bay system. Based on the current dimensions, this system provides a 9’-9” ceiling height.
Green Roof Design
Where feasible, green or planted roofing will be utilized at various levels to reduce ambient temperatures and prevent glare from reflective high-albedo roof surfaces below adjacent office levels. The east courtyard at level 6 will also establish a micro-climate next to adjacent facades to dramatically reduce ambient temperatures for those exposures. Refer to Landscape and Structural sections for more information.
Tenant Space Fit-Out

Core & Shell Typical Office Level
Tenant agencies are expected to significantly vary in size such that some levels may be single tenant floors, while other levels might be multi-tenant with multiple demised agencies of various sizes. Shared common areas per floor will include male and female restrooms, quiet room, and a break room. An area on each floor should be structurally reinforced for any potential tenant agency’s high-density file systems. Access to agency tenant spaces will be secured either at each tenant entrance off the common area and/or a secured elevator.

Tenanted Agency Workplace Typologies
It is anticipated that tenant agencies will deploy a wide variety of workplace typologies. The following diagrams illustrate a possible range of typologies that may be anticipated, ranging from “Open Plan” to “Perimeter Enclosed Offices” and most notably - all points between.

“Open Plan” might include a modest quantity of enclosed spaces for staff offices, meeting rooms, and support areas. These interior enclosures might typically occur on the interior/core of the floor plate. These workplaces typically deploy modular furniture systems with low and/or porous partitioning to facilitate the flow of air, encourage daylight harvesting, and provide access to exterior views. This type of workplace might situate approximately 10% of staff in interior enclosed offices and approximately 90% of staff in open plan furnishing systems.

“Perimeter Enclosed Offices” might be deployed with the primary intention of facilitating “head’s down” focused work. These workplaces may feature a greater proportion of interior enclosure systems, with approximately 50% of staff in enclosed offices and 50% of staff in open plan furnishing systems.
1801 Congress Building
Coordination & Compliance

Tenant Space Fit-Out

**Flexibility + Adaptability**
Design of the core and shell shall allow for tenant spaces to be reconfigured with minimal disruption to interior finish system(s), tenant demising partitions and systems. Moveable wall systems might be deployed by some tenant agencies in lieu of traditionally constructed drywall partitions. Infrastructure for tenant agency spaces should allow for a wide variety of fit out typologies and be easily reconfigurable over time. Distribution and delivery of power, data, and lighting, and other systems should be designed with adaptability as a primary consideration.

**Planning Module**
An architectural and structural planning module will be established early on. The tenant agency workplace design is anticipated to utilize the planning module for efficient space utilization and to anticipate efficient reconfigurations over time.

**Daylight & Views**
Features of the core and shell building design such as a 45' lease-depth and approximately 75% facade glazing ratio are intended to facilitate the use of natural daylight and provide views to the exterior for staff working on the typical office floors. It is also anticipated the design and construction of agency workplaces will provide access to exterior views and maximize daylighting. A typical strategy is to deploy floor-to-ceiling interior glazing systems at the frontage of enclosed offices - regardless of whether they are located on the interior or exterior perimeter of the floorplate.
Cultural Venue
The cultural venue currently illustrated at ground and second levels requires special accommodations such as volumetric space for an auditorium/performance/event space; volumetric exhibit space; loading dock usage and pathway to exhibit large enough for a vehicle; specialized storage and work areas near dock area; and direct public and pedestrian access to exterior. Special needs for acoustic control & separation, lighting, data/communications, and A/V are anticipated. It is anticipated that the architectural expression of this function will deploy unique building materials/ assemblies such as architecturally exposed structural steel (AESS) and unique glazing, lighting, and signage. An occupied roof terrace is anticipated.

Conference Center
While conference center assembly occupancy is currently not required per program, the project team should evaluate the potential benefit of including supporting infrastructure and systems in the core & shell design to allow for the long-term flexibility of building premises. Infrastructure and systems that may be impacted by assembly occupancies include egress capacity; restroom capacity; food service provisions; security operations; vertical transportation, and infrastructure provisions for mechanical, electrical, data, and A/V systems.

Agency Public-Facing Components
While program element confirmation is pending, the project team will likely need to evaluate special features such as additional structural loads, volumetric requirements, loading dock access, direct public visual and pedestrian access, security protocol review, public restrooms, and specialty signage & wayfinding. Infrastructure and systems that may be impacted include public restroom access; security operations; vertical transportation, and infrastructure provisions for mechanical, electrical, data, and A/V systems.

Loading and Service Areas
General Configuration:
Loading dock for the 1801 Congress Building will be located on level G1 and accessed off Brazos Street. A new curb cut at Brazos Street is anticipated at the existing road elevation of approximately 515’ MSL. Refer to the Civil section of this report for information on truck turn and access studies.

Loading Dock Area(s):
Four (4) total loading bays include two (2) truck loading bays and two (2) refuse/recycle bays for trash removal, compaction and collection. Each loading bay’s width and length will be determined by TFC’s designated waste-hauling vendor and programming. Composting may be included in building operations - pending owner’s confirmation of requirement. Cooled holding area may be allocated either near the food service elevator or adjacent to the loading dock area if required.

Structural:
The loading dock is located within the footprint of the structured parking area below grade at the 1801 Congress Building and will have a structured floor. Weight ratings require further definition and coordination with TFC. Structural design will determine possible limits on gross vehicle weight. Multiple column transfers will be required and requires detailed study in the next phase of work. Refer to the drawings for more information on the various locations of column transfers.

Fire Service Access Lobbies
For the portion of the building that contains office spaces directly adjacent to the above-grade parking garage, special design consideration has been given to the layout of separate Fire Service Access Lobbies (FSAL) that can serve both sides of the building, since their floor plates do not align at each level. It is intended that they will shared a common fire stair exit enclosure utilizing a split landing design, but both office and garage will be separate fire-rated lobbies at the various floor plate elevations.

Food Service
With some level of food service anticipated in the building, provisions for an operator-provided grease trap (to be installed in the building’s grease trap vault), kitchen exhaust hoods, and relatively direct access to the loading dock and other service areas should be provided.

Mechanical Ventilation for Garages
The underground parking garage portion of the building shall be designed to accommodate mechanical ventilation per the Mechanical design criteria. It is anticipated that intake and exhaust shafts and vents will be provided at select locations in the building, which will run vertically and terminate above grade per requirements for intake and exhaust. As the building façade design progresses, the team will review how to discretely integrate these openings into the architectural character of the building.

Data Center
In order to serve the future tenant agency’s data and computing needs, a Data Center will be provided in the 1801 Congress Building to house each agency’s technology equipment. Refer to the Technology section of this Report for more information on requirements.

Wireless Access Points
Per the Technology section of this Report, the Master A/E team will review opportunities for Distributed Antenna System (DAS) infrastructure to provide WiFi connectivity in the 1801 Congress Building and exterior areas. These access points could be integrated into light poles or other site related infrastructure or furnishings to ensure they are integrated in an aesthetically acceptable way. If the infrastructure is approved by TFC, it will need to be determined who will provide the base signal feeding the access points.

OPR Compliance Issues

<table>
<thead>
<tr>
<th>Floor Levelness</th>
<th>Slabs should be designed to receive a self-leveling cap in lieu of FL requirements</th>
<th>OPR 5.4.4.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Vehicle Recharge Stations</td>
<td>Provide for 2% of total vehicle count</td>
<td>OPR 2.7.1.8</td>
</tr>
<tr>
<td>Exterior Envelope Acoustics</td>
<td>Provide STC-40, refer to acoustics narrative</td>
<td>OPR 5.2.1.5</td>
</tr>
<tr>
<td>Wellness Center</td>
<td>Will be difficult to provide on ground floor. Space needs are being evaluated in conjunction with Cultural Venue, Office Lobby and other potential ground level activating uses.</td>
<td>OPR 2.4.6</td>
</tr>
</tbody>
</table>
Building Description

The 1601 Congress Building (C16) project site is bounded by 17th Street to the north, the LBJ Building and plaza to the east, 16th Street to the south, and the new Texas Mall to the west. The building is approximately 417,000 GSF of office space and 144,000 GSF of below-grade parking garage. The office portion rises 12 stories above grade at approximately 174 feet high. The massing for the office portion of the building is defined by a single 120 feet wide bar which steps back from 16th Street at Level 10 in order to fall below the Capitol Dominance Zone and to mitigate the change in building height to the south at the Robert E. Johnson Building (REJ). The lower level massing is punctuated by a one-story porch that faces the Texas Mall and provides shade for associated program uses that take advantage of the spill-out space. The child care facility also extends just to the east with a one-story volume that takes advantage of the change in topography from west to east and provides the necessary indoor space while balancing the needs for outdoor play areas as well. The new courtyard formed between the 1601 Congress Building and the LBJ Building provides an ideal setting outdoor play and maintains crucial access to daylighting for both the 1601 Congress and LBJ Building’s upper levels.

<table>
<thead>
<tr>
<th>Office</th>
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<tbody>
<tr>
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<td>B7</td>
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<td>Totals</td>
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</table>
1601 Congress Building

Program

Wellness Center
Space for the Wellness Center is allocated on the east side of level 1 in the 1601 Congress Building directly off the staff entrance and lobby area. The Wellness Center will include showers, restrooms, lockers, and fitness studio rooms planned primarily for fitness use and secondarily scheduled for use as meeting rooms. Operational services such as towel service etc. are expected to be self-serve at this time. Equipment rooms for cardio and/or weights are not anticipated at this time, but should be allowed for in the design and engineering of the core and shell should fitness facility operations change over time. Level B1 includes space directly below the fitness center that may be allocated for fitness use should owner decide appropriate, with windows and direct access to the exterior and high ceilings.

Café
Space on level 1 is allocated for a food service amenity. The operation is envisioned as a coffee shop with food service and outdoor seating. A “grab and go” vending area may be developed as well. The space will be provided with infrastructure appropriate for a commercial kitchen such as type 1 exhaust food and a vault for the operator’s grease trap. A dedicated food service elevator will operate between the B1 loading dock level, the level 1 café and level 2 conference center. The child care facility may or may not wish to arrange catering services with the café operator such that direct service access should be provided to the child care facility.

Conference Center
A centralized conference / training center is anticipated at level 2, with direct access from the ground floor public and staff lobbies. The center will likely include divisible multi-purpose rooms; large, medium and small conference rooms; break out areas; and support space for A/V control, food service, etc. Further discussion should occur regarding food service expectations/operations and the requirements of operational and/or training staff.

Public Services
Visitors that may be parked in the below grade garage levels B3 and B4 may access the Texas Mall from a shared visitor/employee portal located in the northwest corner of the 1601 Congress Building. Public restrooms and the café area may also be accessed directly from this portal integrated into the building.

Office
Ten (10) typical levels of office space are located on levels 3 to 12. Each level includes shared male/female restrooms, break room, and quiet room. The core and shell will be designed to support a variety of tenant agency workplace typologies that can be adaptable over time.

State Employees’ Child Care Facility
Space for the child care facility is allocated on levels 1 and B1 and has direct adjacent access to exterior areas. Direct vehicular access, drop-off/pickup area, short term parking and child care lobby entrance are all provided at level B1. Direct exterior access from the 16th Street sidewalk is provided at an intermediate level between level B1 and level 1 that facilitates street level access to the child care lobby area.

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1601 Congress Building
Drawings

Project Configuration
To develop the physical design project configuration, several diagrams and drawings were created to study various conditions and potential options. The intent of these drawings is to capture current design thinking and decisions arrived at through consensus building with stakeholder groups during the Design Workshop presentations. The next phase of project development will continue to refine the project drawings, including further coordination with required program and service areas, multi-disciplinary coordination, and other factors influencing the physical design project configuration.

Refer to the Appendices section of this report for a sheet list of 30" x 42" drawings available per Package. These drawings are to scale and should be referenced to provide additional information on project configuration and scope.
1601 Congress Building
Drawings
1601 Congress Building
Architectural Design

Massing

Two options — an L-shape and Single bar option — were presented to the steering committee in Design Workshop 3 for the 1601 Congress Building. Both options include a 45’ lease depth. The benefits and concerns of each option were discussed as follows:

L-shape
- Some portion of open loft space on lower floors with smaller configuration on upper floors
- Works well with child care, cafe, garage portals
- Southwest portion of L-shape too close to LBJ Building

Single bar
- allows more outdoor space for the child care facility
- simple, more building flexibility
1601 Congress Building
Architectural Design

Massing
Due to the variable nature of state agencies, which tend to change size regularly, the steering committee's preference was for the single bar option which allowed the most flexibility.
1601 Congress Building
Architectural Design

Massing
Building heights have been limited to match the scale of William B. Travis (WBT) and Stephen F. Austin Buildings (SFA) and respect the preeminence of the Capitol Building. Stepbacks acknowledge the scale of Robert E Johnson Building (REJ) and future phase buildings, while also maintaining compliance with the Capitol Dominance Zone at the southern upper levels.

Massing
1 and 2 story volumes at 1601 Congress Building cafe and lobby activate the ground level pedestrian experience.
Building Edge

The alignment of 1601 Congress Building west facade with Robert E. Johnson (REJ) and William B. Travis (WBT) Buildings and 1801 Congress Building unite the delineate the edge of the mall and frame the view to the Capitol.

Massing as a Response to Fabric

As a fabric building, the 1601 Congress Building responds sympathetically in its massing and ground floor treatment to its adjacent buildings as shown in these views from the southwest.
Engaging Public Space

Porous envelopes and public-oriented programs, such as a Café with outdoor seating, activate the ground plane of buildings to enrich the pedestrian experience of the surrounding public spaces. The porch along the western mall edge of the 1601 Congress Building and state employees’ child care facility amenities activate the public space of the mall on the ground floor.
Civic / cultural buildings
Proposed Phase 1-3 buildings
Active edge
Plazas
Pedestrian circulation
Open space

Interior
Food / Coffee
Auditorium / Conference
Retail
Exterior
Cultural
Theater
Plaza
Park
Playground

1601 Congress Building
Architectural Design

TCC Phase 1 Pre-Conceptual Design Report
Texas Facilities Commission

Volume 3
Pre-Conceptual Design Analysis
Architectural
1601 Congress Building
Architectural Design

Fabric and Focus
Per the Master Plan, the 1601 Congress Building is intended to be a future district fabric building. Fabric buildings play a supporting role within the Capitol Complex. Their modest designs weave together the fabric of the complex creating a cohesive district character across the variety of buildings.

Elements to Create Fabric Buildings
A covered outdoor space along the ground level of 1601 Congress Building continues the language of arcades present in neighboring WBT and REJ Buildings along the Texas Mall.
Building Material Options

Several facade studies of potential material category options (as defined by the Master Plan’s Architectural Design Guidelines) were presented to the steering committee in Design Workshop 5. After reviewing potential implications of the Master Plan minimum requirements and Alternate 1 design, the committee’s preference was for Alternate 2. The option sought to acknowledge the architectural volumes created by the single bar massing and setback by wrapping them consistently with similar materials appropriate to their address on the Texas Mall and surrounding streets, opposed to changing façade materials based solely on their orientation.

Building Material Description

While the opaque cladding material for the building’s façades will be granite, it is envisioned that roughly 70% to 80% of the total surface is clad in unitized 4-sided structural silicone glazed (SSG) aluminum curtainwall panels with low-e insulating glazed units (IGU). Each curtainwall panel will consist of a 2-coat minimum PVDF painted finish aluminum frame, which provides performance-tested air infiltration and water resistant details at all head, jamb, and sill conditions. The exterior envelope system fronting occupied spaces will also be evaluated for compliance with the OPR’s STC-40 requirements. It is anticipated that this will be difficult to achieve without considerable expense. Some cost effective measures, such as unbalanced exterior and interior lites in IGUs, will be evaluated early in the next design phase by the Master A/E and CM Agent Teams.

Roof top mechanical penthouses and other smaller building elements, such as canopies, sun shading devices, trellises, etc., will be clad in acceptable metal materials.

Whether granite or metal, open joint rain screen cladding principles will be utilized where practical in order to provide continuous insulation outboard of the wall cavity and help mitigate water infiltration by creating a pressure-equalized cavity behind the cladding. Insulation thicknesses and values will be determined though performance energy modeling in order to meet and/or exceed the performance goals required by code.
1601 Congress Building
Architectural Design

It is anticipated that the below grade garage will be constructed as a cast-in-place concrete structural frame, thereby creating large expanses of exposed concrete in the garage. In conjunction with wayfinding, circulation paths, portal locations, and opportunities for daylighting, certain interior areas of the garage may be considered for upgraded materials or colorful painted finishes. Exposed building cores, stair shafts, mechanical shafts, and other vertical elements within the garage will be constructed with masonry. Finish materials will be reviewed during Concept Design.

Durability and Life Span
As referenced in the adopted OPR, building elements in the 1601 Congress Building will be required to fall into the required design life span categories, including roofing. In order to meet those guidelines, it is anticipated that Modified Bitumen Roofing will be recommended as the typical roofing assembly.

Natural Light and Fenestration
Maximizing daylighting and views to the outdoors paired with adequate shading techniques can produce better, more productive workspaces. A thinner 120’ depth floor plate coupled with a high percentage of high-performance exterior glazing allows natural light to penetrate deeper into the interior of the building plate to improve the overall indoor quality of space. Glare control will also be taken into consideration to ensure occupant comfort is maintained.

Climate Responsiveness
Due to the existing configuration of 1601 Congress site, the building will need to respond to the hot Texas climate by mitigating heat gain with other passive glazing performance measures like fixed shading to reduce cooling loads in the summer. Because of the changing angle of the sun throughout the day and seasons, south-facing facades benefit from sunshades located horizontally while east- and west-facing facades benefit more from vertical sunshades to reduce the amount of sunlight and heat from entering the building in the summer months.

Green roof systems can also help alleviate extreme climatic conditions by reducing heat gain and heat island effect as well as improving views down onto roofs. Green roofs are being considered for the step back on the south side of the building with climate sensitive, drought-tolerant native plants. Austin’s local Ladybird Johnson Wildflower Center is a valuable resource of research on native planting, having consulted with the master A/E on the development and implementation of a green roof system for the climate.
Screen Service Areas
Unsightly service areas can detract from the street-level appearance of buildings. At the 1601 Congress Building, the loading dock is incorporated into the footprint of the building and entrance openings are screened with a solid overhead coiling gate to limit visibility. The facade facing the dock and service areas will be designed to match office areas to create a cohesive architectural character. For information regarding loading dock access, refer to the Civil section of this report.

Parking Garages
Below-grade parking is preferred to minimize surface parking and concentrate vehicular storage in properly designed structures. At the 1601 Congress Building all parking will be located below grade except a modest quantity located at level B1 for the child care facility, which will be situated within the building envelope and be integrated into the architectural character of the building.

Timelessness and Identity
Buildings should be designed with a timeless style that neither dates nor detracts from the civil character of the complex. Identity should further emphasize the civic magnitude of a state building. Texas iconography celebrates and honors the rich history of our state and its culture. These symbols have been included in civic buildings since the state’s earliest days. Including these elements in the 1601 Congress Building and adjacent Texas Mall is an opportunity to continue a proud tradition and lend the building a unique character.
1601 Congress Building
Sustainability

General
According to the requirements set forth in the OPR, no certification or rating system is required by code, mandate, or other external arrangement. As a State-funded building project, the design is required to follow the State Energy Conservation Office’s (SECO) guidelines for energy conservation, water conservation, and storm water management.

The design will also be reviewed and assessed for potential impacts the project may have on the surrounding site and amenities. Concept Design will determine if opportunities exist to promote additional program amenities or design features to improve the overall surrounding Complex and community.

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In order to minimize negative environmental impacts on the site and promote remediation in support of the natural environment and resources, this project increases non-paved open space and site vegetation considerably over the current condition through the use of green roof systems and other outdoor terraces. As mentioned previously, native drought-tolerant plant species will be selected to help reduce irrigation demands, which will explore rainwater harvesting as a source for non-potable irrigation water.

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1601 Congress Building
Coordination & Compliance

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1601 Congress Building
Coordination & Compliance

Loading and Service Areas

General Configuration:
The off-street loading dock for the 1601 Congress Building will be located on level B1 and accessed via a new service drive off 17th Street. A new curb cut and service drive are anticipated at the existing road elevation of approximately 527’ MSL. Refer to the Civil section of this report for information on truck turn and access studies.

Loading Dock Area:
Three (3) total loading bays include (1) truck loading bay and (2) refuse/recycle bays for trash removal, compaction and collection. Each loading bay’s width and length will be determined by TFC’s designated waste-hauling vendor and programming. Composting may be included in building operations - pending owner’s confirmation of requirement. Cooled holding area may be allocated either near the food service elevator or adjacent to the loading dock area if required.

Structural:
The loading dock is located within the footprint of the structured parking area below grade at 1601 Congress Building and will have a structured floor. Weight ratings require further definition and coordination with TFC. Structural design will determine possible limits on gross vehicle weight. A single column transfer may be required and requires detailed study in the next phase of work.

Grease Trap Vault:
The building requires a cast-in-place concrete underground vault to accommodate for food service operations/operator grease trap. The vault will be located in the loading dock service drive area and requires coordination to finalize location.

Impacts to LBJ Building and Site
The 1601 Congress Building service drive will be generally flat requiring the area just west of the existing LBJ elevated terrace to be excavated and re-graded to a new lower elevation of approximately 527’ MSL. Additional investigation of the existing LBJ terrace construction is needed to confirm the viability of maintaining the existing wall & foundation, which will be exposed at the base per the new lower grade elevation.

The LBJ site’s elevated terrace and site hardscape requires modifications to allow new service and loading area development on the 1601 Congress site. A portion of the existing steps to 17th Street require removal and replacement. The intermediate terrace, stairways and walkway to the existing Congress Avenue/16th-17th Street surface lot will be removed and a new elevated terrace retaining wall shall be provided in replacement. The existing sidewalk system to 16th Street will also be removed and may be replaced in another location- pending additional review of access points and egress paths to the right-of-way.

Existing landscape area between the 1601 Congress Building and LBJ building will be redesigned for use as a state employees’ child care facility play area. The area will require partial regrading and new landscaping appropriate for its use. It is currently anticipated that one of the two mature trees in this area should be protected and retained for integration in the landscape redesign.
Core & Shell Typical Office Level
Tenant agencies are expected to significantly vary in size such that some levels may be single tenant agency floors, while other levels might be multi-tenant agency floors with multiple demised agencies of various sizes. Shared common areas per floor will include male and female restrooms, quiet room, and a break room. An area on each floor should be structurally reinforced for potential tenant agency's high-density file systems. Access to tenant agency spaces will be secured either at each tenant agency entrance off the common area and/or a secured elevator.

Tenant Agency Workplace Typologies
It is anticipated that tenant agencies will deploy a wide variety of workplace typologies. The following diagrams illustrate a possible range of typologies that may be anticipated, ranging from “Open Plan” to “Perimeter Enclosed Offices” and most notably - all points between.

“Open Plan” might include a modest quantity of enclosed spaces for staff offices, meeting rooms, and support areas. These interior enclosures might typically occur on the interior/core of the floor plate. These workplaces typically deploy modular furniture systems with low and/or porous partitioning to facilitate the flow of air, encourage daylight harvesting, and provide access to exterior views. This type of workplace might situate approximately 10% of staff in interior enclosed offices and approximately 90% of staff in open plan furnishing systems.

“Perimeter Enclosed Offices” might be deployed with the primary intention of facilitating “head’s down” focused work. These workplaces may feature a greater proportion of interior enclosure systems, with approximately 50% of staff in enclosed offices and 50% of staff in open plan furnishing systems.
1601 Congress Building - Typical Levels 03 -10

Multi-Tenant Agency
+ Perimeter Enclosed Offices

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosed Office</td>
<td>64</td>
<td>50%</td>
</tr>
<tr>
<td>Workstation</td>
<td>64</td>
<td>50%</td>
</tr>
<tr>
<td>Total Workspace</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>

1601 Congress Building

**1601 Congress Building**

**Coordination & Compliance**

**Tenant Agency Space Fit-Out**

**Flexibility + Adaptability**

- Design of the core and shell shall allow for tenant agency spaces to be reconfigured with minimal disruption to interior finish system(s), tenant agency demising partitions and systems. Moveable wall systems might be deployed by some tenant agencies in lieu of traditionally constructed drywall partitions. Infrastructure for tenant agency spaces should allow for a wide variety of fit out typologies and be easily reconfigurable over time. Distribution and delivery of power, data, and lighting, and other systems should be designed with adaptability as a primary consideration.

**Planning Module**

- An architectural and structural planning module will be established early on. The tenant agency workplace design is anticipated to utilize the planning module for efficient space utilization and to anticipate efficient reconfigurations over time.

**Daylight & Views**

- Features of the core and shell building design such as a 45’ lease-depth and approximately 75% facade glazing ratio are intended to facilitate the use of natural daylight and provide views to the exterior for staff working on the typical office floors. It is also anticipated the design and construction of agency workplaces will provide access to exterior views and maximize daylighting. A typical strategy is to deploy floor-to-ceiling interior glazing systems at the frontage of enclosed offices - regardless of whether they are located on the interior or exterior perimeter of the floorplate.

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**TCC Phase 1 Pre-Conceptual Design Report**

Texas Facilities Commission

**Volume 3**

Pre-Conceptual Design Analysis

Architectural
1601 Congress Building
Coordination & Compliance

Terrace & Green Roof Design
Where feasible, green or planted roofing will be utilized at the level
1 child care facility east terrace and the level 11 south roof setback
to reduce ambient temperatures and prevent glare from reflective
high-albedo roof surfaces below adjacent office levels. The child
care facility terrace is intended to be fully occupied and, in addition
to the green roof systems, it is expected that trellises or other sun
control devices will be required for the terrace design. Refer to
Landscape and Structural sections for more information on the
green roof systems.

West Porch
To help mitigate the scale of the building and create an additional
pedestrian-oriented scale element, the west side of the building at
the Mall is planned to become a grand porch enclosing outdoor
dining and sheltering visitors to the building’s main lobby. It is
anticipated this porch will contain architecturally exposed structure
and varying density of roof cover to provide shelter from the
elements. This porch also mitigates the grade change from north
to south along the west façade and will require extensive site walls
to maintain proper grades. Special attention to lighting suitable for
outdoor dining will also be reviewed.

Wellness Center
Based on the planned occupancy and use at the Wellness Center,
special attention will be paid to mitigate acoustic and vibration
impacts to adjacent spaces, especially when the Center is adjacent
to office or conference space. Mechanical systems will also be
evaluated to provide additional cooling and ventilation capacity for
these spaces.

Conference Center
Infrastructure and systems that will be impacted by assembly
occupancy at the level 2 Conference Center include egress
capacity; miscellaneous structural steel for moveable
partitions; restroom fixture loads; acoustical assemblies &
separation; food service provisions; security operations; vertical
transportation, and infrastructure provisions for mechanical,
electrical, data, and A/V systems.

Food Service
With some level of food service anticipated in the building,
provisions for a operator-provided grease trap (to be installed
in the building’s grease trap vault), kitchen exhaust hoods, and
relatively direct access to the loading dock and other service areas
shall be provided. Due to the significant grade change from west
to east, the café is located at a level above the loading dock and
will require a dedicated service elevator to provide access discrete
from the typical office service elevators. The elevator is also
planned to serve the Conference Center on level 2 for potential
catering access.

Streetscape
For the adjacent side streets that fall into the project’s Limit of
Work, the project will provide streetscape amenities and plantings
consistent with the 2016 Texas Capitol Complex Master Plan,
which are similar to the City of Austin Great Streets program.
Refer to the Civil and Landscape sections of this Report for more
information on which streets are impacted and what measures are
proposed to conform.

Foundation Wall Design
Currently, the Design Team is considering the use of blind
side waterproofing for sub-grade foundation walls for use at
conditioned and unconditioned spaces. The team will review
installations currently under construction locally with the Envelope
Consultant to garner final approval. The walls constructed as part
of this Package will be very close to adjacent structures and care
must be taken to mitigate all impacts to the surrounding context.
In addition, coordination will be required with Package 6 Texas
Mall and Garage due to the continuation of several walls at either
side of grid line 6S. Refer to the Civil and Structural sections in the
Report for more information.

Mechanical Ventilation for Garage
The underground parking garage portion of the building shall
be designed to accommodate mechanical ventilation per the
Mechanical design criteria. It is anticipated that intake and exhaust
shafts and vents will be provided at select locations in the building,
which will run vertically and terminate above grade per requirements for intake and
exhaust. As the building façade design progresses, the team will review how to
discretely integrate these openings into the architectural character of the building.

Data Center
In order to serve the future tenant agency’s data and computing needs, a Data
Center will be provided in the 1601 Congress Building to house each agency’s
technology equipment. Refer to the Technology section of this Report for more
information on requirements.

Wireless Access Points
Per the Technology section of this Report, the Master A/E team will review
opportunities for Distributed Antenna System (DAS) infrastructure to provide WiFi
connectivity in the 1601 Congress Building and exterior areas. These access points
could be integrated into light poles or other site related infrastructure or furnishings
to ensure they are integrated in an aesthetically acceptable way. If the infrastructure
is approved by TFC, it will need to be determined who will provide the base signal
feeding the access points.

Capitol Dominance Zone
The southern portion of the 1601 Congress site slightly overlaps the Zone’s
perimeter. Accordingly, the upper two levels of the office building are set back to
maintain compliance. In order to maximize the building envelope, the setback has
been placed relatively close to the perimeter, thus requiring a couple of unequal
length structural bays. During Concept Design, the team will review how these
bays impact interior planning, as well as structural and façade design. Additionally
as the Concept Design progresses, this upper limit on the Level 11 roof elevation
and setback will be reviewed to ensure compliance at each milestone of project
West Porch Coordination
This element at 1601 Congress Building serves multiple uses and helps to mitigate the north-south grade change along the west face of the building at the Mall.
Building Description

The masterplan introduced the Texas Mall concept - a new public event space on the former northern section of Congress Avenue between 15th Street and Martin Luther King Jr. Boulevard that would be the focus for the Capitol Complex north of 15th Street.

Congress Avenue will become a tree-lined event space with lawn panels extending between the Capitol Grounds and a new "cultural gateway" at Martin Luther King Jr. Boulevard. To accommodate the need for parking in the complex, underground parking would be provided below the mall and connected to the below grade parking at the 1801 Congress and 1601 Congress Buildings.

The majority of the below grade garage scope is in this Package and scope of work - refer to the building areas table for the GSF footages for each of the levels. The Package 6 garage work is approximately 645,000 GSF as it spans from 16th Street north to Martin Luther King Jr. Boulevard.

<table>
<thead>
<tr>
<th>Office</th>
<th>Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>Height</td>
</tr>
<tr>
<td>B1</td>
<td>9.5</td>
</tr>
<tr>
<td>B3</td>
<td>9.5</td>
</tr>
<tr>
<td>B5</td>
<td>9.5</td>
</tr>
<tr>
<td>B7</td>
<td>9.5</td>
</tr>
<tr>
<td>Totals</td>
<td>0</td>
</tr>
</tbody>
</table>
Texas Mall

The Texas Mall will provide a continuation of the grand Congress Avenue corridor south of the Capitol Grounds. The existing Texas State History Museum (TSHM) and proposed 1801 Congress will form a public space that creates a secondary cross-axis on the mall. The newly formed Museum Plaza will complement the existing TSHM plaza and be perceived as an extension of the mall, despite the cessation of the double row of trees just to the north of 18th Street. The central panels between 15th and 18th Street will be lined with generous pedestrian ways on both sides to create a consistent, continuous system of pedestrian paths and access to adjacent buildings and sites.

Amphitheater

Located in the Museum plaza, an outdoor amphitheater will provide terraced seating risers for a 100-person capacity. This space will be equipped with amplified sound capabilities and will be partially covered by the roof of the adjacent garage entry portal. The venue in front of the Austin City Hall provides a similar precedent.

Performance Lawn

The central lawn panel in front of the 1601 Congress Building provides a performance lawn with a 500-person capacity to accommodate small outdoor concerts or an outdoor movie. The lawn will be sloped at approximately 4%, similar to the existing site grading. A flat stage zone will be located in the hardscaped event plaza over the entrance to the underground garage. This zone will be equipped with electrical and data connections for use of a temporary stage.
Texas Mall and Garage (TXM)
Program

Outdoor Dining
Outdoor seating for the food venue will be integrated into the 1601 Congress Building. The space will have direct access to the mall and the indoor space of the food venue. The seating area will be capable of accommodating small performances.

Playground
The state employees' child care facility has a requirement of 7500 SF of dedicated outdoor playground. This playground is broken into multiple sections to accommodate various age groups. The majority of the playground will be located along the east side of the 1601 Congress Building, with a smaller portion on the west side, along the mall. Each of these sections will be enclosed with a perimeter fence that allows for visibility into and out of the playground.

Child-oriented play elements will be distributed along the mall for public use. These elements will be located within the allée on the edges of the mall.

In addition to these features, a public-oriented playground will be located at the west edge of the mall between 16th and 17th Streets. It will be placed in front of the future Phase 3 building site to create a buffer between the mall and the existing surface parking lot.

Events
The mall is planned to be used on a regular basis for special events. Small events may utilize only a single block of the mall whereas larger events, such as the annual Texas Book Festival, may utilize the entire mall and temporarily close portions of the adjacent streets. Utility connections for power and water will be provided at distributed points throughout the mall to allow for a variety of event types and functions.

Monuments
The mall will accommodate the placement of future monuments. Locations will be preserved for smaller monuments within the allée on each side of the lawn panel and for medium-size monuments near the entrance to the new buildings. Exact monument content, design, and details will be determined at date when one is determined and are not part of the Phase 1 development.

Special provisions for monuments, such as structural requirements, power, and lighting, will not be incorporated into the Phase 1 design. Monument designers will be responsible for understanding the loading capacity of the structure below the mall as well as tying into the nearest junction box for power needs. Refer to the Structural section of this report for loading information.
Texas Mall and Garage (TXM) Drawings

Project Configuration
To develop the physical design project configuration, several diagrams and drawings were created to study various conditions and potential options. The intent of these drawings is to capture current design thinking and decisions arrived at through consensus building with stakeholder groups during the Design Workshop presentations. The next phase of project development will continue to refine the project drawings, including further coordination with required program and service areas, multi-disciplinary coordination, and other factors influencing the physical design project configuration.

Refer to the Appendices section of this report for a sheet list of 30" x 42" drawings available per Package. These drawings are to scale and should be referenced to provide additional information on project configuration and scope.
Texas Mall and Garage (TXM)

Drawings

Portals

TCC Phase 1 Pre-Conceptual Design Report
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Pre-Conceptual Design Analysis
Architectural
Underground Parking Garage - Section Axon
Texas Mall and Garage (TXM)
Architectural Design

**Framework**

In Option 1, the Texas Mall is the focus. The Mall extends equally from Martin Luther King Jr. Boulevard to 15th Street. Plazas at the Blanton Plaza, the TSHM, and the 1801 Congress Building form a northern terminus of the mall without disrupting its uniform character. The TSHM bus drop off and star would interrupt the double of trees.

In Option 2, the Texas Mall starts at the southern edge of Museum Plaza, which aligns with the southern edge of the TSHM Plaza. This effectively reinforces the identity of a Museum District and further eases the bus drop off, which can be used for all museums. The crossing of vehicles at the Mall/Plaza at 18th Street would have a special pavement.

For both Options, 18th Street is maintained as a vehicular crossing, but 17th Street is now a pedestrian-only environment due to the ramps down to the underground garage entrances.

The steering committee’s preference was Option 2, citing the strong connection this option makes between the TSHM, the planned music focused museum/cultural venue at the 1801 Congress Building, and the Blanton Museum.
Engaging Public Space

The ground plane of buildings should be activated through public-oriented uses, visible building entries, and porous building envelopes along major axes.

The Phase 1 portion of the Texas Mall will activate the ground plane through the programmatic elements referenced above and on the following pages. Significant elements include playgrounds and distributed play elements, accommodation of mall events, dining and performance facilities, and future monument placement.
Texas Mall and Garage (TXM)
Architectural Design

Engaging Public Space
During the Design Workshop 2, two playground options were presented:

Option 1: Distributed Play with child-oriented elements such as play equipment, historical or story-telling elements, activities located throughout the mall

Option 2: Public Playground at dedicated childcare facility and located in the transition zone in front of 17th Building that could be fenced or secured and serve as a buffer

The steering committee’s consensus was to integrate both playground options and to include a dedicated play scape in the zone between the Mall and the future Phase 3 building between 16th and 17th Street.

Options for Mall Events were presented to the steering committee, refer to Landscape for more information.
Monuments - two options for permanent monuments were presented to the committee. Option 1 showed permanent monuments at building Entry Plazas whereas Option 2 showed permanent monuments within the tree zone. The consensus from the committee was to pursue both options. Per TFC, the Master Plan 2018 Update will provide further direction on Monuments to ensure coordination across the entire Capitol Complex.
Texas Mall and Garage (TXM)
Architectural Design

Building Material Description
Texas Mall
Refer to the Landscape section of this report for information on site materials.

Portals
While the opaque cladding material for the portal's façades will be granite, it is envisioned that roughly 70% to 80% of the total surface is clad in 4-sided structural silicone glazed (SSG) aluminum curtainwall panels with low-e insulating glazed units (IGU). Each curtainwall panel will consist of a 2-coat minimum PVDF painted finish aluminum frame and will provide performance-tested air infiltration and water resistant details at all head, jamb, and sill conditions.

Roof top mechanical equipment, exhaust vents, and other smaller building elements, such as canopies, sun shading devices, trellises, etc., will be clad in acceptable metal materials.

Whether granite or metal, open joint rain screen cladding principles will be utilized where practical. Continuous insulation outboard of the wall cavity will be provided. Insulation thicknesses and values will be determined though performance energy modeling in order to meet and/or exceed the performance goals required by code.

Underground Parking Garage
It is anticipated that the below grade garage will be constructed as a cast-in-place concrete structural frame, thereby creating large expanses of exposed concrete in the garage. In conjunction with wayfinding, circulation paths, portal locations, and opportunities for daylighting, certain interior areas of the garage may be considered for upgraded materials or colorful painted finishes. It is also anticipated that the vertical exterior walls created by the two (2) 17th Street entrance ramps would be clad in either granite or mixed granite materials to cover up the otherwise highly visible exposed concrete faces. Exposed building cores, stair shafts, mechanical shafts, and other vertical elements within the garage will be constructed with masonry. Finish materials will be reviewed during Concept Design.

Durability and Lifespan
As referenced in the adopted OPR, building elements in the Texas Mall and UPG will be required to fall into the required design lifespan categories.

Natural Light and Fenestrations
Though the parking garage is located below-grade, daylighting strategies will be employed to draw natural light down wherever possible. The portals that are expressed above-ground for pedestrian access will incorporate daylighting strategies. As noted above, it is anticipated that the majority of the portal facade will be glazed, allowing light to penetrate into the portal. At the primary public portals, it is anticipated that stairs will be situated in open wells with adjacent openings in the slab to allow light down into lower levels. Wall surfaces may incorporate light colors or other finishes that facilitate the movement of light.

Solar tubes will also be explored for their potential use at strategic locations. This may include areas around portals in order to highlight their location and facilitate wayfinding within the garage.

Climate Responsiveness
Due to the Underground Parking Garage's location entirely below grade, no significant additional measures are required to mitigate the hot Texas climate. The garage is also covered entirely by the landscape and hardscape of the Texas Mall, limiting heat penetration from above, similar to a green roof.
Refer to the Landscape section of this report for additional information on plantings and irrigation that assist in the creation of shade and limit the use of water resources.
During Design Workshop 1, two entrance options were explored for the Underground Parking Garage. Both of these options utilized a visitor’s parking entrance/exit off of Brazos Street incorporated into the 1801 Congress Building.

Option 1: Two employee entrances located off of 17th Street on either side of the mall with entry turning off of the street similar to a typical downtown parking garage. The entrance on the west side of the mall was to be located within the footprint of the future Phase 3 building site. Employees’ state child care drop-off was to be located adjacent to the main entry lanes on the east side of the mall.

Option 2: Employee entrances were placed on either side of the mall within the current right-of-way of 17th Street. Through traffic would be eliminated on the street between Colorado and Brazos Streets with access directly into the parking garage by ramping the street down to Level B2. Employees’ state child care drop-off was to circulate up to Level B1 from the entrance on B2.

The committee’s consensus was to develop Option 2 due to its ease of access into and out of the garage and to the fact that it leaves the Phase 3 site unencumbered for future development.

Entrance Controls
Parking controls will be located within the building and for the Visitor’s entrance at the 1801 Congress building. Three travel lanes with controls will be located at the start of the ramps on each side for the entrances along 17th Street. Refer to the Parking System section for more information.
Portal Location Options
During Design Workshop 2, two garage access portal options were presented to the steering committee. These options explored the use of portals both integrated into the buildings and as freestanding landmark objects.

Option 1 presented five total access portals. Three of the portals were for access directly to the Texas Mall, with two of these portals functioning as landmark entry points. The two additional portals were located adjacent to the primary cores of the office buildings above for direct access into the building lobby and proximity to building elevators.

From the garage below, the three mall access portals were located along a central vehicular and pedestrian circulation route with the two office access portals set away from this spine.
Option 2 presented four total portal locations. Two locations were to be freestanding objects for direct access to the mall. One of these was to be a landmark opportunity. Two additional portals were placed at the perimeter of each building along the mall, providing access both directly into the building lobby and out to the mall.

From the garage below, all four portals were located along or near the primary vehicular and pedestrian circulation route. The committee’s consensus was to develop Option 2 due to its flexibility for the building-integrated portals. Additional feedback from the expert panel encourage that all portals be located outside the building footprints in order to force activation of the mall through pedestrian movement from the garage to the buildings.
Parking Garages
During Design Workshop 1, two internal garage circulation options were presented.

Parking Tabulation

<table>
<thead>
<tr>
<th>Parking Garage</th>
<th>Above-grade Garage G1-G9 Levels</th>
<th>Underground Parking Garage B1 Level Child Care</th>
<th>B2 Level Employee</th>
<th>B3 Level Visitor</th>
<th>B3 Level Employee</th>
<th>B4 Level Visitor</th>
<th>B4 Level Employee</th>
<th>B5 Level Employee</th>
<th>B6 Level Employee</th>
<th>B7 Level Employee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitor Parking</td>
<td>G1-G9 Levels 744 spaces</td>
<td>Child Care 45 spaces</td>
<td>Employee 133 spaces</td>
<td>Visitor 276 spaces</td>
<td>Visitor 280 spaces</td>
<td>Visitor 233 spaces</td>
<td>Visitor 428 spaces</td>
<td>Visitor 671 spaces</td>
<td>Visitor 397 spaces</td>
<td>Visitor 356 spaces</td>
</tr>
<tr>
<td>Total Visitor</td>
<td>554 spaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Employee</td>
<td>3009 spaces</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total Parking</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Internal Circulation
Option 1 proposed a circulation with speed ramps along the western edge of the parking garage. All parking was separated from the speed ramps.

Employee Parking
Parking for employees was located on all levels of the garage below the 1601 Congress Building and on levels B5 through B7 below the 1801 Congress Building.

Visitor Parking
Visitor parking (in blue) was located on levels B3 and B4 below the 1801 Congress Building and plaza.

The committee’s consensus was to develop Option 1.
Internal Circulation

Option 2 proposed a circulation with a double-helix ramp configuration at both the north and south end of the parking garage. All ramps were to incorporate parking and travel lanes along the ramp.

Employee Parking

Parking for employees was located on all levels of the garage below the 1601 Congress Building and on levels B5 through B7 below the 1801 Congress Building.

Visitor Parking

Visitor parking (in blue) was located on levels B3 and B4 below the 1801 Congress Building and plaza.

Parking Tabulation

<table>
<thead>
<tr>
<th>Parking Garages</th>
<th>Above-grade Garage</th>
<th>Underground Parking Garage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801 Congress Above-grade Garage</td>
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</tr>
<tr>
<td>G1-G9 Levels</td>
<td>744 spaces</td>
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<tr>
<td>B1 Level Child Care</td>
<td>36 spaces</td>
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</tr>
<tr>
<td>B2 Level Employee</td>
<td>159 spaces</td>
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</tr>
<tr>
<td>B3 Level Visitor</td>
<td>240 spaces</td>
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<tr>
<td>B3 Level Employee</td>
<td>248 spaces</td>
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<tr>
<td>B4 Level Visitor</td>
<td>330 spaces</td>
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<tr>
<td>B4 Level Employee</td>
<td>248 spaces</td>
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</tr>
<tr>
<td>B5 Level Employee</td>
<td>588 spaces</td>
<td></td>
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<tr>
<td>B6 Level Employee</td>
<td>436 spaces</td>
<td></td>
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<tr>
<td>B7 Level Employee</td>
<td>382 spaces</td>
<td></td>
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<tr>
<td>Total Visitor</td>
<td>606 spaces</td>
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<tr>
<td>Total Employee</td>
<td>2805 spaces</td>
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<tr>
<td>Total Parking Phase 1</td>
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</table>

Internal Circulation

Option 2 proposed a circulation with a double-helix ramp configuration at both the north and south end of the parking garage. All ramps were to incorporate parking and travel lanes along the ramp.

Employee Parking

Parking for employees was located on all levels of the garage below the 1601 Congress Building and on levels B5 through B7 below the 1801 Congress Building.

Visitor Parking

Visitor parking (in blue) was located on levels B3 and B4 below the 1801 Congress Building and plaza.
Parking Garage Future Phase Connections
Provisions will be explored to allow for future below-grade connection to the Phase 2 parking garage at 16th Street.
Texas Mall and Garage (TXM)

Architectural Design

Wayfinding
The Underground Parking Garage is a substantial parking facility that will require clear signage and wayfinding techniques. Levels of the parking garage may incorporate colored or symbolic elements to help users identify their parking location. This also allows for easier identification in the event of an emergency. Clear graphics will be employed throughout to direct cars from entry locations to appropriate parking and the facilitate pedestrian movement from parking to the portal locations.

The Texas Mall will utilize directional signage systems to allow for ease of visitor experience and location of key points of interest along the mall. Regulatory signage will be employed to indicated necessary elements such as emergency access lanes or vehicular restrictions. Both regulatory and directional signage will be designed using durable materials consistent with the architectural character of the mall. Typical regulatory signage materials found throughout the city are not assumed to be used along the Texas Mall.

Timelessness and Identity
Buildings should be designed with a timeless style that neither dates nor detracts from the civil character of the complex. Identity should further emphasize the civic magnitude of a state building. Texas iconography celebrates and honors the rich history of our state and its culture. These symbols have been included in civic buildings since the state’s earliest days. Including these elements in the Texas Mall and its buildings is an opportunity to continue a proud tradition and lend the building a unique character.

Texas Mall and Garage (TXM)

Sustainability

Energy
One of the project’s highest priorities is to deliver a high-performing energy efficient building. It is recommended that in early Concept Design the team establish clear goals and expectations for energy efficiency, while encouraging greater use of energy modeling to assist in the project’s design. Creating an energy reduction target and exploring the use of renewables, in addition to the OPR-required solar ready roof design at the Portals and other passive design strategies, can help promote a cost effective and pragmatic approach to energy efficiency.

Materials
It is recommended that during early Concept Design, the Master A/E team develop guidelines for material selection based on an interest in specifying materials that reduce health risks, reduce environmental impacts, and promote indoor air quality.

Water
As previously identified, opportunities for use of the City of Austin’s reclaimed water system and rainwater harvesting will be analyzed and reviewed during early Concept Design. Additionally, opportunities to manage on site storm water through tertiary cleansing and infiltration will also be explored.

Resilient Design
Given the project location in Austin, Texas, certain site risk factors should be taken into consideration, including increased storm power and frequency, tornadoes, and drought. Per the OPR, this project is intended to have a useful life span well into the 50 to 100 year time frame. Incorporating resilient design strategies can help to complement the building element selections to help ensure this time frame.

Site
In order to minimize negative environmental impacts on the site and promote remediation in support of the natural environment and resources, this project increases open space and site vegetation considerably over the current condition through the use of green roof systems and other paved decks placed above the main roof deck of the underground garage. As mentioned previously, native drought-tolerant plant species will be selected to help reduce irrigation demands, which will explore rainwater harvesting as a source for non-potable irrigation water. Storm water management will be reviewed for on-site tertiary cleansing and infiltration to reduce the demand placed on city utilities.
The underground parking garage is an ideal

OPR 2.7.1.8
Provide central cashier station, pay booths, pay

Provide cages for 3% of total FTEs

OPR 2.7.1.2
Provide for 2% of total vehicle count

playground equipment to encourage a variety of uses and to allow

and playground for visual separation and physical protection of the

function afterwards. An architectural and vehicular barrier will

the remainder of the lot accordingly so that it can continue to

function afterwards. An architectural and vehicular barrier will

need to be provided at the line of separation between parking lot

and playground for visual separation and physical protection of the

area. Careful attention shall be made to the design and layout of

playground equipment to encourage a variety of uses and to allow

for universal access to types of play. Additionally, the permanent

structures for the playground shall be designed so they do not

impede future construction or potential main lobby access from the

Texas Mall to the Phase 3 building.

17th Street Garage Entrances
In order to provide direct access to the garage at the B2 level, 17th
Street will no longer provide through-block access on either side of
the Texas Mall. Careful consideration to design and signage will
need to be provided at the intersections of 17th Street/Colorado
Street and 17th Street/ Brazos Street to ensure drivers and visitors
are aware of the change in street access. The street will also
transition from two-lane two-way traffic with parallel parking on
the south side to three-lane traffic at the garage entrances. The
Design Team will study street widths on both sides of the Texas
Mall to ensure proper dimensions are maintained as the street
changes profile.

Garage Green Roof Design
In order to execute the Texas Mall as designed as top of the
Underground Parking Garage, green roof systems shall be utilized
and coordinated with multiple disciplines to ensure the long
term growth and health of the site plantings and trees. Refer to
the Landscape and Structural sections of this report for more
information on how this complex roof system can be designed.

Impacts to Adjacent Sites
In order to excavate the area required for the underground parking
garage, several adjacent sites will incur impacts to existing
landscape and landscape features. This Package scope will
include any repair and replacement of these site features as
required at the 1801 Congress Building site, the 1601 Congress
Building site, and the Texas Mall site. Refer to the Civil and
Landscape sections of this report for more information, including a
diagrammatic analysis of these impacts.

Streetscape
For the adjacent side streets in the project’s Limit of Work, the
project will provide streetscape amenities and plantings consistent
with the 2016 Texas Capitol Complex Master Plan, which are
similar to the City of Austin Great Streets program. Refer to the
Civil and Landscape sections of this Report for more information on which streets
are impacted and what measures are proposed to conform.

Foundation Wall Design
Currently, the Design Team is considering the use of blind side waterproofing for
sub-grade foundation walls for use at conditioned and unconditioned spaces. The
team will review installations currently under construction locally with the Envelope
Consultant to garner final approval. The walls constructed as part of this Package
will be very close to adjacent structures and care must be taken to mitigate all
impacts to the surrounding context. In addition, coordination will be required with
Package 4 1801 Congress Building and Package 5 1601 Congress Building due to
the continuation of several walls at either side of grid lines 6 and 6S. Refer to the
Civil and Structural sections in the Report for more information.

Mechanical Ventilation for Garage
The underground parking garage portion of the building shall be designed to
accommodate mechanical ventilation per the Mechanical design criteria. It is
anticipated that intake and exhaust shafts and vents will be provided at select
locations in the building, which will run vertically and terminate above grade per
requirements for intake and exhaust. As the portal façade design progresses, the
team will review how to discretely integrate these openings into the architectural
character of the building.

Wireless Access Points
Per the Technology section of this Report, the Master A/E team will review
opportunities for Distributed Antenna System (DAS) infrastructure to provide WiFi
connectivity throughout the Texas Mall. These access points could be integrated into
light poles or other site v infrastructure or furnishings to ensure they are integrated in
an aesthetically acceptable way. If the infrastructure is approved by TFC, it will need
to be determined who will provide the base signal feeding the access points.

OPR Compliance

| Storm Shelter | The underground parking garage is an ideal location for this shelter, do not locate under the footprint of the buildings above, provide signage/duress boxes/ emergency lighting in designated areas |
| Bicycle Parking Cages | Provide cages for 3% of total FTEs |
| Access and Revenue Control | Provide central cashier station, pay booths, pay kiosks |
| RFID | Provide RFID activated gate arm or similar |
| Electric Vehicle Recharge Stations | Provide for 2% of total vehicle count |

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Structural
General Requirements

Codes and Standards
The structures are to be designed using the 2015 International Building Code and referenced standards as follow:
- Structural Concrete: Building Code Requirements for Reinforced Concrete, American Concrete Institute, ACI 318-11.
- Structural Masonry: Building Code Requirements for Masonry Structures, American Concrete Institute, ACI 530-11.
- Light Gauge Steel: Specification for the Design of Cold Formed Steel Structural Members, American Iron and Steel Institute, latest edition.

Design Loads
For the purpose of determining minimum wind and earthquake design loads, the building is classified by occupancy as Risk Category IV.

Wind design lateral load on the structural frame shall be based on a 3-second gust Basic Wind Speed equal to 120 mph. Wind Exposure Classification is ‘B’.

Seismic design lateral load on the structural frame shall be based on a Seismic Site Class Designation ‘C’.

Central Utility Plant & Tunnel
Dead loads include the self-weight of structural elements and the following superimposed area loads:

- Soil weight above tunnel: TBD based on elevations
- Suspended ceiling and mechanical: 15 psf
- Piping weights on tunnel floor: actual weights
- CUP Suspended ceiling and mechanical: 25 psf or actual weights
- CUP Roofing and rigid insulation: 10 psf (minimum or actual weights)
- CUP Equipment weights for floors and roof: Actual weights TBD

Live Loads include the following superimposed area and concentrated loads:

- Tunnel floor: 250 psf (minimum)
- CUP Roof: 20 psf (minimum)
- CUP floors: 250 psf (minimum)
- CUP Public areas, corridors, lobbies: 100 psf
- CUP Stairs: 100 psf
- Storage (minimum): 125 psf
- CUP Partitions: 15 psf (where applicable at Office)
- CUP Office: 80 psf
- Loading Dock: 250 psf (to be confirmed)
**General Requirements**

**1801 Congress & 1601 Congress Offices**
Dead loads include the self-weight of structural elements and the following superimposed area loads:

- **Suspended ceiling and mechanical**: 15 psf
- **Suspended plumbing and electrical at garage floors**: 5 psf
- **Additional topping for concrete (3/4” maximum)**: 5 psf
- **Roofing and rigid insulation**: 10 psf (minimum or actual weights)
- **Green roof elevated deck areas**: 65 psf (minimum)
- **Solar panel allowance on roof**: 10 psf

Live Loads include the following superimposed area and concentrated loads:

- **Roof**: 20 psf
- **Public areas, corridors, lobbies**: 100 psf
- **Stairs**: 100 psf
- **Tenant Agency Terraces**: 100 psf
- **Mechanical Rooms**: 150 psf
- **Storage (minimum)**: 125 psf
- **Partitions**: 15 psf
- **Office**: 80 psf
- **Parking Garage**: 40 psf
- **Parking Garage Impact Load**: 3000 lbs
- **Loading Dock**: 250 psf (to be confirmed)

**Texas Mall and Garage**
Dead loads include the self-weight of structural elements and the following superimposed area loads:

- **Superimposed loadings atop plaza**: Refer Loading Diagram Package 6
- **Suspended ceiling and mechanical**: 15 psf
- **Chiller or utility piping**: Specific weights TBD
- **Suspended plumbing and electrical garage floors**: 5 psf
- **Additional topping for concrete (3/4” maximum)**: 10 psf

Live Loads include the following superimposed area and concentrated loads:

- **Live loads atop plaza**: Refer Loading Diagram – Package 6
- **Public areas, corridors, lobbies**: 100 psf
- **Stairs**: 100 psf
- **Mechanical Rooms**: 150 psf
- **Storage (minimum)**: 125 psf
- **Parking Garage**: 40 psf
- **Parking Garage Impact Load**: 3000 lbs
Excavations

The excavation considerations are based on geotechnical information from surrounding sites. The site-specific geotechnical study is underway but not completed at the time of this issue. Based on the surrounding information, the site will likely consist of some pavements and base materials and/or natural soils. The uppermost natural soil layer will be clayey or sandy silts. Directly below these areas it is anticipated that the Austin Group limestone will be encountered. The depth of this limestone will vary. The limestone will likely consist of a tan and gray limestone. The gray limestone will be a higher compressive strength material than the upper tan limestone. Below the Austin Group limestone is an Eagle Ford Shale that will be encountered. The shale is a lower compressive strength material than the limestone. Based on surrounding information it is anticipated that this material will occur at a mean sea elevation of approximately 460 ft. or lower. Below this formation a Buda limestone should be encountered that will vary in depth with a Del Rio Shale below the Buda formation.

The below-grade excavation is anticipated to primarily occur within the Austin Group Limestone. Water seepage is likely to be encountered during excavation and will need to be controlled. The geotechnical report shall provide more specific determination on water observations. The seepage will likely be related to rock fractures and seams between stratum layers.

The excavation will require some amount of soil stabilization or layback for the upper material and stabilization of the rock material through rock bolting, tiebacks, shotcrete or similar methods. The geotechnical findings will aid in determination of methods to stabilize the existing materials during excavations.

Adjacent Building Foundation Considerations

The existing building foundations and proximity of the excavation will require review and design for surcharge pressures where applicable that will be imparted to the excavation tieback system and final basement wall system. Based on final routing of tunnel there may be distinct locations of close proximity to the excavation, the existing foundation system will need further evaluation to determine any affect from the excavation. The William B. Travis Building lowest basement level is at 505 ft. mean sea elevation. The bottom of the drilled piers are approximately at 493 ft. MSL based on the existing documentation. The excavation depth and final routing of the tunnel will require further analysis relative to proximity of the foundation and shallow depth to ensure that the excavation does not affect the in place capacity of the existing foundations and lowest level support of perimeter foundation walls and basement slab. This area may require underpinning of the existing foundation based on evaluations with geotechnical report findings and final tunnel routing.

Monitoring Program

The pre-concept outline for the basic monitoring program of the existing adjacent structures will be as follows: Prior to starting excavation work at the site, a visual survey shall be made and photographs taken of all improvements near the planned excavation to establish the existing conditions. The photo survey shall include interiors of adjacent buildings.

The excavation and adjacent structures shall be monitored (via survey) for horizontal and vertical movement by a Texas Registered Professional Land Surveyor at the following locations, provided access from the neighboring buildings.

- Top and midpoint of the excavation at 30 ft. centers.
- Corners and every 25 feet along adjacent buildings.
- Settlement monitoring points shall be installed along the street curb and street centerline at 50-ft intervals, additionally, readings shall be taken at all wastewater pipe flowlines and manhole covers and all water line valve stems.

Monitoring points shall be surveyed for horizontal and vertical movement at the following intervals.

- Prior to starting dewatering and excavation
- Once every week during mass excavation.
- Upon completion of each row of tiebacks/ rock nails.
- Upon completion of general excavation.
- Continue monitoring until 30 days after completion of the below-grade structure.

Monitoring point locations shall be field adjusted as required to avoid conflicts with existing/proposed improvements and shall be tied to benchmarks that are a minimum of 75 ft. away from the excavation not subject to ground influenced movement.

Settlement monitoring points shall be a type that is vandal-proof and not subject to being disturbed by pedestrian or vehicular traffic.

The general contractor shall stop excavation and notify the subsurface specialty contractor, engineer of record and the geotechnical engineer if more than ½ inch of horizontal or ¼ inch vertical movement is observed on the walls.

Survey monitoring results shall be submitted to the owner, architect of record, structural engineer of record, general contractor, shoring engineer and geotechnical engineer within 3 days of field survey measurements.

Vibration measurements should be conducted at the adjacent buildings. A minimum of five measurement points per building should be installed to be used during excavation, installation of tiebacks and during below-grade structural construction until 30 days after completion of the below-grade structure. The measurements should occur prior to start of excavation to provide a baseline vibration. Measurement equipment will be installed inside and outside of these buildings (three inside and two outside). The measurements should be taken on a two-week basis during construction excavation activities and reviewed to limit vibrations to 0.6 in/sec.

We would recommend continuous vibration monitoring at the Gethsemane Church. The vibration monitoring shall be initially set conservatively at thresholds of 0.3 in/sec for transient vibrations and 0.2 in/sec for continuous vibrations prior to an alarm alerting the general contractor and subcontractor in order to immediately stop the current work and determine and correct source of vibrations. The owner, architect of record, structural engineer of record and geotechnical engineer shall also be notified. Thresholds levels should be further refined by monitoring vibrations in the buildings for a month period of time during normal day to day activities before construction commences.
Excavation

Conceptual wall sections for below-grade conditions
The wall section indicates two methods for the final condition of the excavation at the Plaza and below the 1801 Congress and the 1601 Congress Building for the below-grade structure. The recommended approach would be the blind side approach that would allow for the excavation to occur outside face of waterproofing for the below-grade structure.

Recommended Wall section with blind-side waterproofing and drainage
Pros:
- The wall placed directly against limestone will have reduced soil pressure since the limestone should be very stable and exert very low lateral pressure against basement
- Reduced lateral pressure against wall result in reduce shear and bending moment in concrete basement walls
- Less demand on lateral systems for resisting any unbalanced soil load pressures.
- Allows near property line excavations

Cons:
- Waterproofing and drainage mat are placed blindside and can only be inspected prior to concrete wall forms being installed.

Wall section per OPR 5.4.3.2 to not have blind-side waterproofing and drainage
Pros:
- Allows for inspection of waterproofing on backside of wall prior to backfilling

Cons:
- Creates significant wall pressures from backfill soil load. This will create larger needs for lateral resistant frames in the below-grade structure due to unbalanced soil loads based on required expansion joint layouts
- The soil lateral wall pressures will require thicker basement walls to resist pressures and resulting shear and bending moments
- Creates larger excavation or reduced garage size depending on property line constraints
Central Utility Plant and Tunnel (CUP)

CUP
The expansion of the Central Utility Plant will be a cast in place concrete structure. The building will consist of a below-grade level, basement level at or near grade and a roof deck supporting the cooling towers. The intent is for the floors of the expansion to be similar in elevation to the existing building. The site has an adjacent existing building for the battery backup systems. This building will be evaluated to leave in place with the new structure built around the existing structure or to provide temporary battery backup at an alternate location to allow for the removal and new construction to occur at this location. The extent of the below-grade basement excavation is still under development. It is recommended to have the new basement placed at a defined distance away from the existing basement to not interfere with the existing foundations, waterproofing and below-grade drainage system around the existing construction. Based on the anticipated heavy mechanical equipment loads, the slab will be in the range of an 8 to 10 inch thick slab with specific locations of increased depth based on heavy pad supported equipment loads. The perimeter basement walls will be cast in place concrete with perimeter drainage system, wall drainage mats and waterproofing. The distinct concentrated loads are anticipated to be supported on drilled straight shaft piers bearing into an underlying limestone. Based on the location of the limestone, spread footings and continuous footings will also be evaluated for the supporting foundations. This will be further defined upon receipt of the geotechnical information.

The elevated structure will consist of a cast in place slab and beam system. The final layout will be dependent on the column layout to coordinate with the equipment clearance requirements. All beams, girders and slabs are anticipated to be reinforced with mild steel and not incorporate post tensioned reinforcement. Post tensioned reinforcement will be evaluated for any special long span girder conditions that would require long span and limiting beam depth considerations.

The roof structure will also utilize the same cast in place construction due to the heavy loading requirements to support the mechanical equipment and cooling towers. For the long term adaptability of the plant, a grid of cast in of inserts will be recommended at the underside to the elevated structures to allow for support of piping without drilling into the concrete structure.

The lateral system for the plan will primarily consist of the concrete moment frames. Shear walls are not anticipated based on the building height.

Utility Tunnel
The tunnels will be approximately 12 ft. wide inside dimension and approximately 12 ft. 6 inch in height inside dimension. This will be further developed as the layout of the piping is determined. The foundation and floor are anticipated to be a continuous mat footing. The walls and roof structure will be cast in place concrete. All the foundation and walls will be reinforced with mild steel reinforcement. The walls and roof will be designed based on depth below the ground surface and minimum live loads as indicated in the design loads. Hollow structural steel sections will be used to create the pipe rack support along one wall of the tunnel. It is anticipated that the racks will be spaced at approximately 10 ft. on center.

Some areas of the tunnel will occur in close proximity to the existing building foundations and will require careful coordination for final routing, design and excavation for the tunnel installation. The tunnel path will go below the Robert E. Johnson building through the breezeway and carry through the garage at the same location. The foundations at the building are straight drilled piers in close proximity to the bottom of the tunnel. The excavation through this area will need to placed in a manner to not over excavate and to provide temporary retention methods as required for installation of the cast in place concrete tunnel without detrimental effect to the existing piers. The existing pier foundation is designed for end bearing pressure only per the existing drawings and existing geotechnical report. The final layout relative to the existing foundation will be reviewed with the geotechnical engineer of record.
1801 Congress Building

The office tower is a 14 story elevated structure above the five level below-grade parking. The typical elevated office tower floors and roof are based on a typical 30 ft. by 30 ft. grid column grid. The column grid is dictated by the configuration of the buildings depths and coordinating with the proposed interior space usage layouts and the below-grade parking. Based on a 30 ft. maximum span, the cast in place concrete system will consist of a cast in place concrete with post tension reinforcement in the girders with all other components utilizing mild steel reinforcement.

Two systems are considered for the typical office floors.

The first and recommended option is the beam and skip pan joist cast in place concrete system. This system works well for the office environment and allows flexibility for future openings within joist spacing or larger openings with supplemental steel framing between the main girders. The slab has mild reinforcement which allows for easier retrofit and coring of the slab for changes in office uses. The joists will utilize 16 inch deep pans with a 5 inch thick slab for a total structure depth of 21 inches. The joists will be reinforced with mild steel. The joists will be supported by girders at each column line. The primary girders will be 21 inches deep. The girders will be post-tensioned. The columns will be cast in place and reinforced with mild reinforcement. Refer to the conceptual bay study for structural system description plan.
The second system is the beam and slab system. This system utilizes formed beams instead of joists to support the slab. This system also utilizes a 6 inch thick slab to span the typical 10 ft. spacing between the supporting beams. The depth of this system would be 24 inches. The system also provides for future retrofit and adaptability. The formed beams can impact speed of construction and associated labor for the forming in comparison to the metal pan system.

A cast-in-place concrete structure is inherently fireproof. No additional external fireproofing will be required to achieve the floor fire separation requirements. Exposed architectural finish surfaces shall meet Class A finishes and other non-exposed surfaces shall meet a Class B finish.

Concrete moment frames using the girders and beams will comprise the primary lateral resisting system. Concrete shear walls may be required through the parking levels based on lateral analysis and final building configuration. The concrete shear walls will be located to coordinate with permanent stairs or core elements that will not impact the long term adaptability of the building.

The elevated structural levels cast in place concrete minimum 28-day concrete compressive strengths will be 5,000 psi. The cast in place concrete columns shall have 28-day compressive strengths in the range of 5,000 psi to 8,000 psi, and reinforcing steel shall have a minimum yield stress of 60 ksi with potential use of 75 ksi in the vertical elements.

The terrace deck areas will also utilize the same framing system. The spacing of the joists will be reduced to allow for the greater loading requirements of exposed terraces and landscape loadings. These areas are anticipated to be recessed below the adjacent floor elevations to allow for waterproofing and sloping of the outdoor areas. The amount of recess will shift the depth of the structural system by the same amount for the floor to floor height reduction below these areas.
Miscellaneous steel members will be required for items such as stairs, façade support, elevator divider beams, intermediate cable guardrail supports, etc.

**Loading Dock Considerations**
The loading dock will require transfer of several columns from the office above to allow for the travel of the trucks access under the tower to the loading dock. Some columns will be shifted up to 15 ft. from their location for the tower above. It is anticipated that approximately five locations will require transfer of columns from a 30 ft. grid to an approximate 45 ft. span conditions. These transfer girder must be sized based on strength and also to limit the deflection of the supporting column and 14 story structure above. In order to limit the depth of these members, post tension reinforcement will be used at these transfer girder locations. The post tensioning will be staged stressed as the tower is constructed above the transfer girders.

**Cultural Venue**
The potential cultural venue is intended to create an open space and irregular shaped structure. Based on current conceptual studies, the structure is anticipated to be constructed primarily of architecturally exposed structural steel construction. The use of exposed structural steel and structural concrete will be explored during concept phase in order to provide consistent architecturally exposed structural steel and provide the appropriate fire rating where required. The treatment of the exposed steel is to be considered an architecturally exposed structural steel (AESS) level of finish. The deck areas will use composite steel and deck construction. A typical floor deck would consists of 2 inch composite metal deck supporting 4 ½ inch thickness of concrete for a total deck thickness of 6 ½ inches.

**Below-Grade Parking**
The below-grade parking structure will transition in framing type to correspond with the parking plaza below-grade. The recommended system is a concrete cast in place flat slab and drop panel. This is the recommended system to limit depth of structure and correspondingly the depth of the below-grade excavation. Reference Package 6 for detailed description and bay study for the below-grade parking.

The foundation for the tower and below-grade parking structure are anticipated to be drilled straight shaft piers that bear into the underlying Buda Limestone below the Eagle Ford Shale. Based on the geotechnical findings and depth of the Upper Austin limestone formation remaining below the excavation, spread footings or mat foundation may be reviewed as an option for construction and cost efficiencies instead of drilled pier foundation.

The perimeter below-grade excavations shall consist of cast in place concrete walls. The thicknesses and strengths will be determined based on the recommendation of the geotechnical report. All below-grade walls will require a drainage system and waterproofing. A perimeter drainage system with cleanouts will be required at the lowest level. Under slab drainage will be reviewed
1601 Congress Building (C16)

1601 Congress Building
The office tower is a 12 story elevated structure above the five level below-grade parking. The typical elevated office tower floors and roof are based on a 30 ft by 45 ft maximum span column grid. The column grid is dictated by the configuration of the buildings depths and coordinating with the proposed interior space usage layouts and the below-grade parking. Based on a column grid layout, the cast in place concrete system will consist of a cast in place concrete with post tension reinforcement in the girders with all other components utilizing mild steel reinforcement.

Two systems are considered for the typical office floors.

The first and recommended option is the beam and skip pan joist system cast in place concrete system. This system works well for the office environment and allows flexibility for future openings within joist spacing or larger openings with supplemental steel framing between the main girders. The slab has mild reinforcement which allows for easier retrofit and coring of the slab for changes in office uses. The joists will utilize 20 inch deep pans with a 5 inch thick slab for a total depth of 25 inches. The joists will be reinforced with mild steel and typically spaced at approximately 6 ft. o.c. The joists will be supported by girders at each column line. The primary girders will be 25 inches deep. The girders will be post-tensioned. The columns will be cast in place and reinforced with mild reinforcement. Refer to the conceptual bay study for structural system description plan.

The second system is the beam and slab system. This system utilizes formed beam instead of joists to support the slab. This system also utilizes a 6 inch thick slab to span the typical 10 ft spacing between the supporting beams. The depth of this system would be 36 inches. The system is not preferred for the 45 ft. span condition as the beams would require post-tension to limit the beam depth. For the consideration for the adaptability of the structure and per the Owner’s project requirements, post-tensioning is not an acceptable option for use in the beams. The post-tensioning in the beams would the ability for removal of beams for reconfiguration and addition of future openings.
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A cast-in-place concrete structure is inherently fireproof. No additional external fireproofing will be required to achieve the floor fire separation requirements. Exposed architectural finish surfaces shall meet Class A finishes and other non-exposed surfaces shall meet a Class B finish.

Concrete moment frames using the girders and beams will comprise the primary lateral resisting system. Concrete shear walls may be required through the parking levels based on lateral analysis and final building and below-grade parking configuration. The concrete shear walls will be located to coordinate with permanent stairs or core elements that will not impact the long term adaptability of the building.

The elevated structural levels cast in place concrete minimum 28-day concrete compressive strengths will be 5,000 psi. The cast in place concrete columns shall have 28-day compressive strengths in the range of 5,000 psi to 8,000 psi, and reinforcing steel shall have a minimum yield stress of 60 ksi with potential use of 75 ksi in the vertical elements.

Miscellaneous steel members will be required for items such as stairs, façade support, elevator divider beams, intermediate cable guardrail supports, etc.
State Employees’ Child Care Facility
The building will contain a State employees’ child care facility at the ground level. As part of the facility, a safe room shall be designated and designed based on ICC/NSSA Standards for the design and construction of storm shelters. The minimum load shall be an EF-3 windstorm resistance. Per ICC 500, the minimum wind speed for tornado shelter design is 200 mph. Per FEMA Guide P-361, the 200 mph wind speed area was developed using the statistics of an EF3 tornado occurrence. The recommended location for this facility would be at an at grade level to not impact the design of the remainder of the tower or parking structure.

Below-grade Parking
The below-grade parking structure will transition in framing to correspond with the parking plaza below-grade parking. The recommended system is a concrete cast in place flat slab and drop panel. This is the recommended system to limit depth of structure and correspondingly the depth of the below-grade excavation. Reference Package 6 for detailed description and bay study for the below-grade parking.

The foundation for the tower and below-grade parking structure are anticipated to be drilled straight shaft piers that bear into the underlying Buda Limestone below the Eagle Ford Shale. Based on the geotechnical findings and depth of the Upper Austin limestone formation remaining below the excavation, spread footings or mat foundation may be reviewed as an option for construction and cost efficiencies instead of drilled pier foundation.

The perimeter below-grade excavations shall consist of cast in place concrete walls. The thicknesses and strengths will be determined based on the recommendation of the geotechnical report. All below-grade walls will require a drainage system and waterproofing. A perimeter drainage system with cleanouts will be required at the lowest level. Under slab drainage will be reviewed with the geotechnical findings.
Texas Mall and Garage (TXM)

Mall
The mall will be a multi-functional space. The mall structure design will require the versatility to be used for pedestrian usage, public gatherings, concert venues, temporary staging, emergency vehicles, temporary vehicular load, landscape areas, large trees, statues and other potential future conditions. The conceptual loading diagram indicates the proposed loading for the design of the mall structure.

<table>
<thead>
<tr>
<th></th>
<th>Tree Planting Area</th>
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<tr>
<td>A</td>
<td>Dead Load</td>
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<td></td>
<td>Soil Weight</td>
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<tr>
<td></td>
<td>Tree Weight</td>
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</tbody>
</table>
|   | Statues           | at TBD designated zones, assume:
|   |                  | max height of 15' including pedestal
|   |                  | max point dead load of 12,000 lbs over 5' x 5' area.
|   |                  | max of one statue per 30' x 30' area in addition to
|   |                  | live load |
|   | Live Load         | 150 psf |
| B | Texas Mall        |
|   | Dead Load         | 500 psf |
|   | Statues           | at TBD designated zones, assume:
|   |                  | max height of 15' including pedestal
|   |                  | max point dead load of 12,000 lbs over 5' x 5' area.
|   |                  | max of one statue per 30' x 30' area in addition to
|   |                  | live load |
|   | Live Load         | 250 psf, min & AASHTO HS20-44 for wheel loads |
| C | 1801 Congress &   |
|   | 1601 Congress     |
|   | Dead Load         |
|   | Plaza             | TBD w/ Landscape Architect |
|   | Live Load         | 250 psf & AASHTO HS20-44 for wheel loads |
Two systems are considered for the mall levels.

The first and recommended option is the flat slab concrete system. The slab is anticipated to be 20 inches in thickness with drop panels at each column for an additional 16 inches of depth. The system will utilize mild reinforcement to allow for future adaptability if required for the space. The columns will be cast in place and reinforced with mild reinforcement. Refer to the conceptual bay study for structural system description plan.

The second system considered for the mall level is the beam and slab system. This system utilizes formed beam to support the slab. This system would have a 10 inch thick slab to span the typical 10 ft spacing between the supporting beams. The beam depths of this system would be 36 inches including the slab depth. The supporting girders would be 42 inch depth inclusive of slab depth. Refer to the conceptual bay study for structural system description plan.

A cast-in-place concrete structure is inherently fireproof. No additional external fireproofing will be required to achieve the floor fire separation requirements. Exposed architectural finish surfaces shall meet Class A finishes and other non-exposed surfaces shall meet a Class B finish.

Concrete moment frames using the girders and beams will comprise the primary lateral resisting system. Concrete shear walls may be required through the parking levels based on lateral analysis and potential unbalanced soil loads.

The mall and parking floor structure cast in place concrete minimum 28-day concrete compressive strengths will be 6,000 psi. The cast in place concrete columns shall have 28-day compressive strengths in the range of 5,000 psi to 8,000 psi, and reinforcing steel shall have a minimum yield stress of 60 ksi with potential use of 75 ksi in the vertical elements.

Miscellaneous steel members will be required for items such as stairs, elevator divider beams, intermediate cable guardrail supports, etc.
Below-grade Parking

The below-grade parking structure recommended system is a concrete cast in place flat slab and drop panel. This is the recommended system to limit depth of structure and correspondingly the depth of the below-grade excavation. The system will utilize a mild reinforced flat slab with drop panels at the columns. The typical slab thickness shall be 9 inches with an additional 3 ½ inches at the drop panels for a total thickness of 12 ½ inches at the drop panel locations at columns.

The foundation for the mall and below-grade garage parking structure are anticipated to be drilled straight shaft piers that bear into the underlying Buda Limestone below the Eagle Ford Shale. Based on the geotechnical findings and depth of the Upper Austin limestone formation remaining below the excavation, spread footing and continuous footings may be reviewed as an option for construction and cost efficiencies instead of drilled pier foundation. The use of this system will also take into account the potential differential settlement between the mall and parking structure and the more heavily loaded office structures.

The perimeter below-grade excavations shall consist of cast in place concrete walls. The thicknesses and strengths will be determined based on the recommendation of the geotechnical report. All below-grade walls will require a drainage system and waterproofing. A perimeter drainage system with cleanouts will be required at the lowest level. Under slab drainage will be reviewed with the geotechnical findings.
Phase 2 Expansion
The southern end of the Underground Parking Garage (UPG) will be designed to accommodate openings within the existing basement walls to allow for the connection of drive aisles into the Phase 2 underground parking garage.

Expansion Joint Locations
Based on the size of the final below-grade structure for the mall, the 1801 Congress Building and the 1601 Congress Building, expansion joints will be required to allow for the immediate and long term creep and temperature shrinkage of the concrete superstructures. The proposed expansion joint locations are as indicated in the diagram.
Texas Mall and Garage (TXM)

The second option is the beam and skip pan joist cast in place concrete system. This system would increase the structural depth and potentially create increased excavation depth. The joists will utilize 16 inch deep pans with a 5 inch thick slab for a total structure depth of 21 inches. The joists will be reinforced with mild steel. The joists will be supported by girders at each column line. The primary girders will be 21 inches deep and mild reinforced. The columns will be cast in place and reinforced with mild reinforcement.
Texas Mall and Garage (TXM)
3.5 Pre-Conceptual Design Analysis

Plumbing
1801 Congress Building
Plumbing Systems

UTILITIES
The site will be served by the following services:

Domestic Water
8” diameter. Preliminary testing established that there is adequate flow near the proposed building and water system static pressure is 65 psig.

Sewer
10” Diameter

Storm
21” Diameter per 2015 IPC 1106.3

BUILDING LOADS
Preliminary estimate of the domestic building loads and required sizes.

Water
8” diameter ~ 550 GPM at 5 FPS.

Waste
1850 DFU’s

Sanitary Sewers
The sanitary waste system will be sized per 2015 IPC using 1/4” per foot slope for piping 2”-3” and 1/8” per foot slope for piping 4” and larger. Above ground soil, waste, vent and storm water piping shall be cast iron no-hub soil pipe. Piping in crawlspace and below slab shall be schedule 40 PVC. Spic & hub cast iron heavy weight for commercial Kitchen and Laundry equipment waste discharges.

1. Floor drains and floor sinks shall be cast iron with flashing flange and shall have neoprene hubless outlets with nickel bronze strainer.
2. Floor drains will be provided as a minimum in the following locations:
   a. Mechanical Equipment
   b. Pump Rooms
   c. Janitor’s Closet
   d. Public toilet rooms
3. Any sinks receiving kitchen waste will be routed to a grease interceptor.
4. Soil, waste, and vent piping will be provided to each and every plumbing fixture and equipment for the proposed building.
5. Final soil, waste, and vent piping connections will be provided to all items requiring waste connections, including all piping, fittings, waste outlets, traps, hangers, and supporting steel, and all miscellaneous related items for a complete and operable system.
6. All building sanitary and waste drainage will be collected and extended to site sanitary sewer. Refer to civil narrative for the additional requirements as it relates to the exterior sewer system and the connection of the sanitary sewers for the proposed building.
7. All vents will be collected and extended to full size roof vents as required.
8. All floor drains will be provided with deep seal traps.
9. The soil and waste system will be provided with cleanouts installed at 40 feet on center and at changes in direction of 90 degrees or more, at the bottom of

PLUMBING SYSTEM DESCRIPTIONS

Domestic Water
Domestic water within the building shall be ductile iron for sizes 4” and larger; and for pipe sizes 3” and smaller shall be copper tube ASTM B88 Type K copper alloy solder joint fittings. For underground domestic water use ASTM B88 Type L with copper alloy solder joint fittings.

1. System shall be provided with a triplex domestic water booster pump system linked with BAS control panel, with hydro-pneumatic pressure expansion tank. System shall be sized to 90 PSI.

2. Lines will be sized in accordance with 2015 IPC The building shall be provided with a domestic water meter provided with Strainer on inlet, and BFP on outlet side.
3. No standby/emergency domestic water storage capacity is required.
4. Provide round brass stamped tags on braided chains for all valves and equipment.
5. Provide color coded vinyl pipe flow and system identification labels.
6. Provide shutoff valves to disconnect all equipment.
7. Provide shutoff valves to isolate all branches off the main, fixture groups, and individual fixtures which do not have service stops.
8. Use ball valves on piping 3” and less and butterfly valves on piping 4” and larger.
9. All ball valves to be full port, two piece with Stainless steel trim.
10. All butterfly valves to have Stainless steel trim and EPDM seats.
11. Provide water priming system for bathroom floor drains.

Water Softener
A water softener will not be required based on the City of Austin water quality report that states hardness level being less than 7 grains per gallon.

Water Heater
Hot water will be generated by three storage types: gas fired, high efficient, and condensing type water heaters set for an outlet temperature of 140°F with an installation suitable for independent unit isolation for maintenance. The hot water recirculation system shall be designed to run at 130°F @ 3 GPM. Point of use thermostatic mixing valves shall be provided at all public plumbing fixtures using hot water. The TMV outlet temperature shall be preset at 110°F. Floor drains will be provided as a minimum in the following locations:

1. System shall be provided with a gravity roof drainage system to be via primary roof and secondary overflow drain system piped through building. Roof drainage design shall be based upon a 100 year storm with 60 minute duration at 5” per hour intensity per 2015 IPC. Secondary roof drainage shall be set following the High rise building design criteria.

2. Storm drainage piping will be designed for 4” of rainfall per hour.
3. All horizontal storm drainage piping, including drain bodies will be insulated.
4. Roof drains will be provided at all roofs receiving rainwater.
5. Maximum area per drain will be 5,000 sq. ft., with a minimum of:
   a. 2 drains for roofs under 10,000 sq. ft.
   b. 4 drains for roofs 10,000 sq. ft. or more

Sanitary Sewers
The sanitary waste system will be sized per 2015 IPC using 1/4” per foot slope for piping 2”-3” and 1/8” per foot slope for piping 4” and larger. Above ground soil, waste, vent and storm water piping shall be cast iron no-hub soil pipe. Piping in crawlspace and below slab shall be schedule 40 PVC. Spic & hub cast iron heavy weight for commercial Kitchen and Laundry equipment waste discharges.

1. Floor drains and floor sinks shall be cast iron with flashing flange and shall have neoprene hubless outlets with nickel bronze strainer.
2. Floor drains will be provided as a minimum in the following locations:
   a. Mechanical Equipment
   b. Pump Rooms
   c. Janitor’s Closet
   d. Public toilet rooms
3. Any sinks receiving kitchen waste will be routed to a grease interceptor.
4. Soil, waste, and vent piping will be provided to each and every plumbing fixture and equipment for the proposed building.
5. Final soil, waste, and vent piping connections will be provided to all items requiring waste connections, including all piping, fittings, waste outlets, traps, hangers, and supporting steel, and all miscellaneous related items for a complete and operable system.
6. All building sanitary and waste drainage will be collected and extended to site sanitary sewer. Refer to civil narrative for the additional requirements as it relates to the exterior sewer system and the connection of the sanitary sewers for the proposed building.
7. All vents will be collected and extended to full size roof vents as required.
8. All floor drains will be provided with deep seal traps.
9. The soil and waste system will be provided with cleanouts installed at 40 feet on center and at changes in direction of 90 degrees or more, at the bottom of
### 1801 Congress Building
### Plumbing Systems

Vertical risers and as the sewer exits the building.

10. Sump pumps and sewage ejectors shall be provided for all drainage with inverts 1 foot above, and all the piping below street sewer main invert.

### Special Waste

All Fat, Oil, Grease, and special waste systems shall be provided with approved separator, and/or interceptor.

- Retaining time and venting shall meet 2015 IPC requirements.
- Design shall provide the required clearances for service and maintenance.

### Cathodic Protection

Cathodic protection will be provided, if required, per National Association of Corrosion Engineers (NACE). Polyethylene piping will be used for underground gas pipe.

### Backflow Protection

Backflow protection will be provided in accordance with 2015 IPC (Backflow Prevention Devices, Assemblies, & Methods)

### Plumbing Fixtures

Fixtures shall meet Federal standards for required flow control devices. 2015 IPC Table 422.1(Minimum Plumbing Facilities), 2010 ADA code requirements will be followed in all aspects regarding handicapped accessible fixtures.

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Flow Rate (GPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public lavatories</td>
<td>0.35</td>
</tr>
<tr>
<td>Public Drinking Fountains</td>
<td>0.5</td>
</tr>
<tr>
<td>Public sinks:</td>
<td>1.0</td>
</tr>
<tr>
<td>Public water closets</td>
<td>1.28</td>
</tr>
<tr>
<td>Public Urinals</td>
<td>0.125</td>
</tr>
<tr>
<td>Mop basin/Service sink</td>
<td>2.0</td>
</tr>
<tr>
<td>Wall hydrants</td>
<td>5.0</td>
</tr>
<tr>
<td>Public Showers</td>
<td>1.5</td>
</tr>
</tbody>
</table>

### Estimated Plumbing Fixture count:

- Lavatory: ~156 Units
- Drinking Fountains: ~59 Units
- Sink: ~18 Units
- Water Closet: ~206 Units
- Urinal: ~42 Units
- Mop Basin: ~14 Units
- Wall hydrants: ~16 Units
- Shower: ~4 Units

### Elevator Hoist-way

Each elevator hoist-way shall be provided with a 50 FT head, 50 GPM (per elevator car) oil sensing, and sump pump in a 30” x 30” pit at bottom of elevator shaft. Pump shall be connected to BAS.

### Insulation

Provide mold resistant mineral fiber with all-purpose scrim foil jacket pipe insulation on domestic cold, hot, and hot water recirculating piping in all areas of the building. Branch piping does not have to be insulated at the Owner’s discretion, but is recommended. Provide factory applied all service jacket in concealed areas and exposed areas. Use preformed insulation fittings for all valves and fittings use valve handle extensions on all shutoff valves.

### Gas System

Building shall be provided with medium pressure natural gas service.

- Gas service size and meter locations shall be coordinated with local Utility Company.
- A Medium Pressure 4" Diameter gas service.
- All appliances and equipment shall be provided with a gas pressure reducing valve.
- All connections to equipment shall be provided with a dirt leg.
- System shall be air pressure tested for leaks before introducing gas to piping array.

### Commissioning

Plumbing systems and components to be commissioned include the domestic water treatment systems, hot water system generator, pumps and components, plumbing fixtures, and all electronic plumbing sensors.

### Design Criteria

The Plumbing systems will be designed in accordance OPR Manual, with TFC, & SECO requirements

- Americans with Disabilities Act (“ADA”) 1990
- Energy Environmental Protection Agency (“EPAct”) 2005
- International Association of Plumbing and Mechanical Officials (IAPMO)
- International Code Council (ICC) family of codes (latest published editions)
- International Building Code (IBC)
- International Fuel Gas Code (IFGC)
- International Plumbing Code (IPC)
- National Fire Protection Association (NFPA)
- (Latest published editions)
- NFPA 54: National Fuel Gas Code

### Texas Commission on Environmental Quality (TCEQ)

Regulations regarding water, wastewater and storm water, waste management, and pollution prevention

Edwards Aquifer Protection Program (EAPP)

### Domestic water savings

The anticipated water savings for the project is 20% as basis of design.

### Storm reclaimed water savings

The building(s) shall be designed to meet SECO requirements for use of reclaimed water. Sources of reclaimed water may include captured rainwater, condensate, and municipally provided reclaimed water, among others.

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TCC Phase 1 Pre-Conceptual Design Report  
Texas Facilities Commission  
Volume 3  
Pre-Conceptual Design Analysis  
Plumbing
1601 Congress Building
Plumbing Systems

UTILITIES
The site will be served by the following services:

Domestic Water
8" diameter. Preliminary testing established that there is adequate flow near the proposed building and water system static pressure is 65 psig.

Sewer
10" Diameter

Storm
21" Diameter per 2015 IPC 1106.3

BUILDING LOADS
Preliminary estimate of the domestic building loads and required sizes.

Water
8" diameter ~ 500 GPM at 5 FPS.

Waste
1600 DFU's

Storm
System shall be based on 5" rainfall per hour size rating per the OPP.

PLUMBING SYSTEM DESCRIPTIONS

Domestic Water
Domestic water within the building shall be ductile iron for sizes 4" and larger; and for pipe sizes 3" and smaller shall be copper tube ASTM B88 Type L with copper alloy solder joint fittings.

For underground domestic water use ASTM B88 Type K copper pipe and fitting shall be used.

1. System shall be provided with a triplex domestic water booster pump system linked with BAS control panel, with hydro-pneumatic pressure expansion tank. System shall be sized to 80 PSI.
2. Lines will be sized in accordance with 2015 IPC
3. The building shall be provided with a domestic water meter provided with Strainer on inlet, and BFP on outlet side.
4. No standby/emergency domestic water storage capacity is required.
5. Provide round brass stamped tags on braided chains for all valves and equipment.
6. Provide color coded vinyl pipe flow and system identification labels.
7. Provide shutoff valves to disconnect all equipment.
8. Provide shutoff valves to isolate all branches off the main, fixture groups, and individual fixtures which do not have service stops.
9. Use ball valves on piping 3" and less and butterfly valves on piping 4" and larger.
10. All ball valves to be full port, two piece with stainless steel trim.
11. All butterfly valves to have stainless steel trim and EPDM seats.
12. Provide water priming system for bathroom floor drains.

Water Softener
A water softener will not be required based on the City of Austin water quality report that states hardness level being less than 7 grains per gallon.

Water Heater
Hot water will be generated by three storage types: gas fired, high efficient, and condensing type water heaters set for an outlet temperature of 140°F with an installation suitable for independent unit isolation for maintenance. The hot water recirculation system shall be designed to run at 130°F @ 3 GPM. Point of use thermostatic mixing valves shall be provided at all public plumbing fixtures using hot water. The TMV outlet temperature shall be preset at 110°F. (Building janitor's sinks and commercial use fixtures and equipment shall have the hot water outlet temperature set by user).

Roof Drainage
Building roof drainage will be via primary roof and secondary overflow drain system piped through building. Roof drainage design will be based upon a 100 year storm with 60 minute duration at 5" per hour intensity per 2015 IPC. Secondary roof drainage shall be set following the High rise building design criteria.

1. A gravity roof drainage system will be designed.
2. Storm drainage piping will be designed for 4" of rainfall per hour.
3. All horizontal storm drainage piping, including drain bodies will be insulated.
4. Roof drains will be provided at all roofs receiving rainwater.
5. Maximum area per drain will be 5,000 sq. ft., with a minimum of:
   a. 2 drains for roofs under 10,000 sq. ft.
   b. 4 drains for roofs 10,000 sq. ft. or more

Sanitary Sewers
The sanitary waste system will be sized per 2015 IPC using 1/4" per foot slope for piping 2"-3" and 1/8" per foot slope for piping 4" and larger. Above ground soil, waste, vent and storm water piping shall be cast iron no-hub soil pipe. Piping in crawlspace and below slab shall be schedule 40 PVC. Spic & hub cast iron heavy weight for commercial Kitchen and Laundry equipment waste discharges.

1. Floor drains and floor sinks shall be cast iron with flashing flange and shall have neoprene hubless outlets with nickel bronze strainer.
2. Floor drains will be provided as a minimum in the following locations:
   a. Mechanical Equipment
   b. Pump Rooms
   c. Janitor's Closet
   d. Public toilet rooms
3. Any sinks receiving kitchen waste will be routed to a grease interceptor.
4. Soil, waste, and vent piping will be provided to each and every plumbing fixture and equipment for the proposed building.
5. Final soil, waste, and vent piping connections will be provided to all items requiring waste connections, including all piping, fittings, waste outlets, traps, hangers, and supporting steel, and all miscellaneous related items for a complete and operable system.
6. All building sanitary and waste drainage will be collected and extended to site sanitary sewer. Refer to civil narrative for the additional requirements as it relates to the exterior sewer system and the connection of the sanitary sewers for the proposed building.
7. All vents will be collected and extended to full size roof vents as required.
1601 Congress Building  
Plumbing Systems

8. All floor drains will be provided with deep seal traps.
9. The soil and waste system will be provided with cleanouts installed at 40 feet on center and at changes in direction of 90 degrees or more, at the bottom of vertical risers and as the sewer exits the building.
10. Sump pumps and sewage ejectors shall be provided for all drainage with inverts 1 foot above, and all the piping below street sewer main invert.

Special Waste
All Fat, Oil, Grease, and special waste systems shall be provided with approved separator, and/or interceptor.
1. Retaining time and venting shall meet 2015 IPC requirements.
2. Design shall provide the required clearances for service and maintenance.

Cathodic Protection
Cathodic protection will be provided, if required, per National Association of Corrosion Engineers (NACE). Polyethylene piping will be used for underground gas pipe.

Backflow Protection
Backflow prevention will be provided in accordance with 2015 IPC Table 603.2 (Backflow Prevention Devices, Assemblies, & Methods) and Table 603.5.

Plumbing Fixtures
Fixtures shall meet Federal standards for required flow control devices. 2015 IPC Table 422.1(Minimum Plumbing Facilities), 2010 ADA code requirements will be followed in all aspects regarding handicapped accessible fixtures.
1. Public lavatories 0.35 GPM
2. Public Drinking Fountains 0.5 GPM
3. Public sinks 1.0 GPM
4. Public water closets 1.28 GPF
5. Public Urinals 0.125 GPF
6. Mop basin/Service sink 2.0 GPM
7. Wall hydrants 5.0 GPM
8. Public Showers 1.5 GPM

Estimated Plumbing Fixture count:
1. Lavatory – 104 Units
2. Drinking Fountains – 32 Units
3. Sink – 19 Units
4. Water Closet – 130 Units
5. Urinal – 34 Units
6. Mop Basin – 15 Units
7. Wall hydrants – 16 Units
8. Shower – 9 Units

Elevator Hoist-way
Each elevator hoist-way shall be provided with a 50 FT head, 50 GPM (per elevator car) oil sensing, and sump pump in a 30" x 30" pit at bottom of elevator shaft. Pump shall be connected to BAS.

INSULATION
Provide mold resistant mineral fiber pipe insulation with all-purpose scrim foil jacket on domestic cold, hot, and wot water recirculating piping in all areas of the building. Branch piping does not have to be insulated at the Owner's discretion, but is recommended. Provide factory applied all service jacket in concealed areas and exposed areas. Use preformed insulation fittings for all valves and fittings use valve handle extensions on all shutoff valves.

GAS SYSTEM
Building shall be provided with medium pressure natural gas service.
1. Gas service size and meter locations shall be coordinated with local Utility Company.
2. A Medium Pressure 4"Diameter gas service.
3. All appliances and equipment shall be provided with a gas pressure reducing valve.
4. All connections to equipment shall be provided with a dirt leg.
5. System shall be air pressure tested for leaks before introducing gas to piping array.

COMMISSIONING
Plumbing systems and components to be commissioned include the domestic water treatment systems, hot water system generator, pumps and components, plumbing fixtures, and all electronic plumbing sensors.

DESIGN CRITERIA
The Plumbing systems will be designed in accordance OPR Manual, with TFC, & SECO requirements
- Americans with Disabilities Act (“ADA”) 1990
- Energy Environmental Protection Agency (“EPAct”) 2005
- International Association of Plumbing and Mechanical Officials (IAPMO)
- International Code Council (ICC) family of codes (latest published editions)
- International Building Code (IBC)
- International Fuel Gas Code (IFGC)
- International Plumbing Code (IPC)

National Fire Protection Association (NFPA)
(NFPA 54: National Fuel Gas Code)

Texas Commission on Environmental Quality (TCEQ)
Regulations regarding water, wastewater and storm water, waste management, and pollution prevention
Edwards Aquifer Protection Program (EAPP)

Domestic water savings
The anticipated water savings for the project is 20% as basis of design.

Storm reclaimed water savings
The building(s) shall be designed to meet SECO requirements for use of reclaimed water. Sources of reclaimed water may include captured rainwater, condensate, and municipally provided reclaimed water, among others.
Texas Mall and Garage (TXM)

Plumbing Systems

Design Conditions
Location: Austin, TX
- 30.81 Degrees North Latitude
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

Design Criteria
The Plumbing systems will be designed in accordance with the City of Austin Building Codes, and the following design references:
- Texas Accessibility Standards (TAS)
- Americans with Disabilities Act ("ADA") 1990
- Energy Environmental Protection Agency ("EPA") 2005
- International Association of Plumbing and Mechanical Officials (IAPMO)
- International Code Council (ICC) family of codes (latest published editions)
- International Building Code (IBC)
- International Fuel Gas Code (IFGC)
- International Plumbing Code (IPC)
- National Fire Protection Association (NFPA)
- NFPA 54: National Fuel Gas Code
- Texas Commission on Environmental Quality (TCEQ)
- Regulations regarding water, wastewater and storm water, waste management, and pollution prevention
- Edwards Aquifer Protection Program (EAPP)

Storm reclaimed water savings
The building(s) shall be designed to meet SECO requirements for use of reclaimed water. Sources of reclaimed water may include captured rainwater, condensate, and municipally provided reclaimed water, among others.

Utilities
The site will be served by the following services:

Domestic Water
2" diameter. Preliminary testing established that there is adequate flow near the proposed building and water system static pressure is 65 psig.

Sewer
6" Diameter

Storm
12" Diameter per 2015 UPC 1106.3, based on 5" rainfall per hour size rating.

Plumbing Systems
1. Special floor drains and, or, trench drains with tractor grade, and wheelchair safe grate and removable sediment bucket shall be provided at each garage level.
2. Garage drainage shall be discharged directed to a sump pit containing at least a dual ejection pump system with enough head to reach gravity drainage.
3. Soil, waste, and vent piping will be provided to each and every plumbing fixture and equipment for the proposed building.
4. Final soil, waste, and vent piping connections will be provided to all items requiring waste connections, including all piping, fittings, waste outlets, traps, hangers, and supporting steel, and all miscellaneous related items for a complete and operable system.
5. All garage building drainage will be collected and extended to site sanitary sewer. Refer to civil narrative for the additional requirements as it relates to the exterior sewer system and the connection of the sanitary sewers for the proposed building.
6. All vents will be collected and extended to full size roof vents as required.
7. All floor drains will be provided with traps.
8. The soil and waste system will be provided with cleanouts installed at 40 feet on center and at changes in direction of 90 degrees or more, at the bottom of vertical risers and as the sewer exits the garage building.
9. Sump pumps and shall be provided for all drainage with inverts 1 foot above, and all the piping below street sewer main invert.
10. A non freeze sill cock, shall be provided per garage level to be used for parking area cleaning.
11. Each hose station shall be provided with code approved BFP and hose rack.

Cathodic Protection
Cathodic protection will be provided, if required, per National Association of Corrosion Engineers (NACE). Polyethylene piping will be used for underground gas pipe.

Backflow Protection
Backflow protection will be provided in accordance with 2015 IPC Backflow Prevention Devices, Assemblies, & Methods

Elevator Hoist-way
Each elevator hoist-way shall be provided with a 50 FT head, 50 GPM (per elevator car) oil sensing, and sump pump in a 30" x 30" pit at bottom of elevator shaft. Pump shall be connected to BAS.

INSULATION
Provide mold resistant mineral fiber pipe insulation on domestic cold, hot, and hot water recirculating piping in all areas of the building. Branch piping does not have to be insulated at the Owner's discretion, but is recommended. Provide factory applied all service jacket in concealed areas and PVC jacket in exposed areas. Use preformed insulation fittings for all valves and fittings use valve handle extensions on all shutoff valves.

Commissioning
Plumbing systems and components to be commissioned include the domestic water treatment systems, hot water system generator, pumps and components, plumbing fixtures, and all electronic plumbing sensors.

Plumbing Water savings
The storage of storm water shall be anticipated to be used as drip irrigation as a base of design.
3.6 Pre-Conceptual Design Analysis

Mechanical
Central Utility Plant and Tunnel (CUP)

Mechanical

Central Plant Loading Study

This study investigates the chilled water and electrical upgrades necessary to provide reliable chilled water service to the future phases of the Texas Facilities Commission (TFC) Capitol Complex Master Plan. This study included review of the potential phasing of the infrastructure upgrades and the impacts of the phasing on the total project. It also included review of previous studies of the existing 5,690 ton Capitol Central Utility Plant (CUP), 4,410 ton Stephen F. Austin (SFA) Physical Plant, 1,655 ton Robert E. Johnson (REJ) Physical Plant, 1,950 ton William P. Clements, Jr. (WPC) Physical Plant, and associated distribution capacities and deficiencies. All of the previous studies were used to determine how the new Central Utility Plant (CUP) would be implemented to serve the future facilities as outlined in the TFC Capitol Complex Master Plan.

The TFC Capitol Complex Master Plan includes three future phases (1, 2, and 3) with net growth potential by phase of 1,025,000 square feet (SF), 525,000 SF and 530,000 SF respectively. It also includes four distant future phases (A, B, C, X, Y, and Z) with a total net growth of 3,131,475 SF.

Various combinations of phases were reviewed to determine the different CUP chilled water capacity needs based on total build out square footage (SF) using industry standard SF per ton values of 400 for existing buildings and 450 for new buildings. In order to accommodate current SF and future SF between 15th Street / Martin Luther King Jr. Boulevard and Congress Avenue / Trinity Street as well as the future work between 15th Street /13th Street and San Jacinto Boulevard / Trinity Street, the CUP would need approximately 10,000 tons of chilled water capacity. In addition to the CUP, a future 4,000 ton chilled water plant would be needed to accommodate future work occurring between 15th Street /Martin Luther King Jr. Boulevard and Congress Street / Guadalupe Street. The 10,000 ton CUP and 4,000 ton future plant is the largest chilled water need scenario.

The chilled water upgrades described in this study will improve the following:

- Chilled water reliability by connecting new and existing chilled water plants to a common loop.
- Chilled water redundancy by connecting new and existing chilled water plants to a common loop.
- Lifecycle cost and reduced operating expenses.

The implementation of the chilled water infrastructure upgrades outlined in this study will support the Texas Facilities Commission’s goals to optimize the efficiency, reliability, and capacity of the chilled water infrastructure serving the current Capitol Complex and for the projected growth.

Following are the primary goals of this study:

1. Assess existing chilled water and electrical utility infrastructure for the inclusion of a new CUP.
2. Identify approximate CUP load and overall footprint to accommodate various build out scenarios in the TFC Capitol Complex Master Plan.
3. Identify approximate chilled water tunnel size to accommodate various build out scenarios in the TFC Capitol Complex Master Plan.
4. Identify obstacles implementing the new CUP and associated tunnels.

Capitol Complex Physical Plant Annex (CUP) and associated Tunnel Sizing

Table 1 identifies all of the buildings (existing and future) that were included in the sizing of the future CUP.

TFC Capitol Complex Master Plan - North of 15th Street Existing and Future Building Summary

<table>
<thead>
<tr>
<th>Building</th>
<th>Phase or Year Built</th>
<th>Square Footage</th>
<th>East or West of Congress Avenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Retirement Services (ERS)</td>
<td>Phase A</td>
<td>338,114</td>
<td>E</td>
</tr>
<tr>
<td>Lyndon B. Johnson (LBJ)</td>
<td>Phase B</td>
<td>294,371</td>
<td>E</td>
</tr>
<tr>
<td>Stephen F. Austin (SFA)</td>
<td>Phase C</td>
<td>558,711</td>
<td>W</td>
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<tr>
<td>Central Services Building (CSB)</td>
<td>Phase Y</td>
<td>417,391</td>
<td>E</td>
</tr>
<tr>
<td>William B. Travis (WBT)</td>
<td>Phase C</td>
<td>477,378</td>
<td>E</td>
</tr>
<tr>
<td>William P. Clements Jr. (WPC)</td>
<td>Existing (1990)</td>
<td>316,706</td>
<td>E</td>
</tr>
<tr>
<td>Texas State History Museum (TSHM)</td>
<td>Existing (2001)</td>
<td>185,000</td>
<td>W</td>
</tr>
<tr>
<td>1601 Congress Avenue</td>
<td>Phase 1 (2020)</td>
<td>420,000</td>
<td>E</td>
</tr>
<tr>
<td>1801 Congress Avenue</td>
<td>Phase 1 (2020)</td>
<td>605,000</td>
<td>E</td>
</tr>
<tr>
<td>15th Street</td>
<td>Phase 2 (2022)</td>
<td>165,000</td>
<td>W</td>
</tr>
<tr>
<td>Lavaca Street</td>
<td>Phase 2 (2022)</td>
<td>360,000</td>
<td>W</td>
</tr>
<tr>
<td>17th Street</td>
<td>Phase 3 (2024)</td>
<td>170,000</td>
<td>W</td>
</tr>
<tr>
<td>Colorado Street</td>
<td>Phase 3 (2024)</td>
<td>360,000</td>
<td>W</td>
</tr>
<tr>
<td>Lot 22</td>
<td>Phase Y</td>
<td>316,706</td>
<td>E</td>
</tr>
<tr>
<td>Garage G</td>
<td>Phase Y</td>
<td>236,148</td>
<td>E</td>
</tr>
<tr>
<td>Garage J</td>
<td>Phase C</td>
<td>197,140</td>
<td>W</td>
</tr>
<tr>
<td>Lot 19</td>
<td>Phase A</td>
<td>105,280</td>
<td>W</td>
</tr>
<tr>
<td>Garage A</td>
<td>Phase Z</td>
<td>502,212</td>
<td>E</td>
</tr>
<tr>
<td>Garage F</td>
<td>Phase X</td>
<td>90,626</td>
<td>E</td>
</tr>
</tbody>
</table>

Table 1: TFC Capitol Complex Master Plan - North of 15th Street Existing and Future Building Summary

As illustrated in the table above, only buildings located between 15th Street /Martin Luther King Jr. Boulevard and Congress Avenue/Trinity Street as well as the future work between 15th Street /13th Street and San Jacinto Boulevard/Trinity Street were included in this study. All future work occurring south of 15th Street between Lavaca Street and San Jacinto Boulevard is not included.
10,000 Ton CUP

The largest CUP chilled water requirement occurs when the existing buildings plus all phases are built out. Tables 2 and 3 summarize the calculations used for this scenario.

Based on Table 3, the total CUP tonnage needed to serve the existing/future buildings on the east side of Congress Avenue would be approximately 10,000 tons with approximately five 2,500 ton chillers with comparable cooling tower capacity. This configuration would allow for one redundant chiller and cooling tower.

The preliminary 10,000 ton chilled water plant would consist of a basement, first floor, and roof which aligns with the sub-basement, basement, and lower roof of the existing Sam Houston Building. The primary/secondary chilled water pumps and condenser water pumps would be located in the basement along with connection to the new chilled water tunnel. The chillers would be located on the first floor. The cooling towers would be located on the roof. A future chilled water plant to serve the future growth on the west side of Congress Avenue will be needed in all of the scenarios presented in this report.

The preliminary 4,000 ton chilled water plant would consist of a basement, first floor, and roof. The primary/secondary chilled water pumps and condenser water pumps would be located in the basement along with connection to the new chilled water tunnel. The chillers would be located on the first floor. The cooling towers would be located on the roof. A future redundant chilled water plant to serve the existing/future buildings on the east side of Congress Avenue would be approximately three 2,000 ton chillers with comparable cooling tower capacity. This configuration would allow for one redundant 2,000 on chiller/cooling tower at the future chilled water plant. These calculations also include the continued use of the existing 2,940 ton Stephen F. Austin chilled water plant with 1,470 ton chiller/cooling tower for redundancy.

### Table 2 - Chilled Water Capacity for Existing plus Phases 1, 2, 3, A, B, C, Y, X, and Z Summary

<table>
<thead>
<tr>
<th>Buildings Included</th>
<th>Total Bldg. Area (SF)</th>
<th>Tonnage Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total North Side SF</td>
<td>6,617,479</td>
<td>15,564</td>
</tr>
<tr>
<td>Existing Bldg. or Bldgs. Being Replaced with New SF</td>
<td>3,089,367</td>
<td>7,723</td>
</tr>
<tr>
<td>Tons at 400 SF/ton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future Phases 1-3 SF</td>
<td>2,090,000</td>
<td>4,622</td>
</tr>
<tr>
<td>Future Phases A-C and X-Z SF</td>
<td>1,448,112</td>
<td>3,218</td>
</tr>
</tbody>
</table>

### Table 3 - Chilled Water Capacity for Existing plus Phases 1, 2, 3, A, B, C, Y, X, and Z Summary

<table>
<thead>
<tr>
<th>East Side SF</th>
<th>West Side SF</th>
<th>East Side Tons</th>
<th>West Side Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,834,344</td>
<td>1,255,023</td>
<td>4,586</td>
<td>3,318</td>
</tr>
<tr>
<td>1,025,000</td>
<td>1,065,000</td>
<td>2,278</td>
<td>2,344</td>
</tr>
<tr>
<td>1,145,892</td>
<td>302,420</td>
<td>2,546</td>
<td>6,72</td>
</tr>
</tbody>
</table>

East Side Total Tonnage: 9,410
West Side Total Tonnage: 6,164

Preliminary 10,000 Ton Chilled Water Plant - Sub-Basement Plan

Scale 1/16" = 1'-0" 19' Floor to Floor
Central Utility Plant and Tunnel (CUP)
Mechanical

Preliminary 10,000 Ton Chilled Water Plant - Basement Plan
Scale 1/16" = 1'-0"
24' Floor to Floor

Preliminary 10,000 Ton Chilled Water Plant - Roof Plan
Scale 1/16" = 1'-0"
Central Utility Plant and Tunnel (CUP)
Mechanical

8500 Ton CUP

Table 4 and 5 indicate chilled water requirements when the total number of phases are removed.

Based on Table 5, the total CUP tonnage needed to serve the existing/future buildings on the east side of Congress Avenue minus Phase X would be approximately 8,500 tons with approximately three 2,000 ton chillers and two 2,500 ton chillers with comparable cooling tower capacity. This configuration would allow for one redundant chiller and cooling tower.

The preliminary 8,500 ton chilled water plant would consist of a basement, first floor, and roof which aligns with the sub-basement, basement, and lower roof of the existing Sam Houston Building. The primary/secondary chilled water pumps and condenser water pumps would be located in the basement along with connection to the new chilled water tunnel. The chillers would be located on the first floor. The cooling towers would be located on the roof. The approximate footprint per floor would be 150 ft. long x 105 ft. wide with basement having 19 ft. floor to floor and first floor having 24 ft. floor to floor. Refer to floor plans for the 8500 Ton CUP.

A future chilled water plant of 4,000 tons with approximately three 2,000 ton chillers with comparable cooling tower capacity would be needed to serve the existing/future buildings on the west side of Congress Avenue. This configuration would allow for one redundant 2,000 ton chiller/cooling tower at the future chilled water plant. These calculations also include the continued use of the existing 2,940 ton Stephen F. Austin chilled water plant with 1,470 ton chiller/cooling tower for redundancy.

### Table 4 - Chilled Water Capacity for Existing plus Phases 1, 2, 3, A, B, C, and Y Summary

<table>
<thead>
<tr>
<th>Buildings Included</th>
<th>Total Bldg. Area (SF)</th>
<th>Tonnage</th>
<th>Tonnage Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total North Side SF</td>
<td>5,986,667</td>
<td>14,151</td>
<td></td>
</tr>
<tr>
<td>Existing Bldg. or Bldg. Being Replaced with New SF</td>
<td>3,051,393</td>
<td>7,628</td>
<td>Tons at 400 SF/ton</td>
</tr>
<tr>
<td>Future Phases 1-3 SF</td>
<td>2,080,000</td>
<td>4,622</td>
<td>Tons at 450 SF/ton</td>
</tr>
<tr>
<td>Future Phases A-C and Y SF</td>
<td>855,274</td>
<td>1,901</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5 - Chilled Water Capacity for Existing plus Phases 1, 2, 3, A, B, C, and Y located on the East and West sides of Congress Avenue Summary

<table>
<thead>
<tr>
<th>East Side SF</th>
<th>West Side SF</th>
<th>East Side Tons</th>
<th>West Side Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,834,344</td>
<td>1,217,049</td>
<td>4,586</td>
<td>3,043</td>
</tr>
<tr>
<td>1,025,000</td>
<td>1,055,000</td>
<td>2,278</td>
<td>2,344</td>
</tr>
<tr>
<td>552,854</td>
<td>302,420</td>
<td>1,229</td>
<td>672</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total East Side Tonnage</th>
<th>Total West Side Tonnage</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,092</td>
<td>6,059</td>
</tr>
</tbody>
</table>

Scale 1/16” = 1”-0”
19’ Floor to Floor
Preliminary 8,500 Ton Chilled Water Plant - Basement Plan

Scale 1/16" = 1'-0"
24' Floor to Floor

Preliminary 8,500 Ton Chilled Water Plant - Roof Plan

Scale 1/16" = 1'-0"
Central Utility Plant and Tunnel (CUP)

**Mechanical**

6000 Ton CUP

The final scenario reviewed the total CUP tonnage needed to serve the existing buildings and those included in Phases 1 through 3. Below is a summary of the square footages used for this evaluation.

<table>
<thead>
<tr>
<th>Building</th>
<th>Phase or Year Built</th>
<th>Square Footage</th>
<th>East or West of Congress Avenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Retirement Services (ERS)</td>
<td>1966/1970s</td>
<td>115,000</td>
<td>E</td>
</tr>
<tr>
<td>Lyndon B. Johnson (LBJ)</td>
<td>1973</td>
<td>299,512</td>
<td>E</td>
</tr>
<tr>
<td>Stephen F. Austin (SFA)</td>
<td>1973</td>
<td>417,141</td>
<td>W</td>
</tr>
<tr>
<td>Central Services Building (CSB)</td>
<td>1980</td>
<td>96,865</td>
<td>E</td>
</tr>
<tr>
<td>William B. Travis (WBT)</td>
<td>1985</td>
<td>466,020</td>
<td>E</td>
</tr>
<tr>
<td>William P. Clements Jr. (WPC)</td>
<td>1990</td>
<td>473,338</td>
<td>W</td>
</tr>
<tr>
<td>Robert E. Johnson (REJ)</td>
<td>2000</td>
<td>307,090</td>
<td>E</td>
</tr>
<tr>
<td>Texas State History Museum (TSHM)</td>
<td>2001</td>
<td>185,000</td>
<td>W</td>
</tr>
<tr>
<td>1601 Congress Building</td>
<td>Phase 1 (2020)</td>
<td>420,000</td>
<td>E</td>
</tr>
<tr>
<td>1801 Congress Building</td>
<td>Phase 1 (2020)</td>
<td>605,000</td>
<td>E</td>
</tr>
<tr>
<td>15th Street</td>
<td>Phase 2 (2022)</td>
<td>165,000</td>
<td>W</td>
</tr>
<tr>
<td>Lavaca Street</td>
<td>Phase 2 (2022)</td>
<td>360,000</td>
<td>W</td>
</tr>
<tr>
<td>17th Street</td>
<td>Phase 3 (2024)</td>
<td>170,000</td>
<td>W</td>
</tr>
<tr>
<td>Colorado Street</td>
<td>Phase 3 (2024)</td>
<td>360,000</td>
<td>W</td>
</tr>
</tbody>
</table>

**Table 6: TFC Capitol Complex Master Plan - North of 15th Street Existing and Future Building Summary**

<table>
<thead>
<tr>
<th>Buildings Included</th>
<th>Total Bldg. Area (SF)</th>
<th>Tonnage</th>
<th>Tonnage Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total North Side SF</td>
<td>4,439,966</td>
<td>10,522</td>
<td>Combined Tonnage from below</td>
</tr>
<tr>
<td>Existing Bldgs.</td>
<td>2,359,966</td>
<td>5.900</td>
<td>Tons at 400 SF/ton</td>
</tr>
<tr>
<td>Being Replaced with New SF</td>
<td>2,359,966</td>
<td>5.900</td>
<td>Tons at 400 SF/ton</td>
</tr>
<tr>
<td>Future Phases 1-3 SF</td>
<td>2,080,000</td>
<td>4,622</td>
<td>Tons at 450 SF/ton</td>
</tr>
</tbody>
</table>

**Table 7: Chilled Water Capacity for Existing plus Phases 1, 2, 3 Summary**

<table>
<thead>
<tr>
<th>East Side SF</th>
<th>West Side SF</th>
<th>East Side Tons</th>
<th>West Side Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,284,487</td>
<td>1,075,479</td>
<td>3,211</td>
<td>2,689</td>
</tr>
<tr>
<td>1,025,000</td>
<td>1,055,000</td>
<td>2,278</td>
<td>2,344</td>
</tr>
<tr>
<td><strong>East Side Total Tonnage</strong></td>
<td><strong>West Side Total Tonnage</strong></td>
<td>5,489</td>
<td>5,033</td>
</tr>
</tbody>
</table>

**Table 8: Chilled Water Capacity for Existing plus Phases 1, 2, 3, located on the East and West sides of Congress Avenue Summary**

Based on the tables, the total CUP tonnage needed to serve the existing/future buildings on the east side of Congress Avenue minus Phases A-C and X-Z would be approximately 6,000 tons with approximately four 2,000 ton chillers with comparable cooling tower capacity. This configuration would allow for one redundant chiller and cooling tower.

The preliminary 6,000 ton chilled water plant would consist of a basement, first floor, and roof which aligns with the sub-basement, basement, and lower roof of the existing Sam Houston Building. The primary/secondary chilled water pumps and condenser water pumps would be located in the basement along with connection to the new chilled water tunnel. The chillers would be located on the first floor. The cooling towers would be located on the roof. The approximate footprint per floor would be 125 ft. long x 105 ft. wide with basement having 19 ft. floor to floor and first floor having 24 ft. floor to floor. Refer to the floor plans for the 6000 Ton CUP.

A future chilled water plant of 3,000 tons with approximately three 1,500 ton chillers with comparable cooling tower capacity would be needed to serve the existing/future buildings on the west side of Congress Avenue. This configuration would allow for one redundant 1,500 on chiller/cooling tower at the future chilled water plant. These calculations also include the continued use of the existing 2,940 ton Stephen F. Austin chilled water plant with 1,470 ton chiller/cooling tower for redundancy.

The preliminary 3,000 ton chilled water plant would consist of a basement, first floor, and roof. The primary/secondary chilled water pumps and condenser water pumps would be located in the basement along with connection to the new chilled water tunnel. The chillers would be located on the first floor. The cooling towers would be located on the roof.
Central Utility Plant and Tunnel (CUP)

Tunnel Layouts / Sections

The walkable tunnels that will be installed to distribute chilled water to the existing and new facilities described within this report will be routed to the north from the new CUP located next to the existing CUP between the Texas Workforce Commission Building and Annex, under Robert E. Johnson Building, run north on the east side of Congress Avenue down to 18th Street, across Congress Avenue (through the garage) west, run south on the west side of Congress Avenue and tie back into the tunnel on the north side of 15th Street. This routing will allow for future build outs and Stephen F. Austin Building chilled water plant tie-in for added redundancy.

Regardless of the scenario, we recommend the tunnels be sized to accommodate the 10,000 ton chilled water load. To accommodate the 10,000 ton chilled water load, 30" chilled water supply/return piping will be needed. This pipe size is based on a 12 degree temperature difference between the chilled water supply and return. The approximate walkable tunnel would be 12 ft. tall x 12 ft. wide. Refer to the Utility Tunnel Section.

Preliminary Tunnel Section
Scale 1/4" = 1'-0"

Preliminary Tunnel Bend
Scale 1/4" = 1'-0"
Central Utility Plant and Tunnel (CUP)
CUP and Tunnel Construction Obstacles

There are several items that require further review as the design of the CUP and associated tunnels moves forward. Below is a list of these items.

1. Existing direct buried 12” chilled water supply/return piping between Stephen F. Austin building and William B. Travis Building as well as the direct buried 8” chilled water supply/return piping which taps off the 12” mains to serve the Lyndon B. Johnson building. This piping will need to be maintained during road/utility construction on Congress Avenue or disconnected with temporary chilled water systems provided at the William B. Travis and Lyndon B. Johnson buildings to backfeed the existing chilled water piping serving each building. When the new tunnel and CUP is operational, both buildings will be tied into the new chilled water loop. The Stephen F. Austin chilled water system will also be tied into the new chilled water loop. If the piping is disconnected and temporary chilled water system provided, then the existing Stephen F. Austin chilled water system will need to be evaluated to ensure the system can turn down to handle the cooling loads of Stephen F. Austin building only.

2. Currently located within the footprint of the proposed new CUP are the following items:
   - Existing electrical/battery building
   - Existing emergency generators (2) and fuel tank
   - Existing electrical service
   - Existing GAATN fiber backbone
   - Existing condenser water supply/return piping is routed below grade
   - Existing louvers, doors, and windows on the side of the Sam Houston building where the new CUP will be located

All of these items will need to be evaluated as design proceeds.
### Building Loads
The preliminary calculated cooling load is approx. 1750 tons. The total preliminary calculated heating load is 12,200 Mbh.

### Design Conditions
Indoor conditions shall comply with ASHRAE 2013 Fundamentals.

**Location:** Austin, TX
- 30.81 Degrees North Latitude
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

**Climatic Conditions:**
- Heating Design: 25.2 degrees F DB
- Cooling Design: 99.7 degrees F DB/75 degrees F WB
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

### Chilled water will be provided from the existing campus central plant. Provide (2) 1750 ton plate and frame heat exchangers.
Provide (2) 3000 gpm chilled water pumps. Chilled water heat exchangers and pumps to be N+1 for redundancy. Piping to be installed in an accessible tunnel 12” supply and return to Building.

Three high efficiency condensing gas fired hydronic boilers sized at 6,000 Mbh output (sized for N+1 redundancy), Three inline variable speed primary pumps located in the pump room shall be sized at 610 gpm. Piping to be 6” supply and return to building.

The building will be served by one Air Handling Unit (AHU) per level. The building will be served by one AHU per level. Units to be modular double wall filled with foam insulation. Ducts will be sized for maximum of 2000 fpm in medium pressure supply duct, 1250 fpm maximum in low pressure supply duct:

<table>
<thead>
<tr>
<th>Level</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>45,000 cfm each</td>
</tr>
<tr>
<td>2</td>
<td>25,000 cfm</td>
</tr>
<tr>
<td>3-5</td>
<td>32,000 cfm</td>
</tr>
<tr>
<td>6</td>
<td>54,000 cfm</td>
</tr>
<tr>
<td>7-14</td>
<td>50,000 cfm</td>
</tr>
</tbody>
</table>

### Make up Air will be provided by a penthouse enclosed 100% OA makeup air unit (MAU). This unit will be ducted down to all AHUs on the levels. Exhaust will be ducted back for energy recovery. Energy recovery to be glycol run around coil. MAU to be sized per OPR at 60,000 cfm OA.

The Server room will be served by (2) 20-ton computer room air conditioning systems (1 redundant) with exterior air cooled condensers. Units to be located in adjacent support room.

The building control system shall be a Direct Digital Control (DDC) system and shall be designed to interface with the existing system serving the existing TFC facilities.

The building control system shall be a Direct Digital Control (DDC) system. The building will be served by one AHU per level. Units to be located in adjacent support room.

### Piping Design Criteria
Hydronic piping systems shall be a looped design sized as follows:

1. Chilled Water Loop: C-factor of 120, maximum pressure drop of 3.0 FT/100 FT or maximum fluid velocity of 8 FT/S (whichever is more restrictive) and minimum fluid velocity of 1 FT/S.
2. Coil Pressure Drops: Maximum 15 FT, while maintaining max velocity between 3 & 5 FPS

### Ductwork Design Criteria
All ductwork shall be designed in accordance with requirements of the construction specified as stated in the latest SMACNA standards. General sizing criteria shall be as follows:

S/A upstream of VAV: 2000 fpm (max) or 0.1 in/100 (max)

S/A downstream of VAV or no VAV: 1250 fpm (max) or 0.08 in/100 (max)

S/A, R/A and E/A branches to grilles: Same as grille neck, max 500 FPM R/A: 2000 fpm (max) or 0.07 in/100 (max)

### Load Shedding
The air handling units will have unoccupied night set back modes and exhaust fan systems will be shut down during hours of non-use.

### Chilled Water System
1. Pipe: CHW Piping shall be installed in accordance with ASME 31.9, building service piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2” and smaller and welded for larger piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2” and smaller and welded for larger piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping.
2. Valves: Valves will be ball valves with body materials to match the service piping materials and stainless steel ball for 2” and smaller and lug type butterfly for larger piping for isolation service and plug type valves for throttling service.
3. Insulation: All CHW piping will be insulated with closed cell phenolic foam insulation with all-purpose scrim foil jacket. Insulation for indoor piping shall be
1” thick for piping 1” and smaller and 1-1/2” thick for piping larger than 1”. For exterior piping insulation thickness shall be increased one size. Exposed piping, exterior to building to have aluminum jacket.

Heating Hot Water System:
1. Pipe: HW Piping shall be installed in accordance with ASME 31.9, building service piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2” and smaller and welded and flanged or grooved for piping over 2”. For pipe 2” and smaller, brazed Type L copper pipe with brass/bronze or pressure seal fittings is also acceptable.
2. Valves: Valves will be brass ball valves with stainless steel ball for 2” and smaller and lug type butterfly for larger piping for isolation service and plug type valves for throttling service
3. Insulation: Piping will be insulated with fiberglass insulation with all-purpose scrim foil jacket. Piping insulation to be 1” thick for piping 1” and smaller and 2” thick for piping larger than 1”. Piping exposed in crawl space and exterior to building to be insulated with closed cell phenolic foam insulation with aluminum jacket.

Duct Systems
1. All main ductwork shall be G-90 grade; galvanized sheet metal fabricated in accordance with SMACNA standards and shall have pressure classifications suitable for the static pressure of each system. Branch ducts to ceiling registers shall be insulated flexible ductwork. Grease duct to be Type 304 stainless steel, fully-welded, and routed up through roof to grease exhaust fan.
2. Ductwork downstream of low velocity air units, all return and exhaust ducts shall be low velocity pressure class 1.
3. Grilles, Register and Diffusers: Prime coated steel and/or extruded aluminum.

4. Fire and Smoke Dampers: Fusible link type fire dampers in fire separations fabricated in accordance with NFPA 90A and UL 555, and motor operated fire/smoke dampers at smoke barriers fabricated in accordance with UL 555S Class 2 Leakage Classification. Smoke detectors in the supply ducts of all air-handling units and in ducts at smoke barriers.
5. Insulation: Flame spread of 25 or less; smoke developed of 50 or less. Round ductwork and ducts with longest side 18” or less: 1.0 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, and all joints sealed. All external. Rectangular ductwork with longer side greater than 18”: 1.5 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, all joints sealed.

Commissioning
Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for Enhanced commissioning as required by in accordance with TFC Design Standards. One hundred percent of the HVAC controls, equipment and systems shall be commissioned.
1601 Congress Building
Heating, Ventilation, and Air Conditioning

Building Loads
The preliminary calculated cooling load is approx. 1200 tons. The total preliminary calculated heating load is 8,500 Mbh.

Design Conditions
Indoor conditions shall comply with ASHRAE 2013 Fundamentals.

Location: Austin, TX
- 30.81 Degrees North Latitude
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

Climatic Conditions:
- Heating Design: 25.2 degrees F DB
- Cooling Design: 99.7 degrees F DB/75 degrees F WB
- 2500 fpm maximum in high pressure supply duct:
- 1250 fpm maximum in low pressure supply duct:
- 600 fpm maximum in medium pressure supply duct:
- 425 gpm. Piping to be 8” supply and return to Building.

General exhaust shall be to energy recovery make up unit. Exhaust discharge shall be coordinated with outside air intakes to provide a minimum of 30 ft separation.

Economizer: Project is located in ASHRAE climate zone 2A.

Air filtration for all units will be MERV 8 pre-filters and MERV 13 secondary filters.

Load Shedding
The air handling units will have unoccupied night setback modes and exhaust fan systems will be shut down during hours of non-use.

Chilled Water System
1. Pipe: CHW Piping shall be installed in accordance with ASME 31.9, building service piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2” and smaller and welded and flanged or grooved for piping over 2”. For CHW pipe 2” and smaller, brazed Type L copper pipe with brass/bronze socket type or pressure seal fittings is also acceptable.
2. Valves: Valves will be ball valves with body materials to match the service piping materials and stainless steel ball for 2” and smaller and lug type butterfly for larger piping for isolation service and plug type valves for throttling service.
3. Insulation: All CHW piping will be insulated with closed cell phenolic foam insulation with all-purpose scrim foil jacket. Insulation for indoor piping shall be

Ductwork Design Criteria
All ductwork shall be designed in accordance with requirements of the construction specified as stated in the latest SMACNA standards. General sizing criteria shall be as follows:

1. Chilled Water Loop: C-factor of 120, maximum pressure drop of 3.0 FT/100 FT or maximum fluid velocity of 8 FT/S (whichever is more restrictive) and minimum fluid velocity of 1 FT/S.
2. Coil Pressure Drops: Maximum 15 FT, while maintaining max velocity between 3 & 5 FPS

Chilled Water System
1. Pipe: CHW Piping shall be installed in accordance with ASME 31.9, building service piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2” and smaller and welded and flanged or grooved for piping over 2”. For CHW pipe 2” and smaller, brazed Type L copper pipe with brass/bronze socket type or pressure seal fittings is also acceptable.
2. Valves: Valves will be ball valves with body materials to match the service piping materials and stainless steel ball for 2” and smaller and lug type butterfly for larger piping for isolation service and plug type valves for throttling service.
3. Insulation: All CHW piping will be insulated with closed cell phenolic foam insulation with all-purpose scrim foil jacket. Insulation for indoor piping shall be

Load Shedding
The air handling units will have unoccupied night set back modes and exhaust fan systems will be shut down during hours of non-use.
1601 Congress Building
Heating, Ventilation, and Air Conditioning

1" thick for piping 1" and smaller and 1-1/2" thick for piping larger than 1". For exterior piping insulation thickness shall be increased one size. Exposed piping, exterior to building to have aluminum jacket.

Heating Hot Water System
1. Pipe: HW Piping shall be installed in accordance with ASME 31.9, building service piping. Piping will be black steel schedule 40 with steel fittings for larger pipes and malleable iron fittings for smaller piping. Pipe shall be threaded or grooved for piping 2" and smaller and welded and flanged or grooved for piping over 2". For pipe 2" and smaller, brazed Type L copper pipe with brass/bronze or pressure seal fittings is also acceptable.
2. Valves: Valves will be brass ball valves with stainless steel ball for 2" and smaller and lug type butterfly for larger piping for isolation service and plug type valves for throttling service
3. Insulation: Piping will be insulated with fiberglass insulation with all-purpose scrim foil jacket. Piping insulation to be 1" thick for piping 1" and smaller and 2" thick for piping larger than 1". Piping exposed in crawl space and exterior to building to be insulated with closed cell phenolic foam insulation with aluminum jacket.

Duct Systems
1. All main ductwork shall be G-90 grade; galvanized sheet metal fabricated in accordance with SMACNA standards and shall have pressure classifications suitable for the static pressure of each system. Branch ducts to ceiling registers shall be insulated flexible ductwork. Grease duct to be Type 304 stainless steel, fully-welded, and routed up through roof to grease exhaust fan.
2. Ductwork downstream of low velocity air units, all return and exhaust ducts shall be low velocity pressure class 1, including garage exhaust from above-grade parking.
3. Grilles, Register and Diffusers: Prime coated steel and/or extruded aluminum.
4. Fire and Smoke Dampers: Fusible link type fire dampers in fire separations fabricated in accordance with NFPA 90A and UL 555, and motor operated fire/smoke dampers at smoke barriers fabricated in accordance with UL 555S Class 2 Leakage Classification. Smoke detectors in the supply ducts of all air-handling units and in ducts at smoke barriers.
5. Insulation: Flame spread of 25 or less; smoke developed of 50 or less. Round ductwork and ducts with longest side 18" or less: 1.0 lb. per cu. ft. density, 1-1/2" thick flexible glass fiber with reinforced foil Kraft facing, and all joints sealed. All external. Rectangular ductwork with longer side greater than 18": 1.5 lb. per cu. ft. density, 1-1/2" thick flexible glass fiber with reinforced foil Kraft facing, all joints sealed.

Commissioning
Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for Enhanced commissioning as required by in accordance with TFC Design Standards. One hundred percent of the HVAC controls, equipment and systems shall be commissioned.
Building Loads
The preliminary calculated ventilation rate for the below grade parking structure will be approx. 300,000 cfm for the 1601 Congress portion and 543,300 cfm for the 1801 Congress portion.

Design Conditions
Indoor conditions shall comply with ASHRAE 2013 Fundamentals.

Location: Austin, TX
- 30.81 Degrees North Latitude
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

Climatic Conditions:
- Heating Design: 25.2 degrees F DB
- Cooling Design: 99.7 degrees F DB/75 degrees F WB

Ductwork Design Criteria
All ductwork shall be designed in accordance with requirements of the construction specified as stated in the latest SMACNA standards. General sizing criteria shall be as follows:

- S/A upstream of VAV: 2000 fpm (max) or 0.1 in/100 (max)
- S/A downstream of VAV or no VAV: 1250 fpm (max) or 0.08 in/100 (max)
- S/A, R/A and E/A branches to grilles: Same as grille neck, max 500 FPM R/A: 2000 fpm (max) or 0.07 in/100 (max)

General Exhaust: 2000 fpm (max) or 0.07 in/100 VAV Box See Below

<table>
<thead>
<tr>
<th>Box Size</th>
<th>Max CFM</th>
<th>Min CFM (max turndown)</th>
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Duct Systems
1. All main ductwork shall be G-90 grade; galvanized sheet metal fabricated in accordance with SMACNA standards and shall have pressure classifications suitable for the static pressure of each system. Branch ducts to ceiling registers shall be insulated flexible ductwork.
2. Ductwork downstream of low velocity air units, all return and exhaust ducts shall be low velocity pressure class 1.
3. Grilles, Register and Diffusers: Prime coated steel and/or extruded aluminum.
4. Insulation: Flame spread of 25 or less; smoke developed of 50 or less. Round ductwork and ducts with longest side 18” or less: 1.0 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, and all joints sealed. All external. Rectangular ductwork with longer side greater than 18”: 1.5 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, all joints sealed.

Commissioning
Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for Enhanced commissioning as required by in accordance with TFC Design Standards. One hundred percent of the HVAC controls, equipment and systems shall be commissioned.

Building Loads
The preliminary calculated ventilation rate for the below grade parking structure will be approx. 300,000 cfm for the 1601 Congress portion and 543,300 cfm for the 1801 Congress portion.

Design Conditions
Indoor conditions shall comply with ASHRAE 2013 Fundamentals.

Location: Austin, TX
- 30.81 Degrees North Latitude
- 97.68 Degrees West Longitude
- 495 Feet Elevation Above Mean Sea Level

Climatic Conditions:
- Heating Design: 25.2 degrees F DB
- Cooling Design: 99.7 degrees F DB/75 degrees F WB

Ductwork Design Criteria
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- S/A, R/A and E/A branches to grilles: Same as grille neck, max 500 FPM R/A: 2000 fpm (max) or 0.07 in/100 (max)

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Duct Systems
1. All main ductwork shall be G-90 grade; galvanized sheet metal fabricated in accordance with SMACNA standards and shall have pressure classifications suitable for the static pressure of each system. Branch ducts to ceiling registers shall be insulated flexible ductwork.
2. Ductwork downstream of low velocity air units, all return and exhaust ducts shall be low velocity pressure class 1.
3. Grilles, Register and Diffusers: Prime coated steel and/or extruded aluminum.
4. Insulation: Flame spread of 25 or less; smoke developed of 50 or less. Round ductwork and ducts with longest side 18” or less: 1.0 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, and all joints sealed. All external. Rectangular ductwork with longer side greater than 18”: 1.5 lb. per cu. ft. density, 1-1/2” thick flexible glass fiber with reinforced foil Kraft facing, all joints sealed.

Commissioning
Commission all HVAC systems and equipment, including controls, and all systems requiring commissioning for Enhanced commissioning as required by in accordance with TFC Design Standards. One hundred percent of the HVAC controls, equipment and systems shall be commissioned.
3.7 Pre-Conceptual Design Analysis
Electrical
Central Utility Plant and Tunnel (CUP)

General Electrical Distribution and Power
The electrical distribution systems at the Central Utility Plant (CUP) will consist of primary power service from Austin Energy. The Austin Energy switchgear and transformers are proposed to be located adjacent to the new central plant along San Jacinto Boulevard for service access by Austin Energy. The primary service voltage to the plant will be 12.47kV using 15kV rated switchgear. The 12.47kV service will be reduced to 4,160V for use by the chillers. Each chiller will be equipped with a variable speed drive. The service voltage will also be reduced to 480/277V and 120/208V for the chilled water and condenser water pumps, cooling towers, and balance of plant equipment. Based on the 10,000 ton central plant scenario the electrical load is approximately 6000kW.

Surge protection will be provided at each level of distribution voltage. Consideration should be given to power factor correction equipment. The distribution system equipment will consist of switchgear, switchboards, distribution panelboards, and branch circuit panelboards. Variable frequency drives will be provided on pumps and cooling tower fans were appropriate. Electrical power will be provided for general purpose receptacles, and other equipment requiring electrical connections. All systems will be designed in accordance with the National Electrical Code (NEC). Raceways will consist of conduit and cable tray. All raceways and cable trays will be color coded to identify the installed system.

Lighting Systems
Lighting for the building will generally consist of LED type fixtures for interior applications and for the majority of exterior applications, except where other source is required for specific applications. Lighting controls will be a combination of manual and automatic control to provide energy savings. Locations of fixtures and control means will be coordinated with building features and other obstacles.

Grounding and Lightning Protection Systems
An earth electrode system (EES) and bonding will be designed in accordance with the NEC. Lightning protection for the facilities will be assessed and designed in accordance with NFPA 780. All grounding systems will be bonded together to the ground ring electrode.

Communications
Interior telecomm distribution system will consist of an empty raceway and cable tray horizontal pathway system. Cable trays will be sized in accordance with TIA/EIA 569. Where differing systems reside in the same cable tray dividers will be provided and communications drops to panels/equipment will utilize separate raceways. Maximum cable distance from telecommunication panels/rooms to equipment or outlet will be limited to no more than 290 feet in the planned pathway. All raceways and cable trays will be color coded to identify the installed system.

Electronic Safety and Security
Access Control Systems (ACS) and Closed-Circuit Television and cameras (CCTV) will be provided where required. The ACS will include measures such as CAC-card readers with electric strikes and associated hardware. The CCTV will include pan-tilt-zoom cameras on all major buildings with cabling infrastructure to enable monitoring from a central station. All Access Control and Intrusion Detection systems will be installed in separate raceways from any other building systems. All raceways and cable trays will be color coded to identify the installed system.

Integrated Automation
The direct digital control (DDC) system will integrated into the existing Siemens Apogee system in the Sam Houston Building central plant.
1801 Congress Building

**Electrical Systems**

**Code Criteria**
- NFPA 70 National Electrical Code 2017
- NFPA 72 National Fire Alarm and Signaling Code
- NFPA 780 Standards for the Installation of Lightning Protection Systems
- ASHRAE 90.1 (current adopted version)
- IESNA Illuminating Engineering Society

**Building Standards**

Electrical systems shall comply with the Texas Facilities Commission Owner's Project Requirements document.

**Electrical Power Distribution**

- Total estimated demand building load: 3363.2 kW
- 3363.2 kW x 1.25 (25% spare capacity) = 4204 kW

**Primary Building Power**

Primary power for the building will be supplied from a utility vault within the building envelope based on Austin Energy standards. Feeders from the utility vault will supply the building main electrical room with 480/277V. Provisions shall be made for a future Solar Photovoltaic (PV) system complete with inverter, solar panels and all accessories connected to the utility switchgear. The solar panels will be located on the roof and a pathway will be provided to route power from the future PV system to utility equipment per Austin Energy standards.

**BUILDING ELECTRICAL EQUIPMENT**

A 5000A, 480/277, 3ϕ, 4W, 42KAIC switchgear with draw-out breakers will be provided in the main electrical room. The switchgear will include space for 25% spare capacity. Physical space shall also be allotted in the utility vault for the future photovoltaic system equipment. Provide at least 1-1/2 times the minimum code-required working clearance around all major electrical equipment.

**Power and distribution Panel Boards**

- Panels will be commercial grade 84 circuits, 3ϕ, 4W
- Sized for 25% spare capacity
- Bolt-on type breakers
- Fully rated for available fault current, copper bus

120/208V Panels
- Panels will be commercial grade 3ϕ, 4W three (3) sections
- (2) 84 circuits sections, and (1) 42 circuit section
- Sized for 25% spare capacity
- Bolt-on type breakers
- Fully rated for available fault current, copper bus

Each level of the building will have three (3) transformers rated at 112.5 kVA each. Each transformer will be supplied from a single 480/277V distribution panel. Each transformer will supply one (1) three section 120/208V panel. A central electrical room will provide 480/277V supplies to two (2) satellite electrical rooms for each level to accommodate branch circuits. Each satellite electric room will contain a 112.5 kVA transformer and panel boards. Energy efficient transformers will be “K-4” rated with copper windings, low sound level, 80°C temperature rise. Mechanical power connections including starter (where not provided with equipment) and disconnects will be provided.

**Automatic Transfer Switch**

Provide an ATS for transfer between utility and backup generator power supply. The ATS shall be of the enclosed type and be activated by electrical transfer. The ATS shall have relays for connection to the generator starting and stopping signals.

**Vertical Busway**

Plug-in vertical busway will be provided to interconnect the main electrical switchgear to each building level’s electrical room. Vertical busway will be 480/277V.

**Variable Frequency Drives (VFD)**

Provide VFD’s where motors are larger than 5HP. All operations of the VFD shall be contained in the same VFD enclosure. VFD shall be approved by the equipment manufacturer for the particular product and application.
1801 Congress Building
Electrical Systems

LIGHTING
Luminaires will be primarily LED. With longer expected “lamp” life on LEDs sources than fluorescent lamp sources, this will save not only on energy use, but also on future maintenance. High efficiency dimmable drivers will be provided to address energy code control. Egress lights will be LED-type. Lighting will be provided in all exit pathways. Exit lights shall be LED type.

A low voltage programmable lighting control system will be provided comprised of a master panel with programmable CPU with relays and additional remote control panels. To maximize the energy efficiency of spaces, occupancy sensors will be used where practical and daylight sensors will be provided where practical in spaces with abundant natural daylight.

Exterior luminaires will be LED, minimum 70CRI, full-off and dark-sky compliant. Exterior lights will be controlled through photocell and the building’s lighting control system.

Parking Garage Lighting
Parking and garage lighting fixtures will be designed to achieve even spatial effect to maximize lighting efficiency through LED type luminaires. Control for parking garage will be time-of-day through building control systems.

Target lighting levels
- Parking area: Average 5-7 footcandles
- Garage entrances: 30-50 footcandles
1601 Congress Building
Electrical Systems

Code Criteria
- NFPA 70 National Electrical Code 2017
- NFPA 72 National Fire Alarm and Signaling Code
- NFPA 780 Standards for the Installation of Lighting Protection Systems
- ASHRAE 90.1 (current adopted version)
- IESNA Illuminating Engineering Society

Building Standards
Electrical systems shall comply with the Texas Facilities Commission Owner's Project Requirements document.

Electrical Power Distribution
- Total estimated demand building load: 2800.8 kW
- 2800.8 kW x 1.25 (25% spare capacity) = 3501.1 kW

Primary Building Power
Primary power for the building will be supplied from a utility vault within the building envelope based on Austin Energy standards. Feeders from the utility vault will supply the building main electrical room with 480/277V. Provisions shall be made for a future Solar Photovoltaic (PV) system complete with inverter, solar panels and all accessories connected to the utility switchgear. The solar panels will be located on the roof and a pathway will be provided to route power from the future PV system to utility equipment per Austin Energy standards.

BUILDING ELECTRICAL EQUIPMENT
A 5000A, 480/277, 3ϕ, 4W, 42KAIC switchgear with draw-out breakers will be provided in the main electrical room. The switchgear will include space for 25% spare capacity. Physical space shall also be allotted in the utility vault for the future photovoltaic system equipment. Provide at least 1-1/2 times the minimum code-required working clearance around all major electrical equipment.

Power and distribution Panel Boards
480/277V Panels
- Panels will be commercial grade 84 circuits, 3ϕ, 4W
- Sized for 25% spare capacity
- Bolt-on type breakers
- Fully rated for available fault current, copper bus

120/208V Panels
- Panels will be commercial grade 3ϕ, 4W three (3) sections
- (2) 84 circuits sections, and (1) 42 circuit section
- Sized for 25% spare capacity
- Bolt-on type breakers
- Fully rated for available fault current, copper bus

Each level of the building will have one (1) transformer rated at 225 kVA. Each transformer will be supplied from a single 480/277V distribution panel. Each transformer will supply one (1) three section 120/208V panel. Energy efficient transformers will be “K-4” rated with copper windings, low sound level, 80°C temperature rise. Electrical panelboards and transformer will be located in a satellite electrical room for each level. Mechanical power connections including starter (where not provided with equipment) and disconnects will be provided.

Automatic Transfer Switch
Provide an ATS for transfer between utility and backup generator power supply. The ATS shall be of the enclosed type and be activated by electrical transfer. The ATS shall have relays for connection to the generator starting and stopping signals.

Vertical Busway
Plug-in vertical busway will be provided to interconnect the main electrical switchgear to each building level's electrical room. Vertical busway will be 480/277V.

Variable Frequency Drives (VFD)
Provide VFD's where motors are larger than 5HP. All operations of the VFD shall be contained in the same VFD enclosure. VFD shall be approved by the equipment manufacturer for the particular product and application.

Power Monitoring
Monitoring for loads will be provided through distribution panel CT's.

Generators
A minimum of two (2) backup standby generators will be required for the building critical loads. One dedicated 250 kW generator will be provided for all Life-safety systems. One dedicated 250 kW generator will be provided for the building Data Center. Generators will supply 480/277V, 3ϕ, 4W to electrical loads. The fuel supply for generators will be natural gas. Each docking station ampacity rating shall match or exceed the full load rating of the respective generator.

Life-Safety Emergency Power
Life-safety emergency power will be supplied by a standby natural gas generator. The generator will provide at minimum 90 minute capacity to serve life-safety loads such as, egress lighting, exit signs, fire alarm systems, fire service access elevator, fire pump, and HVAC smoke containment systems.

Uninterruptible Power Supply (UPS)
Provide two (2) 200 kW Uninterruptible Power Supply (UPS) systems with 15 minutes of battery run time and maintenance bypass for the server room (“2N” configuration).

Grounding and Bonding
The main electrical room will be equipped with a main grounding bus bar which will be connected to a series of grounding electrodes. The main bus bar will be directly connected to the main switchgear and individual grounding bus bars will be located in all electrical and telecommunications rooms. A lightning protection system will be provided for the facility in compliance with NFPA 780.

Parking Garage Power
Provide Electric Vehicle recharge stations for 2% of the total vehicle count.

Texas Mall Power
Provide pathway and branch circuits for power to landscape lighting and features as well as other electrical loads as required at the Texas Mall. Features requiring power will be circuited to the building nearest the load. If the power requirements are significant, electrical subpanels may be provided throughout the Mall to more effectively serve the area.
**1601 Congress Building**  
**Electrical Systems**

**LIGHTING**  
Luminaires will be primarily LED. With longer expected “lamp” life on LEDs sources than fluorescent lamp sources, this will save not only on energy use, but also on future maintenance. High efficiency dimmable drivers will be provided to address energy code control. Egress lights will be LED-type. Lighting will be provided in all exit pathways. Exit lights shall be LED type.

A low voltage programmable lighting control system will be provided comprised of a master panel with programmable CPU with relays and additional remote control panels. To maximize the energy efficiency of spaces, occupancy sensors will be used where practical and daylight sensors will be provided where practical in spaces with abundant natural daylight.

Exterior luminaires will be LED, minimum 70CRI, full-off and dark-sky compliant. Exterior lights will be controlled through photocell and the building’s lighting control system.

**Parking Garage Lighting**  
Parking and garage lighting fixtures will be designed to achieve even spatial effect to maximize lighting efficiency through LED type luminaires. Control for parking garage will be time-of-day through building control systems.

**Target lighting levels**  
- Parking area: Average 5-7 footcandles  
- Garage entrances: 30-50 footcandles

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**Proposed lighting layout**  
“2-1-2” lighting layout intended to reduce overall fixture count while maximizing light coverage
3.8 Pre-Conceptual Design Analysis

Fire Protection
Central Utility Plant and Tunnel (CUP)

Fire Protection Systems

Design Criteria
The systems in the garage and utility plant shall conform to the following codes, standards, and guidelines:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- NFPA 13
- NFPA 24
- NFPA 70
- NFPA 72
- NFPA 90A
- Texas Accessibility Standards (TAS)
- Americans with Disabilities Act
- Owner's Insurance underwriter requirements

All fire protection system equipment shall be new and listed by UL or approved by FM global.

Central Utility Plant and Tunnel (CUP)

Fire Suppression System

Water Supply
The flow test data from the city domestic was assumed to be 1000 gpm at 50 psi. A fire flow test shall be performed to determine the actual supply for the building. A double check valve (ASSE rated) with an OS&Y valve shall be installed leading to the building with an authority having jurisdiction (AHJ) approved backflow prevention device on a separate fire line leading to the riser. A flush mounted fire department connection shall be installed outside the building in a visible and accessible location. A safety factor of 10 psi or 10 percent of the pressure, whichever is greater, shall be included in all hydraulic calculations. The assumed water supply should be sufficient to serve the suppression systems; a fire pump will not be required for the CUP.

Wet-Pipe Sprinkler System
The central plant shall be fully sprinklered per NFPA 13. The utility tunnel will not have a fire suppression system as it is an equipment access area only. Pendant sprinklers shall be used throughout the areas with finished ceilings and upright sprinklers shall be installed in areas with no ceilings. Occupancies, sprinkler densities, and design areas shall be determined per NFPA 13. Light hazard occupancies include, but are not limited to, office space and incidental areas. Ordinary hazards include mechanical rooms, electrical rooms, and other equipment spaces.

Standpipes
The central plant will not require a standpipe system due to its height.

Piping
Sprinkler and standpipe piping shall be ASTM A53 schedule 40 for all piping. Piping to have Victaulic roll groove fittings.

Central Utility Plant and Tunnel (CUP)

Fire Alarm System

As part of the renovation of the CUP, a fire alarm control panel (FACP) will be installed as well as notification and initiating devices to support to the new areas of the CUP. The FACP will interface with the existing FACP within the building.

Panel Location
The fire alarm control panel (FACP) in the CUP will be located near the existing FACP for the building. The FACP shall be addressable with networking capabilities, shall have provisions to report alarms to an offsite emergency response agency.

Initiating Devices
Initiating devices will be provided in the new areas of the CUP and will report to the main building FACP. Initiating devices will include manual pull stations, tamper switches, and area smoke detectors as required by code, as well as sprinkler system monitoring devices.

Notification Devices
Visual and audible notification devices will be provided in the CUP as required by the IBC and ADA requirements. Complete audibly and visual coverage will be provided throughout the CUP. Speaker/strobe combination devices will be located throughout the CUP and activated from a fire alarm signal. These devices will be located in all areas and will be connected through a Class B circuit.

Emergency Systems Interface
HVAC shutdown and elevator recall will be controlled by the FACP within the CUP.
Design Criteria
The systems in this high-rise building shall conform to the following codes, standards, and guidelines:
- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- NFPA 13
- NFPA 14
- NFPA 17A
- NFPA 20
- NFPA 24
- NFPA 75
- Owner’s Insurance underwriter requirements

All fire protection system equipment shall be new and listed by UL or approved by FM global.

Water Supply
The flow test data from the city domestic was assumed to be 1000 gpm at 50 psi. A fire flow test shall be performed to determine the actual supply for the building. Two independent supplies will be provided. A double check valve (ASSE rated) with an OS&Y valve shall be installed leading to the building with an authority having jurisdiction (AHJ) approved backflow prevention device on a separate fire line leading to the fire pump. A post indicator valve will be provided on the main fire supply to the building. Two four way flush mounted fire department connections shall be installed outside the building in a visible and accessible location approved by the AHJ.

Fire Pumps
The fire suppression system demand will be provided by an electric motor-driven fire pump and jockey pump, which will be connected to emergency power. The preliminary pump rating is 1000 gpm with a boost pressure of 145 psi. This estimated pump size is based on having no fire flow teStreet. The flow used as the baseline for sizing the pump was 1000 gpm at 50 psi residual. The pump sizing will need to be verified once a fire flow test is performed. A safety factor of 10 psi or 10 percent of the pressure, whichever is greater, shall be included in all hydraulic calculations. A controller and transfer switch shall be provided with a remote alarm cabinet. A four way fire pump test header shall be provided for testing and maintenance. Fire department access shall be met per NFPA 20. This includes approval from the AHJ of fire pump room location and access to the room via an exterior location.

Wet-Pipe Sprinkler System
The building shall be fully sprinklered per NFPA 13. It will have an automatic wet-pipe, Class I combined automatic sprinkler and standpipe system. The design demand will be whichever is greater, the sprinkler system or the standpipe system. Floor control valves shall be provided at each floor to serve the sprinklers on that floor. Additionally, where pump shut-off plus city static pressure exceeds 155 psi, the floor control valve shall be pressure restricting type. Each floor control valve will include a pressure restricting valve (where necessary), supervised shut-off valve, and flow switch. Sprinklers shall be quick response type in all light and ordinary hazard occupancies. Light hazard occupancies include, but are not limited to, office space, museum space, and incidental areas. Ordinary hazards include mechanical rooms, electrical rooms, and automobile parking. Pendant recessed heads shall be used throughout the areas with finished ceilings and upright heads shall be installed in areas with no ceilings. All occupancies, sprinkler densities, and design areas shall be determined per NFPA 13.

Dry-Pipe and Preaction Systems
Portions of the sprinkler or standpipe system that are exposed to ambient temperatures less than 40° F shall be protected by a dry pipe sprinkler system. This includes areas such as the parking garage and loading dock. The dry pipe valve shall be located in an area that is maintained at or above 40° F. An air compressor with refrigerated dryer shall be provided for air maintenance. System zoning will be done so that volume limitations or remote head time limitations per NFPA 13 are met. IT rooms will be provided with double-interlock preaction systems in lieu of wet-pipe sprinkler systems. The preaction valve will open upon receipt of air-aspirating smoke alarm and low air-pressure alarm.

Standpipes
A Class I Automatic wet standpipe shall be provided. It will be a combined system with the automatic sprinkler system. The system shall be capable of providing 500 gpm to the most remote standpipe plus 250 gpm to each additional standpipe (up to 1000 gpm maximum). Additionally, 100 psi must be provided at the most remote point of the system. 2-1/2" valves will be located at the intermediate landings in the stairwells. All hose valve outlets shall be pressure restricting type to 100 psi. A four-way roof outlet shall be provided. All portions of the building shall be located within 200 ft of a hose connection per NFPA 14.

Other Fire Suppression Systems
A wet-chem system to protect the kitchen area of the restaurant shall be designed and installed per NFPA 17A.

Piping
Sprinkler and standpipe piping shall be ASTM A53 schedule 40 for all piping. Dry standpipe piping shall be galvanized. Piping to have Victaulic roll groove fittings.

Estimating Flow and Pressure Demand

<table>
<thead>
<tr>
<th>FLOW</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>0.1 gpm/sq ft</td>
</tr>
<tr>
<td>Area</td>
<td>1500 sq ft</td>
</tr>
<tr>
<td>Overage</td>
<td>1.15</td>
</tr>
<tr>
<td>Hose Stream</td>
<td>100 gpm</td>
</tr>
</tbody>
</table>

Required Flow Sprinkler:

\[ Q = (D \times A \times O) + H \]

\[ = 272.5 \text{ gpm} \]

Standpipe:

| Three stairwells | 1000 gpm |

Flow from the standpipe is greater than the sprinkler flow and therefore the design requirement for both buildings

<table>
<thead>
<tr>
<th>PRESSURE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction loss</td>
<td>45 psi</td>
</tr>
<tr>
<td>Elevation loss</td>
<td>85 psi</td>
</tr>
<tr>
<td>Pressure at remote sprinkler head</td>
<td>11 psi</td>
</tr>
<tr>
<td>Friction loss</td>
<td>10 psi</td>
</tr>
<tr>
<td>Elevation loss</td>
<td>86.6 psi</td>
</tr>
<tr>
<td>Pressure at remote standpipe</td>
<td>100 psi</td>
</tr>
</tbody>
</table>

Pressure at top of standpipe is greater than the sprinkler system and therefore the design requirement for both buildings

| Total Pressure loss | 195 psi |
| Residual Pressure | 50 psi |
| Pump boost required | 145 psi |
1801 Congress Building

Fire Alarm System

A fully addressable fire alarm system with voice communication will be provided as required by and in compliance with the most recently adopted editions of the following codes and standards:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- NFPA 70
- NFPA 72
- NFPA 90A
- Texas Accessibility Standards (TAS)
- Americans with Disabilities Act

These devices will be connected through a Class X circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

1. Area Smoke Detectors; UL Listed for use; Photoelectric, analog addressable type; Provide all mounting accessories required at each device location.
2. Duct Smoke Detectors: UL Listed for use; fit with a duct housing assembly and sampling tubes; Sampling tube length as required to completely span duct; Auxiliary contacts in base as required for control functions listed herein.
3. Heat Detectors; UL listed, Addressable. Provide all mounting accessories required at each device location.
4. Pull Stations: UL Listed; Addressable, key reset; Provide all mounting accessories required at each device location.

Smoke detection will be provided at a minimum in all mechanical rooms, electrical rooms, and similar rooms that are not provided with sprinkler protection, as well as all elevator lobbies. An air-aspirating smoke detection system will be provided in IT rooms and interface with the installed pre-action fire suppression systems. Smoke detection and heat detection will both be provided at a minimum in elevator machine rooms and at the top of elevator hoist ways. Duct smoke detection will be provided in air supply systems in accordance with the International Mechanical Code and NFPA 90A.

The fire alarm system will include a fireman's two-way communication system between stairwell landings on each floor, each elevator cab, the fire pump location, and the fire command center. A remote annunciator panel will be provided at the building entrance. A control panel will be provided in the fire command center to monitor and control the stairwell pressurization system.

Panel Location

The fire alarm control panel (FACP) will be located in a fire command control room, located on the first floor of the building, near the main entrance. Multiple panels may be required due to the size of the building. The FACP shall be addressable with networking capabilities, shall operate in a local manner and have provisions to report alarms to an offsite emergency response agency. A separate releasing panel will be installed to support the pre-action system in the IT room. Alarms and trouble conditions shall be annunciated on the panel with an LCD alpha-numeric display. The FACP shall include voice evacuation alarm modules and a fireman’s handset for issuing live voice instructions.

Initiating Devices

Initiating devices will be provided in the building core areas and will report to the building FACP. Initiating devices will include manual pull stations, area smoke detectors, area heat detectors, and duct smoke detectors as required by code, as well as sprinkler system monitoring devices.

Notification Devices

Visual and audible notification devices will be provided as required by the ADA, TAS, and IBC. Complete visual coverage will be provided in all common and public areas of the building, including all corridors, lobbies, multi-purpose rooms, cafes, gift shops, museum exhibit areas, and auditoriums. Automated voice emergency evacuation instructions from the FACP will be sounded on the level of the alarm initiation and on the levels above and below through dedicated fire alarm system speakers. Strobe and speaker/strobe combination devices will also be activated on the floor of alarm initiation as well as the floors above and below. These devices will be located in common use areas of the building and will be connected through a Class B circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

1. Visual Notification Devices; UL Listed for use. Provide all mounting accessories required at each device location.
2. Audible Notification Devices; UL Listed for use; Speaker type. Provide all mounting accessories required at each device location.
3. Integrated units: Provide integrated Audible/Visual units. UL Listed for use; Provide all mounting accessories required at each device location.

Emergency Systems Interface

HVAC shutdown and elevator recall will be controlled by the FACP located in the fire command center. The building will be provided with an emergency power system to power loads required to have a backup power system by IBC and other loads required to have emergency backup power.
1601 Congress Building
Fire Suppression Systems

Design Criteria
The systems in this high-rise building shall conform to the following codes, standards, and guidelines:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- NFPA 13
- NFPA 14
- NFPA 20
- NFPA 24
- NFPA 75
- Owner’s Insurance underwriter requirements

All fire protection system equipment shall be new and listed by UL or approved by FM global.

Water Supply
The flow test data from the city domestic was assumed to be 1000 gpm at 50 psi. A fire flow test shall be performed to determine the actual supply for the building. Two independent supplies will be provided. A double check valve (ASSE rated) with an OSAY valve shall be installed leading to the building with an authority having jurisdiction (AHJ) approved backflow prevention device on a separate fire line leading to the fire pump. A post indicator valve will be provided on the main fire supply to the building. Two motor-driven fire pumps and jockey pump, which will be connected to the building outside the building in a visible and accessible location approved by the AHJ.

Fire Pumps
The fire suppression system demand will be provided by an electric motor-driven fire pump and jockey pump, which will be connected to emergency power. The preliminary pump rating is 1000 gpm with a boost pressure of 125 psi. This estimated pump size is based on having no fire flow. The flow used as the baseline for sizing the pump was 1000 gpm at 50 psi residual. The pump sizing will need to be verified once a fire flow test is performed. A safety factor of 10 psi or 10 percent of the measured pressure, whichever is greater, shall be included in all hydraulic calculations. A controller and transfer switch shall be provided with a remote alarm cabinet. A four way fire pump test header shall be provided for testing and maintenance. Fire department access shall be met per NFPA 20. This includes approval from the AHJ of fire pump room location and access to the room via an exterior location.

Wet-Pipe Sprinkler System
The building shall be fully sprinklered per NFPA 13. It will have an automatic wet-pipe, Class I combined automatic sprinkler and standpipe system. The design demand will be whichever is greater, the sprinkler system or the standpipe system. Floor control valves shall be provided at each floor to serve the sprinklers on that floor. Additionally, where pump shut-off plus city static pressure exceeds 155 psi, the floor control valve shall be pressure restricting type. Each floor control valve will include a pressure restricting valve (where necessary), supervised shut-off valve, and waterflow switch. Sprinklers shall be quick response type in all light and ordinary hazard occupancies. Light hazard occupancies include, but are not limited to, office space, museum space, and incidental areas. Ordinary hazards include mechanical rooms, electrical rooms, and automobile parking. Pendent recessed heads shall be used throughout the areas with finished ceilings and upright heads shall be installed in areas with no ceilings. All occupancies, sprinkler densities, and design areas shall be determined per NFPA 13.

Dry-Pipe and Preaction Systems
Portions of the sprinkler or standpipe system that are exposed to ambient temperatures less than 40° F shall be protected by a dry pipe sprinkler system. This includes areas such as the parking garage and loading dock. The dry pipe valve shall be located in an area that is maintained at or above 40° F. An air compressor with refrigerated dryer shall be provided for air maintenance. System zoning will be done so that volume limitations or remote head time limitations per NFPA 13 are met.

IT rooms will be provided with double-interlock preaction systems in lieu of wet-pipe sprinkler systems. The preaction valve will open upon receipt of air-aspirating smoke alarm and low air-pressure alarm.

Standpipes
A Class I Automatic wet standpipe shall be provided. It will be a combined system with the automatic sprinkler system. The system shall be capable of providing 500 gpm to the most remote standpipe plus 250 gpm to each additional standpipe (up to 1000 gpm maximum). Additionally, 100 psi must be provided at the most remote point of the system. 2-1/2” valves will be located at the intermediate landings in the stairwells. All hose valve outlets shall be pressure restricting type to 100 psi. A four-way roof outlet shall be provided. All portions of the building shall be located within 200 ft of a hose connection per NFPA 14.

Piping
Sprinkler and standpipe piping shall be ASTM A53 schedule 40 for all piping. Dry standpipe piping shall be galvanized. Piping to have Victaulic roll groove fittings.

Estimating Flow and Pressure Demand

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>gpm/sq ft</td>
<td>0.1</td>
</tr>
<tr>
<td>Area</td>
<td>sq ft</td>
<td>1500</td>
</tr>
<tr>
<td>Overage</td>
<td></td>
<td>1.15</td>
</tr>
<tr>
<td>Hose Stream</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Required Flow Sprinkler</td>
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<td>272.5</td>
</tr>
<tr>
<td>Standpipe</td>
<td></td>
<td>750</td>
</tr>
<tr>
<td>Flow from standpipe is greater than the sprinkler flow and therefore the design requirement for both buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friction loss</td>
<td>psi</td>
<td>37.5</td>
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<tr>
<td>Elevation loss</td>
<td>psi</td>
<td>65</td>
</tr>
<tr>
<td>Pressure at remote sprinkler head</td>
<td>psi</td>
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<tr>
<td>Friction loss</td>
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<td>10</td>
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<tr>
<td>Elevation loss</td>
<td>psi</td>
<td>65</td>
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<tr>
<td>Pressure at remote outlet</td>
<td>psi</td>
<td>100</td>
</tr>
<tr>
<td>Pressure at top of standpipe is greater than the sprinkler system and therefore the design requirement for both buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Pressure loss</td>
<td>psi</td>
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<tr>
<td>Residual Pressure</td>
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<td>50</td>
</tr>
<tr>
<td>Pump boost required</td>
<td>psi</td>
<td>125</td>
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</table>
A fully addressable fire alarm system with voice communication will be provided as required by and in compliance with the most recently adopted editions of the following codes and standards:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- NFPA 70
- NFPA 90A
- Texas Accessibility Standards (TAS)
- Americans with Disabilities Act

The fire alarm system may be required by AFD to include a fireman’s two-way communication system between stairwell landings on each floor, each elevator cab, the fire pump location, and the fire command center. A remote annunciator panel will be provided at the building entrance. A control panel will be provided in the fire command center to monitor and control the stairwell pressurization system.

**Panel Location**

The fire alarm control panel (FACP) will be located in a fire command control room, located on the first floor of the building, near the main entrance that is acceptable to AFD. Multiple panels may be required due to the size of the building. The FACP shall be addressable with networking capabilities, shall operate in a local manner and have provisions to report alarms to an offsite emergency response agency. A separate releasing panel will be installed to support the preaction system in the IT room. Alarms and trouble conditions shall be annunciated on the panel with an LCD alpha-numeric display. The FACP shall include voice evacuation alarm modules and a fireman’s handset for issuing live voice instructions.

**Initiating Devices**

Initiating devices will be provided in the building core areas and will report to the building FACP. Initiating devices will include manual pull stations, area smoke detectors, area heat detectors, and duct smoke detectors as required by code, as well as sprinkler system monitoring devices.

Smoke detection will be provided at minimum in all mechanical rooms, electrical rooms, and similar rooms that are not provided with sprinkler protection, as well as all elevator lobbies. An air-aspirating smoke detection system will be provided in IT rooms and interface with the installed preaction fire suppression systems. Smoke detection and heat detection will both be provided at minimum in elevator machine rooms and at the top of elevator hoist ways. Duct smoke detection will be provided in air supply systems in accordance with the International Mechanical Code and NFPA 90A.

These devices will be connected through a Class X circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

**Notification Devices**

Upon activation of a fire alarm, automatic voice emergency evacuation instructions from the FACP will activate on the level of the alarm initiation and on the levels above and below through dedicated fire alarm system speakers. Strobe and speaker/strobe combination devices will also be activated on the floor of alarm initiation as well as the floors above and below. These devices will be located in common use areas of the building, and will be connected through a Class B circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

1. Visual Notification Devices; UL Listed for use. Provide all mounting accessories required at each device location.
2. Audible Notification Devices: UL Listed for use; Speaker type. Provide all mounting accessories required at each device location.
3. Integrated units: Provide integrated Audible/Visual units. UL Listed for use; Provide all mounting accessories required at each device location.

**Emergency Systems Interface**

HVAC shutdown and elevator recall will be controlled by the FACP located in the fire command center.

The building will be provided with an emergency power system to power loads required to have a backup power system by IBC and other loads required to have emergency backup power.

![1601 Congress Building (C16) Fire Alarm System - Riser Diagram](image-url)
Texas Mall and Garage (TXM)
Fire Suppression Systems

Design Criteria
The systems in the garage and utility plant shall conform to the following codes, standards, and guidelines:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- NFPA 13
- NFPA 14
- NFPA 24
- Owner's Insurance underwriter requirements

All fire protection system equipment shall be new and listed by UL or approved by FM global.

Water Supply
The flow test data from the city domestic was assumed to be 1000 gpm at 50 psi. A fire flow test shall be performed to determine the actual supply for the building. A double check valve (ASSE rated) with an OS&Y valve shall be installed leading to the building with an authority having jurisdiction (AHJ) approved backflow prevention device on a separate fire line leading to the riser. A water control valve will be provided on the main fire supply to the building. A flush mounted fire department connection shall be installed outside the building in a visible and accessible location. A safety factor of 10 psi or 10 percent of the pressure, whichever is greater, shall be included in all hydraulic calculations. The assumed water supply should be sufficient to serve the suppression systems; a fire pump will not be required for the underground parking garage.

Dry-Pipe Sprinkler System
The garage shall be fully sprinklered per NFPA 13 with dry-pipe sprinkler systems. Upright sprinklers shall be installed in areas with no finished ceilings. The dry pipe valves shall be located in an area that is maintained at or above 40° F. An air compressor with refrigerated dryer shall be provided for air maintenance. System zoning will be done so that volume limitations or remote head time limitations per NFPA 13 are met. Occupancies, sprinkler densities, and design areas shall be determined per NFPA 13.

Ordinary hazards include mechanical rooms, electrical rooms, and automobile parking areas.

Standpipes
A Class I Automatic dry standpipe system shall be provided for the parking garage. This standpipe system shall be fed from the domestic water supply and through a dry pipe valve. All portions of the parking garage will be served by outlets located so that each portion is within 200 feet of a 2-1/2” hose outlet. All hose outlets shall be pressure restricting type to 100 psi.

Piping
Sprinkler and standpipe piping shall be ASTM A53 schedule 40 for all piping. Dry standpipe piping shall be galvanized. Piping to have Victaulic roll groove fittings.
Texas Mall and Garage (TXM)

Fire Alarm System

The Underground Parking Garage (UPG) fire alarm system will have a main fire alarm control panel (FACP) located within the UPG, and annunciator panels within the 1801 Congress Building (C18) and 1601 Congress Building (C16). The fire command centers in C18 and C16 will also have the capabilities to provide live-voice instructions to the parking garage. The design allows the Austin Fire Department (AFD) to respond to either the C18 or C16 building in the event of a fire incident in the UPG.

The fire alarm systems provided will be in compliance with the most recently adopted editions of the following codes and standards:

- Texas Facilities Commission OPR Version 1
- International Building Code (IBC)
- International Fire Code (IFC)
- International Mechanical Code (IMC)
- NFPA 70
- NFPA 72
- NFPA 70A
- Texas Accessibility Standards (TAS)
- Americans with Disabilities Act

Panel Location

The FACP in the UPG will be located near one of its main entrances. Annunciator panels will be located in the fire command centers in 1801 Congress and 1601 Congress Building. The FACP shall be addressable with networking capabilities, shall operate in a local manner and have provisions to report alarms to an offsite emergency response agency. Alarms and trouble conditions shall be annunciated on the panel with an LCD alpha-numeric display. All of the panels shall include voice evacuation alarm modules and a fireman’s handset for issuing live voice instructions.

Initiating Devices

Initiating devices will be provided in the garage and will report to the parking garage FACP as well as the annunciator panels. Initiating devices will include manual pull stations and area smoke detectors as required by code, as well as sprinkler system monitoring devices. Smoke detectors will be provided at minimum in all elevator lobbies, initiating devices will include manual pull stations, area smoke detectors, area heat detectors, and duct smoke detectors as required by code, as well as sprinkler system monitoring devices. Smoke detection will be provided at minimum in all mechanical rooms, electrical rooms, as well as all elevator lobbies. Smoke detection and heat detection will both be provided at minimum in elevator machine rooms and at the top of elevator hoist ways. Duct smoke detection will be provided in air supply systems in accordance with the International Mechanical Code and NFPA 90A. All initiating devices will be connected through a Class X circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

- Area Smoke Detectors; UL Listed for use; Photoelectric, analog addressable type; Provide all mounting accessories required at each device location.
- Duct Smoke Detectors; UL Listed for use; Fit with a duct housing assembly and sampling tubes; Sampling tube length as required to completely span duct; Auxiliary contacts in base as required for control functions listed herein.
- Heat Detectors; UL listed for use, Addressable. Provide all mounting accessories required at each device location.
- Pull Stations: UL Listed for use; Addressable, key reset; Provide all mounting accessories required at each device location.

Notification Devices

Visual and audible notification devices will be provided in the garage as required by the ADA, TAS, and IBC. Automated voice emergency evacuation instructions from the FACP will be sounded on the level of the alarm initiation and on all other underground levels through dedicated fire alarm system speakers. Strobe and speaker/strobe combination devices will also be activated. These devices will be located in all common use areas, and will be connected through a Class B circuit. Fire alarm system circuits shall meet NFPA 72 survivability requirements at Level 2 or Level 3.

1. Visual Notification Devices; UL Listed for use. Provide all mounting accessories required at each device location.
2. Audible Notification Devices: UL Listed for use; Speaker type. Provide all mounting accessories required at each device location.
3. Integrated units: Provide integrated Audible/Visual units. UL Listed for use; Provide all mounting accessories required at each device location.

Emergency Systems Interface

HVAC shutdown and elevator recall will be controlled by the FACP located near the entrance of the parking garage.
3.9 Pre-Conceptual Design Analysis
Technology
General Summary

The purpose of this document is to identify and furnish the construction requirements for the Information Technology (IT) infrastructure that will support the voice telecommunications services, data communications networks, audiovisual (A/V) systems, video distribution systems and security systems for the Texas Facility Commission Capitol Complex Phase 1 in Austin, Texas. The information in this document will be used as a reference by the design team establishing the telecommunications infrastructure, audio-video and security systems designs for the project.

Best Practices

There are several functional design criteria standards that should be applied to the design and integration of telecommunications and technology for the Texas Capitol Complex buildings. The technology design should provide flexibility to allow for future connectivity as newer technologies are implemented. The technology infrastructure should be designed for easy maintenance and expandability, providing spare capacity for future system growth. The IT infrastructure should have state-of-the-art design to provide the highest reliability and the longest operational life. The IT, A/V and Security systems and infrastructure design should comply with the most recent TFC OPR design guidelines as well as the following industry standards and design parameters.

Codes and Standards

3. Institute of Electrical and Electronic Engineers (IEEE).
5. Americans with Disabilities Act
10. IEEE 802.4 Broadband Applications.
11. IEEE 802.7 Broadband Specifications Standard.
12. International Code Council
16. Texas Accessibility Standards (TAS)

Acronyms and Definitions

A/V: Audio-Visual, audiovisual
BAS: Building Automation System
BCN: Building Control Network, administered by the TFC’s BCN staff. The BCN includes the building automation system (BAS); security (access control and intrusion detection); closed circuit television (CCTV); fire alarm; and energy related monitoring systems.
ECC: Emergency Command Center
EF: Entrance Facility (also referred as Demarc)
CATV: Community Access Television
CCTV: Closed Circuit Television
DAS: Distributed Antenna System
DATA: IT Data Network that includes voice over internet protocol (VoIP), data, Wi-Fi; cable access television (CATV), internet protocol television, audio-visual (A/V) and distributed antenna systems (DAS).
E-DAS: Emergency Distributed Antenna System
ER: Equipment Room (also referred as MDF)
IDF: Intermediate Distribution Frame
IP: Internet Protocol
IPTV: Internet Protocol Television
IT: Information Technology
ITS: Information Transport System
IDS: Intrusion Detection System
MDF: Main Distribution Frame
OSP: Outside Plant
PoE: Power over Ethernet
PTZ: Pan Tilt Zoom
RFID: Radio Frequency Identification Device
TR: Telecom Room (also referred as IDF)
VoIP: Voice Over Internet Protocol
General Infrastructure Requirements

OUTSIDE PATHWAY

Conduits to Property Line for IT/Telecom Service Providers

Outside telecom conduits are required to provide pathways for the telecom service providers (SP) into the Building Entrance Facility (EF) for each building: the 1801 Congress & the 1601 Congress Buildings.

Preceding coordination with the Service Providers, TFC should plan to provision two (2) – 4” conduits for each service provider stubbed out and capped below grade at the property line.

If a maximum of three (3) SPs are considered, a provision of six (6) – 4” conduits from the Building Entrance Facility (EF) rooms to the 1801 Congress & 1601 Congress Buildings’ property lines is required.

Telecommunications Conduits

For Phase 1 scope of work access locations for conduits should be provided at key locations for the IT/Data and BCN networks. These locations include future expandability of the outside conduit plant for Phases 2 and 3 of the project. The access utilities (vaults, pull boxes, etc.) shall be sized based on the number of conduits and pathways they are serving. Below are the preliminary access locations:

AL1 SW corner of 1801 Congress Building (Congress Avenue and 18th Street)
AL2 SE corner of Texas State History Museum (Congress Avenue and 18th Street)
MB1 Mid-block of William B. Travis Building (Congress Avenue)
AL3 NW corner of 1601 Congress Building (Congress Avenue and 17th Street)
AL4 NE corner of Phase 3 Building (Congress Avenue and 17th Street)
MB2 Mid-block of 1601 Congress Building (Congress Avenue)
AL5 NW corner of Robert E. Johnson Building (Congress Avenue and 16th Street)
AL6 NE corner of Phase 2 building (Congress Avenue and 16th Street)

Outside Conduits for IT-Data and BCN Networks – Pathway 1

TFC requires two separate pathways serving the 1801 Congress and 1601 Congress Buildings the conduits described below will conform to Pathway 1 (see above manholes and pull-boxes designations)

<table>
<thead>
<tr>
<th>Conduit Size</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 – 4” C</td>
<td>1801 Congress Equipment Room (ER) to Entrance Facility (EF) room</td>
</tr>
<tr>
<td>6 – 4” C</td>
<td>1801 Congress EF room to AL1</td>
</tr>
<tr>
<td>4 – 4” C</td>
<td>AL1 to AL2</td>
</tr>
<tr>
<td>6 – 4” C</td>
<td>AL1 to MB1</td>
</tr>
<tr>
<td>6 – 4” C</td>
<td>MB1 to AL3</td>
</tr>
<tr>
<td>6 – 4” C</td>
<td>AL3 to AL4</td>
</tr>
<tr>
<td>6 – 4” C</td>
<td>AL3 to MB2</td>
</tr>
</tbody>
</table>

Outside Conduits for the DATA and BCN Networks – Pathway 2

The provision of the second point of entrance, i.e., the redundant pathway for both buildings is through the Utility Tunnel as follow:

4-4” C Multicell 4 – 1” type from the 1801 Congress Building ER to the 1601 Congress Building ER via the Utility Tunnel.

4-4” C Multicell 4 – 1” type from the 1601 Congress ER to the CUP via the Utility Tunnel.
General Infrastructure Requirements

Inside Pathway
Pathways for both the 1801 Congress and the 1601 Congress Buildings will be provided for the telecom service providers and the DATA and BCN network systems between the Entrance Facility (EF) and Equipment Room (ER) rooms and the vertically stacked telecommunications rooms for levels B1 through 9th and level 1 through 15th respectively. The 1801 Congress Building will require 12 – 16 four-inch (4") conduit sleeves interconnecting the TR. The 1601 Congress Building will require 8 – 12 (4") conduit sleeves.

Distributed Antenna System (DAS) Requirements
Each building will need a connection to the Redundant Distributed Antenna System (DAS) fiber optic network in its core Data Center/ER/TR location. Each building location will require a multi-carrier remote/extender mounted in each floors Telecommunication Equipment Room (TR) rooms and be equipped with redundant and/or emergency power connections. The remotes are for multi-band antenna distribution at each floor that will carry the signal of (3) major carriers and local Emergency Communications First Responders and State Official radio frequencies. The system should be 911 location compliant so that the general location of the caller can be isolated. The individual floor level antenna should be capable of varying their signal strength from a remote computer interface to ensure ease of adjustment as required. The pathway for the antenna from the TR central core into each tenant subsection of the floor should be protected in conduit. Each floor should be broken into a minimum of (4) zones and be associated with the direction of the buildings North-South-East-West alignment.

Each garage section will need a connection to the Redundant DAS fiber optic network in its core TR location. Each garage location will require a multi carrier remote/extender mounted in local TR closets and be equipped with redundant and/or emergency power connections. The remotes are for multi-band antenna distribution at each level that will carry the signal of (3) major carriers and local Emergency Communications First Responders and State Official radio frequencies. The system should be 911 location compliant so that the general location of the caller can be isolated. The individual garage level antenna can vary their signal strength from a remote computer interface to ensure ease of adjustment as required. The pathway for the antenna from the TR into each garage subsection should be protected in conduit. Each level should be broken into a minimum of (4) zones and be associated with the direction North-South-East-West alignment.

Site Wi-Fi
Given the need for DAS and E-DAS in each building and parking structure it is in the best interest of the State and Carriers to evaluate DAS systems that are capable of providing “public wifi” over the same owner infrastructure. In this system each building could be equipped with antenna mounted behind exterior architectural panels or integrated into light poles. This system would provide support both for the area around the building and the Texas mall via fiber connections. These areas may require separate Remote DAS extender as well as specialized connection to the Owner DAS Headend (ODH) so that signal capacity can be adjusted for large events density of user profile. These systems also need to be coordinated with the carriers to avoid signal overlap from surrounding towers.
Central Utility Plant and Tunnel (CUP) Security Infrastructure

The tunnel is planned to be part of Phase 1 activities to connect the Central Utility Plant (CUP) to the new facilities as a utility feed element. The size of the tunnel and the fact that it routes from the 1801 Congress Building to the CUP connecting each of these buildings underground establishes it as a security critical element. The security concept of the tunnel will be to secure every entrance/exit to the tunnel and minimize pedestrian access into it to specific entrances in State owned facilities.

Electronic Access control, including lockdown control
The electronic access control will consist of card readers, electronic locks, card reader control panels, and other elements that allow each door or portal to be controlled electronically allowing only authorized passage. The infrastructure will consist of the following elements:

Conduit
- Conduit from each door to a secured, security electronics enclosure inside the tunnel.
- There will be multiple secured, security electronics enclosures throughout the span of the tunnel, no less than 500 feet apart.
- Conduit between the secured, security enclosures inside the tunnel.
- Conduit between the secured, security enclosure closest to the 1801 Congress Building and the Data Center/ER inside the 1801 Congress Building

120VAC locations
- Each secured, security enclosure will require (1) dedicated 20A, 120VAC quad receptacle.

Intrusion Detection System, including duress buttons
The intrusion detection system (IDS) will be comprised of a control/communicator inside one of the secured, security electronics enclosures, door contacts on the doors that are integrated with the access control system and motion detectors installed at 300 foot intervals throughout the length of the tunnel. The infrastructure needed for the IDS in the tunnel will consist of the following:

Conduit
- Conduit to each perimeter accessible door or hatch that accesses the tunnel from the nearest secured, security electronics enclosure.
- Conduit to each motion detector from the nearest secured, security electronics enclosure.

120VAC locations
- The IDS can use the dedicated 120VAC receptacles that are in the secured, security electronics enclosure.

Emergency Call Stations
Emergency call stations need to be installed at 300 foot intervals throughout the length of the tunnel. These will report back to the 1801 Congress Building Emergency Command Center (ECC) for monitoring and response. The infrastructure requirements for the emergency call stations in the 1801 Congress Building will consist of the following:

Conduit
- Conduit from each call station to the nearest TR/ER.

120VAC Locations
- Each emergency call station will need (1) 15A, 120VAC duplex receptacle.
- The 15A does not have to be dedicated but cannot be shared on more than two call stations.

Video Surveillance
The video surveillance system will consist of IP based surveillance cameras, power of Ethernet (PoE) switches, a server, and storage. The intent of the server and storage is to be located inside the Data Center area of the 1801 Congress Building. Monitoring and control of the video surveillance system will be capable at each ECC via a network connection. The video surveillance will need to cover the tunnel in its entirety with cameras at each end and at 100 foot intervals throughout the length of the tunnel. Each emergency call station will have a camera located near it to provide a video view of the activity in the immediate area. The infrastructure for the video surveillance system will consist of the following:

Conduit
- Conduit from each camera to the nearest secured, security electronics enclosure.

120VAC locations
- The 120VAC power installed for the access control will provide for the PoE switchgear in these enclosures.

Emergency Command Centers
The tunnel will not have an ECC inside of it but it will be monitored by the ECC in the 1801 Congress Building.

Security Sensitive Tenant Agency Space
Not applicable to the tunnel.
1801 Congress Building

Equipment Room and Spaces

The physical layer of the technology infrastructure consisting of the equipment rooms, cable pathways and cable is often said to be more important than the end point network electronic equipment. The information technology infrastructure should be standards based, flexible and designed with spare capacity enabling future growth and easy migration to support future technologies.

Building Entrance Facility (EF)

One Building Service Entrance space is required for the 1801 Congress Building. This Entrance Facility (EF) room will accommodate multiple service providers with fire-resistant, plywood backboard applied to all walls and overhead runway designed for optimal routing of each carrier’s cabling into and within the room. The EF room will serve as the building demarcation point for the termination of outside facilities (including the local and long distance carriers and telecom service providers) for the voice, data, video networks and auxiliary systems that interconnect to the local, building-wide networks. This room will also house the Digital Antenna System (DAS) based equipment from the Service Providers. Based on the assumption of having three (3) Service Providers this room should be approximately 15 ft. x 30 ft. and located at Level 01.

Telecommunication Equipment Rooms (TR)

Telecommunications Rooms (TR) are required at all levels to provide intermediate termination and interconnection points to telecommunications and technology systems that require the installation of equipment in a distributed environment. These spaces are located to maintain industry standard cable lengths for the communications cabling. The TRs will house rack- and wall-mounted equipment for the telephone, data networking, and CATV systems. The equipment rooms will be provisioned with equipment racks, patch panels, grounding bus bars, overhead ladder racks and ¾” telecom plywood walls. They will house the cabling supporting the voice terminals and data communications as well as terminations for the Access Control and Surveillance system and miscellaneous BCN terminations and equipment. The estimated number of TR per level and room sizes are as follow:

- Level 02 TR (west) 15 ft. x 15 ft.
- Level 02 TR (east) 15 ft. x 25 ft.
- Levels 03 - 06 TR (north) 15 ft. x 20 ft.
- Levels 03 - 06 TR (south) 15 ft. x 25 ft.
- Levels 07 - 15 TR (north) 15 ft. x 15 ft.
- Levels 07 - 15 TR (south) 15 ft. x 15 ft.

Data Center

A Data Center room will house the data networking hardware, servers and storage equipment for the state agencies residing in the 1801 Congress Building. The Data Center is to be designed based on a Tier 2 uptime availability and 2N redundancy for the UPS system. The Data Center could be in the center-east side of Level 02 allowing for future expandability to the north or south spaces. Preliminary estimates sized this room at 60 ft. x 60 ft. Factors such as physical separation of networking equipment within the different TFC departments will add space requirements to the Data Center to a potential 60 ft. x 90 ft. space.

Conduit

- Conduit to each card reader controlled door from the nearest TR/ER
  - Perimeter doors
  - TR/ER doors
  - Electrical room doors
  - Mechanical room doors
  - Tunnel entrance door(s)
- Conduit for the fiber connection from the server location to the 1601 Congress Building utilizing the tunnel
- Conduit/ raceway connection between each TR and the ER/server room
- Conduit/ raceway between the 15th floor TR and the elevator mechanical room
- Conduit connection between the ER/Server room and the ECC
- Conduit connecting the parking entrance control equipment to the nearest TR/ER (coordinate with parking entrance gate provider for the gate and motor requirements).
- Conduit from the gate motor location to a secure enclosure in the parking entrance vicinity, secured side for the gate electronic controls.

1801 Congress Building

Security Infrastructure

The 1801 Congress is a 14-story high-rise building with 8 of those floors being above grade parking and 5 floors of below grade parking. This facility will house a permanent emergency command center (ECC) to monitor the security of the Texas Mall area. During Phase 1 this will be the main ECC. In Phase 2, the 15th Street building will house the main ECC as it will be the permanent location of the DPS.

The security systems servers and head end components will reside in the 1801 Congress Building permanently, even though the main monitoring location will be a Phase 2 buildout in the 15th building. The security of the 1801 Congress Building will consist of a secured perimeter, secured elevator traffic, secured parking garage, and secured entry into the tunnel.

Electronic Access control, including lockdown control

The electronic access control will consist of card readers, electronic locks, door prop/forced sounder, card reader control panels, and other elements that allow each door or portal to be controlled electronically allowing only authorized passage. The access control system will also provide controlled passage through each elevator by either integration with the elevator control or the installation of a card reader inside each elevator cab. The infrastructure will consist of the following elements:
1801 Congress Building
Security Infrastructure

120VAC locations
- Each TR requires (1) dedicated 30A, 120VAC quad receptacle for wall mounted security equipment
- Each parking entrance control point from public space will require (1) dedicated 15A, 120VAC quad receptacle inside the security electronics enclosure. In addition to this, coordinate with the gate motor designer for specific power requirements for the parking gate motor(s).

Intrusion Detection System (IDS), including duress buttons
The intrusion detection system (IDS) for the perimeter of the building will include door contacts, glass break detectors, interface keypads, and sounders/sirens. The core and shell of the building will include the permanent mounting of door contacts and glass break detectors at each entrance to the building that has a door with glass in it at the ground level or public accessible area. There will also be one keypad in the control room for arming and disarming the IDS. For local annunciation, there will be a sounder/siren located on the ground floor of the parking garage and at the first office space floor. The tenant improvement will need to include the duress buttons at each reception station and door contacts into their specific areas from the common area.

Infrastructure requirements for the IDS will consist of the following components:

Conduit
- Conduit from each perimeter accessible door that is not card reader controlled from the nearest TR/ER.
- Conduit/raceway to each 120VAC locations
- Only the main control communicator for the IDS will require (1) dedicated, 15A, 120VAC duplex receptacle.

Emergency Call Stations
The emergency call stations will be installed throughout the parking garage levels for 1801 Congress Building. These are typically installed two (2) per floor as long as the blue light is visible from any point within the parking garage. These emergency call stations are IP based stations that interact with the local or main ECC. The infrastructure requirements for the emergency call stations in the 1801 Congress Building will consist of the following:

Conduit
- Conduit from each call station to the nearest TR/ER.

120VAC Locations
- Each emergency call station will need (1) 15A, 120VAC duplex receptacle.
- The 15A does not have to be dedicated but cannot be shared on more than two (2) call stations.

Video Surveillance
The video surveillance system will consist of IP based surveillance cameras, power of Ethernet (PoE) switches, a server, and storage. The intent of the server and storage is to be located inside the Data Center area of the 1801 Congress building. Monitoring and control of the video surveillance system will be capable at each ECC via a network connection. The video surveillance for the perimeter of the space will include the parking garage entrances, general traffic on each parking garage level, any specific parking designated areas for security purposes, the common area of the main entry floor of office spaces, and each elevator lobby. The exterior perimeter of the building shall also be covered by cameras on the building exterior. The infrastructure for the video surveillance system will consist of the following:

Conduit
- Each exterior camera will need a conduit stubbed out through the building and routed through conduit or raceway to the nearest TR/ER.
- Each interior camera will need conduit from its location to the nearest accessible ceiling space/raceway to route to the nearest TR/ER.

120VAC Locations
- The only 120VAC locations will be in the TR/ER racks providing power to the PoE switches.

Emergency Command Centers (ECC)
The 1801 Congress Building will be home to the temporary move of the DPS agency in addition to the long term agencies that will occupy the building. Due to these circumstances, the 1801 Congress Building is the appropriate location for the Phase 1 Emergency Command Center (ECC). The Phase 1 ECC will be the main ECC during the construction process of the Phase 1 activities and up to the construction of the 15th Street Building in Phase 2. The 15th Street Building will house the main ECC when it is built. The 1801 Congress Building ECC will consist of workstation computers, monitors, and will connect to the security system servers housed in the Data Center via a high-speed network connection. The core and shell project will need to include the installation of the server and head end components to make the video surveillance cameras and security systems function until the tenant improvement is built out.

Security Sensitive Tenant Agency Space
Security sensitive tenant areas will be built out with the tenant improvement of the 1801 Congress Building. The infrastructure for those spaces will be fed from the nearest TR/ER to support the security system components.
1601 Congress Building

Equipment Room and Spaces

Building Entrance Facility (EF)
One Building Service Entrance space is required for the 1601 Congress Building. The EF infrastructure requirements for the 1601 Congress Building are the same as the 1801 Congress Building. Based on the assumption of having three (3) Service Providers this room should be approximately 15 ft. x 30 ft. and located at Level B1.

Equipment Room (ER)
The Equipment Room (ER), will serve as the main equipment room for the termination of inside cable facilities for the voice, data, video networks and auxiliary systems that interconnect to the networks, including the local and long distance carriers and telecom service providers. The ER will house network and cable plant equipment, freestanding and wall-mounted equipment for the telephone, security panels, data networking and CATV equipment. The ER will accommodate both the DATA and the Building Control Network (BCN) equipment. The ER will house the PBX, data networking equipment, access control and CCTV systems, CATV head end equipment and any other BCN auxiliary equipment necessary for the operation of the building. The ER should be approximately a 16 ft. x 30 ft. and located in Level B1.

Telecommunication Equipment Rooms (TR)
Telecommunications Rooms (TR) are required at all levels to provide intermediate termination and interconnection points to telecommunications and technology systems that require the installation of equipment in a distributed environment. These spaces are located to maintain industry standard cable lengths for the communications cabling. The TRs will house rack- and wall-mounted equipment for the telephone, data networking, and CATV systems. The equipment rooms will be provisioned with equipment racks, patch panels, grounding bus bars, overhead ladder rack and ¾” telecom plywood walls. They will house the cabling supporting the voice terminals and data communications as well as terminations for the Access Control and Surveillance system and miscellaneous BCN terminations and equipment.

The estimated number of TR per level and room sizes are as follow:

<table>
<thead>
<tr>
<th>Level</th>
<th>Room Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>15 ft. x 15 ft.</td>
</tr>
<tr>
<td>02</td>
<td>15 ft. x 25 ft.</td>
</tr>
<tr>
<td>03 - 11</td>
<td>15 ft. x 20 ft.</td>
</tr>
<tr>
<td>12</td>
<td>15 ft. x 25 ft.</td>
</tr>
</tbody>
</table>

Data Center
The Data Center room will house the data networking hardware, servers and storage equipment for the TFC departments residing in the 1601 Congress Building. The Data Center could reside on Level B1. Preliminary estimates sized this room at 30 ft. x 45 ft. Factors such as physical separation of networking equipment within the different TFC departments will add space requirements to the Data Center to a potential 30 ft. x 60 ft. space.

The 1601 Congress Building is a 12-story building that has 5 below grade parking levels. The 1601 Congress building will house the state employees’ child care center and other tenant agency office spaces. The 1601 Congress Building will have ground floor interactions with public accessible spaces. The parking garage levels are all below-grade with ground level parking entrances.

Electronic Access Control, including lockdown control
The electronic access control will consist of card readers, electronic locks, prop/forced sounder, card reader control panels, and other elements that allow each door or portal to be controlled electronically allowing only authorized passage. The access control system will also provide controlled passage through each elevator by either integration with the elevator control or the installation of a card reader inside each elevator cab. The infrastructure will consist of the following elements:

- Conduit to each card reader controlled door from the nearest TR/ER
  - Perimeter doors
  - TR/ER doors
  - Electrical room doors
  - Mechanical room doors
  - Tunnel entrance door(s)
  - State employees’ child care entrance door(s)
  - State employees’ child care interior entrance door(s)
- Conduit for the fiber connection from the server location to the 1801 Congress Building utilizing the tunnel
- Conduit/raceway connection between each TR and the ER/Server room
- Conduit/raceway between the 14th floor TR and the elevator mechanical room
- Conduit connection between the ER/Server room and the ECC
- Conduit connecting the parking entrance control equipment to the nearest TR/ER (coordinate with parking entrance gate provider for the gate and motor requirements). Conduit from the gate motor location to a secure enclosure in the parking entrance vicinity, secured side for the gate electronic controls.
1601 Congress Building
Security Infrastructure

120VAC locations
- Each TR requires (1) dedicated 30A, 120VAC quad receptacle for wall mounted security equipment
- Each parking entrance control point from public space will require (1) dedicated 15A, 120VAC quad receptacle inside the security electronics enclosure. In addition to this, coordinate with the gate motor designer for specific power requirements for the parking gate motor(s).

Intrusion Detection System (IDS), including duress buttons
The intrusion detection system (IDS) for the perimeter of the building will include door contacts, glass break detectors, interface keypads, and sounders/sirens. The core and shell of the building will include the permanent mounting of door contacts and glass break detectors at each entrance to the building that has a door with glass in it at the ground level or public accessible area. There will also be one keypad in the control room for arming and disarming the IDS. For local annunciation, there will be a sounder/siren located on the ground floor of the parking garage and at the first office space floor. The tenant improvement will need to include the duress buttons at each reception station and door contacts into their specific areas from the common area.

Infrastructure requirements for the IDS will consist of the following components:

Conduit
- Conduit to each perimeter accessible door that is not card reader controlled from the nearest TR/ER.
- Conduit/raceway to each device location located in the common area.

120VAC locations
- Only the main control communicator for the IDS will require (1) dedicated, 15A, 120VAC duplex receptacle.

Emergency Call Stations
The emergency call stations will be installed throughout the parking garage levels for the 1601 Congress building. These are typically installed two (2) per floor as long as the blue light is visible from any point within the parking garage. These emergency call stations are IP based stations that interact with the local or main ECC. The infrastructure requirements for the emergency call stations in the 1601 Congress building will consist of the following:

Conduit
- Conduit from each call station to the nearest TR/ER.

120VAC Locations
- Each emergency call station will need (1) 15A, 120VAC duplex receptacle.
- The 15A does not have to be dedicated but cannot be shared on more than two (2) call stations.

Video Surveillance
The video surveillance system will consist of IP based surveillance cameras, power of Ethernet (PoE) switches, a server, and storage. The intent of the server and storage is to be located inside the Data Center area of the 1801 Congress Building with a fiber connection to the PoE switchgear located in the 1601 Congress building TR/ER's. Monitoring and control of the video surveillance system will be capable at each ECC via a network connection. The video surveillance for the perimeter of the space will include the parking garage entrances, general traffic on each parking garage level, any specific parking designated areas for security purposes, the common area of the main entry floor of office spaces, and each elevator lobby. The state employees’ child care facility will also have video surveillance cameras installed during the tenant improvement of this space. The exterior perimeter of the building shall also be covered by cameras on the building exterior. The tenant improvement requirements for security will be supported from each TR and ER in the 1601 Congress Building. The infrastructure for the video surveillance system will consist of the following:

Conduit
- Each exterior camera will need a conduit stubbed out through the building and routed through conduit or raceway to the nearest TR/ER.
- Each interior camera will need conduit from its location to the nearest accessible ceiling space/raceway to route to the nearest TR/ER.

120VAC locations
- The only 120VAC locations will be in the TR/ER racks providing power to the PoE switches.

Emergency Command Centers (ECC)
The 1601 Congress Building security elements will be monitored by the Phase 1 ECC located in the 1801 Congress Building. Once the 15th Street Building is built out then the main ECC will monitor the 1601 Congress Building. Either ECC is supported by network connectivity so migration between the two ECC's will be mostly staffing once they are built out. There is no current plan for an ECC inside the 1601 Congress building.

Security Sensitive Tenant Agency Space
Security sensitivetenant areas will be built out with the tenant improvement of the 1601 Congress building. The infrastructure for those spaces will be fed from the nearest TR/ER to support the security system components.
Texas Mall and Garage (TXM)

Security Infrastructure

The Texas Mall is the outside area along Congress Avenue that will be converted into a greenbelt. The mall will be built to attract public and state employees to visit it. The security intent will be to provide specific video coverage of protected pathways and emergency call stations and general surveillance of the greenbelt spaces.

Electronic Access Control, including lockdown control

Not applicable.

Intrusion Detection System (IDS), including duress buttons

The intrusion detection system (IDS) for the Texas Mall will consist of door contacts on the vaults/hatches that allow entry into the Utility Tunnel and duress/panic buttons contained within the emergency call stations. The infrastructure for the IDS will consist of the following:

Conduit
- Conduit from each door contact location to the nearest secured, security electronics enclosure in the Utility Tunnel.

120VAC
- Not applicable

Emergency Call Stations (ECC)

The emergency call stations will be required at no less than each corner of each block on both sides. These emergency call stations will be monitored by the 1801 Congress ECC. The infrastructure for the emergency call stations in the mall greenbelt will consist of the following:

Conduit
- Conduit joining the two (2) emergency call stations at each block corner.
- Conduit from the emergency call station over the tunnel into the nearest secured, security electronics enclosure in the tunnel.

120VAC
- Each emergency call station will require (1) 15A, 120VAC for every two (2) emergency call stations.

Video Surveillance

The video surveillance system will consist of IP based surveillance cameras, power of Ethernet (PoE) switches, a server, and storage. The intent of the server and storage is to be located inside the Data Center area of the 1801 Congress Building. Monitoring and control of the video surveillance system will be capable at each ECC via a network connection. The video surveillance will need to use specific surveillance to cover the emergency call locations and the protected pathways and use general surveillance to view the mall common areas. The infrastructure for the video surveillance system will consist of the following:

Conduit
- For cameras on buildings, conduit to the nearest TR/ER in the 1801 Congress and 1601 Congress Buildings.
- For cameras on poles, conduit to the nearest emergency call station (then subsequently to the secured, security electronics enclosure).
- Each light pole installed within the mall greenbelt area should have a signal conduit routing to the nearest emergency call station to inclusion of any future camera installation on the pole.

120VAC locations
- Included in the secured, security electronics enclosure and TR/ER’s.

Emergency Command Centers

The mall will be monitored by the ECC in the 1801 Congress Building.
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6TXM A-901  TXM - 3D SECTION - NO-SO 1
## Appendix

### Design Workshops

<table>
<thead>
<tr>
<th>Workshop Number</th>
<th>Topic</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFC Design Workshop 1</td>
<td>Transportation and Parking</td>
<td>September 29, 2016</td>
</tr>
<tr>
<td>TFC Design Workshop 2</td>
<td>Outdoor Ground Level</td>
<td>October 12, 2016</td>
</tr>
<tr>
<td>TFC Design Workshop 3</td>
<td>Massing and Core Studies</td>
<td>October 28, 2016</td>
</tr>
<tr>
<td>TFC Design Workshop 4</td>
<td>Indoor Ground Level</td>
<td>November 7, 2016</td>
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<tr>
<td>TFC Design Workshop 5</td>
<td>Architectural Character &amp; Materials</td>
<td>November 29, 2016</td>
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</tbody>
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