


Planning Commission Staff Report

Project Type:	Amended Site Development Plan
Meeting Date:	May 11, 2020
From:	Chris Dietz, Planner 
Location:	Northeast of the intersection of Conway Road and Chesterfield Parkway East.
Description:	Fairfield Suites ASDP: An Amended Site Development Plan, Landscape Plan, Lighting Plan, Architectural Elevations and Architect's Statement of Design for a 2.84-acre tract of land zoned "PC" Planned Commercial District located northwest of the intersection of Conway Road and Chesterfield Parkway East.

PROPOSAL SUMMARY

Chesterfield Village Lodging, LLC has submitted a request for a proposed hotel addition located in the Fairfield Suites Subdivision. This addition is comprised of a new 54,780 square-foot, four-story hotel with 88 additional guest rooms, a parking structure located beneath the hotel addition, amended elevations to the existing hotel building and a redesigned parking area within this development. An existing vacant restaurant building on site will be demolished to accommodate parking requirements for the new hotel.

HISTORY OF SUBJECT SITE

The site was initially zoned "R-3" by St. Louis County until being rezoned "C-8" Planned Commercial District in 1985. In 1997, this PC district was combined with an adjoining "R-3" Residence District to form a new C-8 district governed under Ordinance 1207. A Site Development Section Plan was approved in 1997 along with a Boundary Adjustment Plat, resulting in the 2.84-acre site that exists today. In 2004, Amended Architectural Elevations were approved for the existing building onsite to renovate the siding material for the hotel. Most recently, the site was



Figure 1: Aerial of Subject Site

rezoned from a “C-8” Planned Commercial District to a new “PC” – Planned Commercial District in 2019 and is currently governed under the provisions of Ordinance 3055. This rezoning established the development criteria for two different development paths for either two conjoined hotels or one hotel and one restaurant—similar to what is currently located on the site.

LAND USE AND ZONING

The surrounding zoning districts and land uses for this site are as follows:

Direction	Zoning	Land Use
North	“PC” – Planned Commercial District	Recreation (Performing Arts Center)
South	“PC” – Planned Commercial District	Vacant/Agriculture
East	“R-3” – Residential District	Multifamily Residential
West	“C-8” – Planned Commercial District	Hotel – Extended Stay

COMPREHENSIVE PLAN

The City of Chesterfield Comprehensive Land Use Map delineates the subject site within the “Urban Core” land use designation, which was defined as the area known as Chesterfield Village, centered at the intersection of I-64/US 40 and Clarkson Road/Olive Boulevard and primarily served by the Chesterfield Parkway. Land uses for the Urban Core include a mixture of high-density residential, retail, and office uses containing the highest density development in Chesterfield.



Figure 2: Future Land Use Map

The Comprehensive Plan states that the Urban Core should serve as the physical and visual focus for the City and include both residential and commercial developments with parks, municipal services, and preservation of historic structures and areas, with cultural, entertainment and pedestrian amenities for

Off-Street Parking and Loading

Parking for this site will be accommodated by a single-story parking structure located beneath the proposed hotel on the south side of the building which will provide 35 parking spaces. Such parking structures are encouraged for denser development within the Urban Core. A vacant restaurant currently located on the site will also be demolished to further accommodate parking requirements for this development.

The Unified Development Code (UDC) requires this development to provide 216 parking spaces for the 180 total hotel room units (1.2 spaces per room). However, the UDC also allows Modification of Standards for Parking and Loading up to a 20% reduction of minimum parking, subject to the review of the Director of Planning. As such, the applicant has requested a 17% reduction as well as a reduction in the amount of loading spaces required for this site, bringing the total amount of parking required to 180 spaces (1.0 space per room) and providing only two (2) 10' x 25' loading spaces without the additional one (1) 10' x 40' loading space required by UDC regulations.

The applicant has supplied a parking study required for this request, as required by code, citing other hotels in the City that utilized similar parking-to-room ratios as well as sufficient use of the current smaller loading space utilized by the existing hotel. This request for Modification of Standards has since been approved by the Director.

Landscaping

The site includes a landscape buffer along both Conway Road and East Chesterfield Parkway. These existing landscape areas will be retained, along with the prominent water feature and landscape area located at the intersection on the southeast corner of the site. The landscape areas at each entry from both roads will be improved to provide more plantings, including the landscape area around the freestanding sign along Chesterfield Parkway.

Other landscaping will be incorporated throughout the site's interior and will include a mixture of evergreen, deciduous and ornamental plantings. All proposed landscaping complies with the Unified Development Code.

Lighting

Lighting for this development will be upgraded for the existing building in addition to the proposed hotel and will primarily consist of utilitarian wall fixtures, soffit lighting and pole-mounted fixtures throughout the parking area. However, one fixture (Fixture "D"), located on either side of the main entrance under the portico of the proposed building will be decorative in nature and will illuminate upward, intended to accentuate the main entrance. The light emitted by this fixture is intended to be cut off completely by the underside of the portico, but requires Planning Commission approval as it is not fully shielded. The figure below demonstrates the nature of this decorative fixture. A photometric plan and all cutsheets are included in the Planning Commission Packet attached to this report.

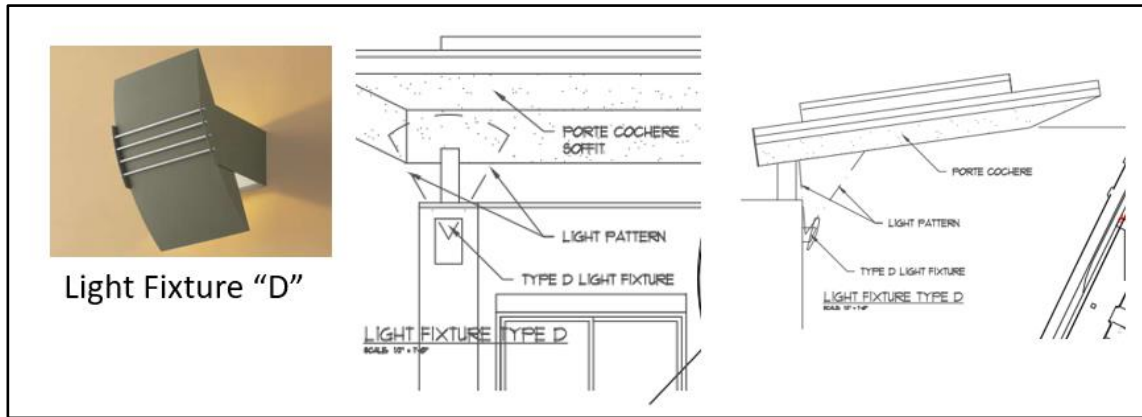


Figure 4: Fixture "D"

Architectural Elevations

This proposal features a four-story hotel building with a parking structure located beneath the south end of the building. The proposed hotel will provide 88 hotel rooms and will rise to an elevation of 62'4" measured from the parking garage entrance (maximum of 65' allowed). By ordinance, the site is allowed a maximum Floor Area Ratio (F.A.R.) of .86 and has a minimum open space requirement of 26%. The proposed development would bring the F.A.R. to exactly .86 and the open space for the site to 26.78%.

The building material utilized for this project will include brick and other materials that will match that of the existing building, while also incorporating some of the new features of the proposed building to be retrofitted on the existing hotel to create a cohesive design schedule for the entire site. Materials include brick (to match that used on the existing hotel), several shades of neutral-colored EIFS, glass and composite wood elements and fiber cement accents used to accentuate a transition zone between the two conjoined buildings. Other features included a pedestrian-level utilization of glass on the main entrance of the proposed building as well as a patio area located just south of the main entrance of the building.

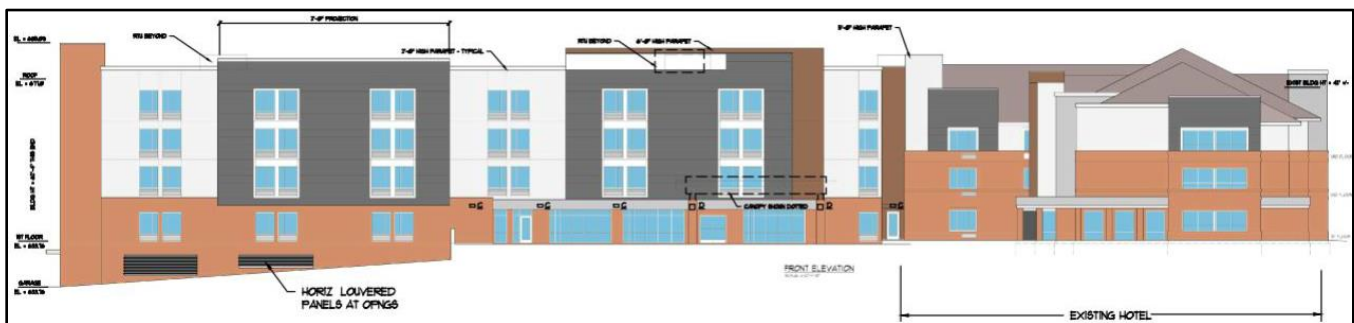


Figure 5: East Elevation



Figure 6: Architectural Rendering

ARCHITECTURAL REVIEW BOARD INPUT

On February 13, 2020, this project was reviewed by the Architectural Review Board which raised several concerns regarding this project. Primarily, the Board expressed concern over the designs of both the proposed and existing buildings clashing while being connected to each other. After a brief discussion of these concerns, the applicant requested that no action be taken by the Board on this project until these issues were addressed.

This project was reviewed again by the Architectural Review Board on April 14, 2020 after the applicant made significant changes to the design of the site's proposed and existing hotel buildings. At that time the Board recommended approval of the project by a vote of 4-0 with two (2) conditions:

1. Staff to ensure that the proposed brick material matches that of the existing structure.
2. Verify that the proposed parking garage louvres will match either the color of the EIFS or brick of the proposed building.

The applicant has since revised their elevations and has successfully addressed these conditions.

STAFF RECOMMENDATION

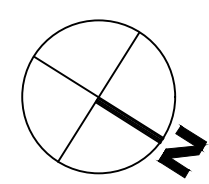
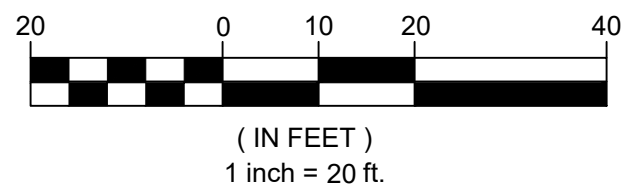
Staff has reviewed this proposed development and found it to be in compliance with the City's Comprehensive Plan, Unified Development Code and site-specific ordinance and all outstanding comments have been addressed at this time. Staff recommends approval of this Amended Site Development Plan for Fairfield Suites.

MOTION

The following options are provided to the Planning Commission for consideration relative to this application:

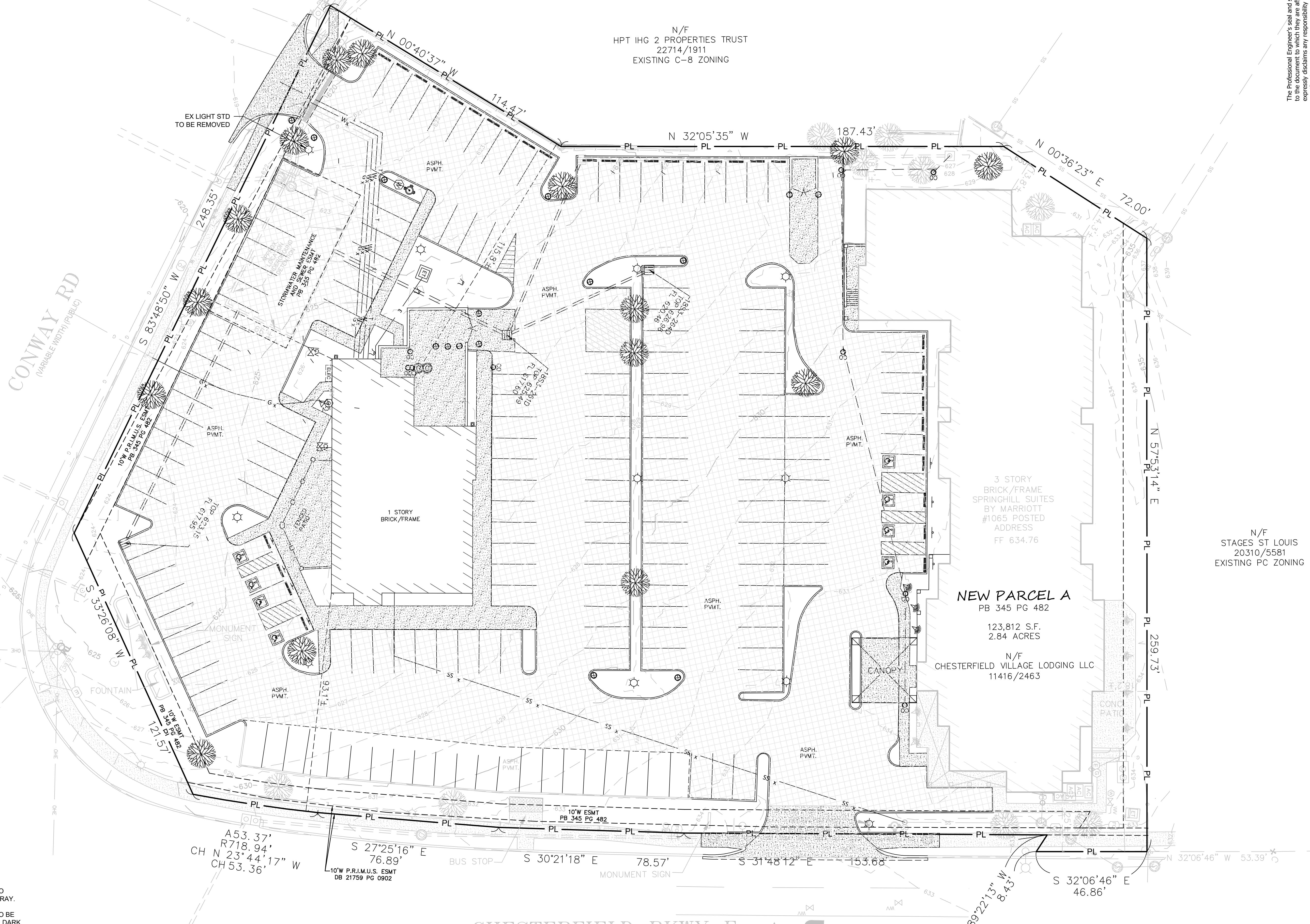
- 1) "I move to approve (or deny) the Amended Site Development Plan, Landscape Plan, Lighting Plan, Architectural Elevations and Architect's Statement of Design for Fairfield Suites, as presented."
- 2) "I move to approve the Amended Site Development Plan, Landscape Plan, Lighting Plan, Architectural Elevations and Architect's Statement of Design for Fairfield Suites with the following conditions..." (Conditions may be added, eliminated, altered or modified)

Attachments: Amended Site Development Plan Packet



N/F
HPT IHG 2 PROPERTIES TRUST
22714/1911
EXISTING C-8 ZONING

CONWAY RD
(VARIABLE WIDTH) (PUBLIC)



3 STORY
BRICK/FRAME
SPRINGHILL SUITES
BY MARRIOTT
#1065 POSTED
ADDRESS
FF 634.76

NEW PARCEL A
PB 345 PG 482
123,812 S.F.
2.84 ACRES
N/F
CHESTERFIELD VILLAGE LODGING LLC
11416/2463

N/F
STAGES ST LOUIS
20310/5581
EXISTING PC ZONING

NOTE:
EXISTING ELEMENTS TO
REMAIN ARE SHOWN GRAY.
EXISTING ELEMENTS TO BE
REMOVED ARE SHOWN DARK.

CHESTERFIELD PKWY E
(VARIABLE WIDTH) (PUBLIC)

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MISSOURI STATE CERTIFICATE OF AUTHORITY # 20080827

CHESTERFIELD VILLAGE
LODGING, LLC
1850 CRAIGSHIRE, SUITE 103
ST LOUIS, MO 63146

AMENDED SITE DEVELOPMENT PLAN
SPRINGHILL SUITES / FAIRFIELD SUITES
1065 East Chesterfield Parkway
Chesterfield, Missouri 63017
A TRACT OF LAND BEING NEW PARCEL A OF A RESUBDIVISION OF ADJUSTED
LOT 3C OF A BOUNDARY ADJUSTMENT PLAT OF LOTS 3B AND 3C OF THE
SUBDIVISION OF LOT OF HERMAN STEWME OFFICE PARK, PB 345 PG 482 OF THE
ST LOUIS COUNTY RECORDS.

PRELIMINARY - NOT FOR CONSTRUCTION

ISSUE DATE	DESCRIPTION
11-27-2019	Revision - City Comments

JOB NO:	CV18-0409.00
DRAWN BY:	GAS
CHECKED BY:	TBS
DATE:	10/28/2019
SHEET NO.	EXISTING SITE PLAN

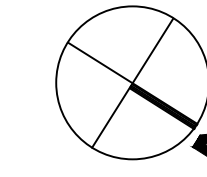
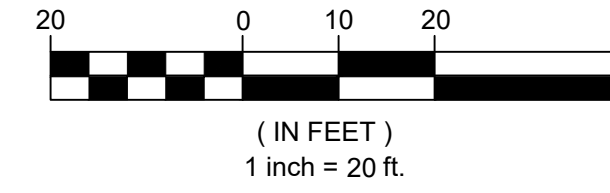
C001

THE UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NONEXISTENCE, SIZE, TYPE, OR LOCATION OF THESE OR OTHER UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UTILITIES, SHOWN OR NOT SHOWN, AND SAID UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO ANY CONSTRUCTION OF IMPROVEMENTS.

* MAXIMUM BUILDING HEIGHT IS TO ROOF LEVEL AND DOES NOT INCLUDE PARAPETS, SCREENS, OR MECHANICAL EQUIPMENT

NOTES:

1. ITEMS SHOWN GRAY (BACKGROUND) ARE EXISTING ITEMS TO REMAIN AND BE USED IN PLACE. SEE C001.
2. ALL EXISTING LIGHT STANDARDS ON-SITE ARE TO BE REMOVED AND REPLACED UNLESS OTHERWISE NOTED. SEE ATTACHED LIGHTING PLAN.
3. AN OPPORTUNITY FOR RECYCLING WILL BE PROVIDED IN ACCORDANCE WITH ORDINANCE 3055 REQUIREMENTS.



CONWAY RD
(VARIABLE WIDTH) (PUBLIC)



EXISTING FOUNTAIN TO REMAIN (USE IN PLACE)

EXISTING LIGHT STANDARD TO REMAIN (USE IN PLACE)

EXISTING BUS STOP TO REMAIN (USE IN PLACE)

EXISTING LIGHT STANDARD TO REMAIN (USE IN PLACE)

EXISTING LIGHT STANDARD TO REMAIN (USE IN PLACE)

EXISTING FIRE HYDRANT TO REMAIN (USE IN PLACE)

EXISTING LIGHT STANDARD TO REMAIN (USE IN PLACE)

N/F
HPT IHG 2 PROPERTIES TRUST
22714/1911
EXISTING C-8 ZONING

4-STORY HOTEL
88 ROOMS - HEIGHT ±62'
FIRST LEVEL FF 633.76
GARAGE LEVEL FF 622.76

3 STORY
BRICK/FRAME
SPRINGHILL SUITES
BY MARRIOTT
#1065 POSTED
ADDRESS
FF 634.76

NEW PARCEL A
PB 345 PG 482
123,812 S.F.
2.84 ACRES

N/F
CHESTERFIELD VILLAGE LODGING LLC
11416/2463

N/F
STAGES ST LOUIS
20310/5581
EXISTING PC ZONING

CHESTERFIELD PKWY E
(VARIABLE WIDTH) (PUBLIC)

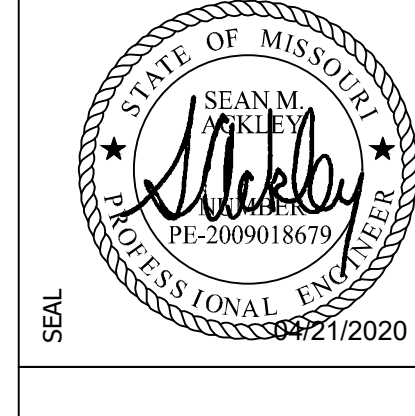
PRELIMINARY - NOT FOR CONSTRUCTION

AMENDED SITE DEVELOPMENT PLAN
SPRINGHILL SUITES / FAIRFIELD SUITES

1065 East Chesterfield Parkway
Chesterfield, Missouri 63017
A TRACT OF LAND BEING NEW PARCEL A OF A RESUBDIVISION OF ADJUSTED LOT 3C OF A BOUNDARY ADJUSTMENT PLAT OF LOTS 3B AND 3C OF THE SUBDIVISION OF LOT OF HERMAN STEMMER OFFICE PARK, PB 345 PG 482 OF THE ST LOUIS COUNTY RECORDS.

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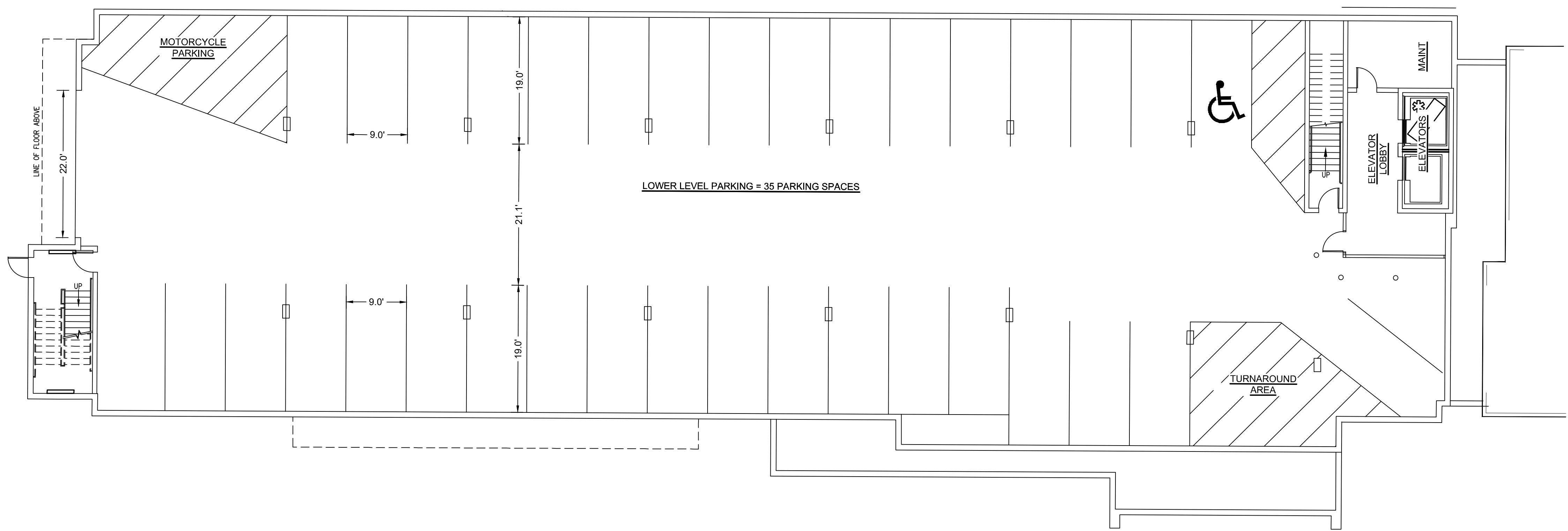


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C002



LOWER LEVEL PARKING
SCALE: 1" = 10'

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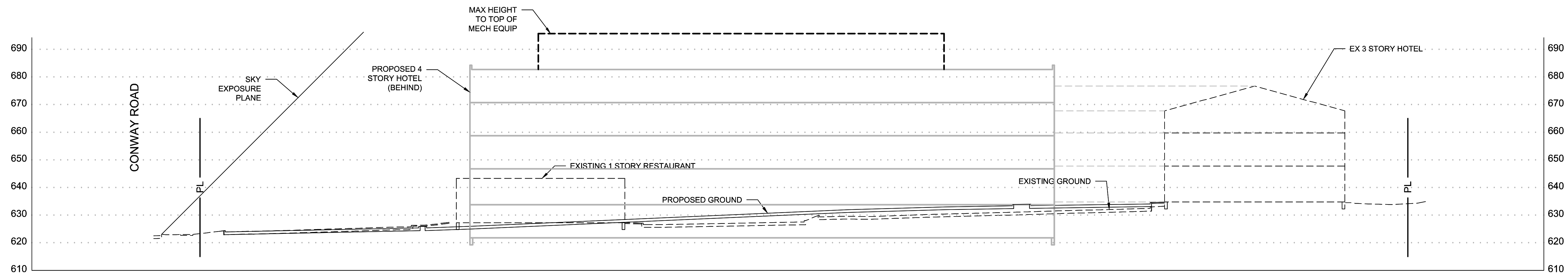
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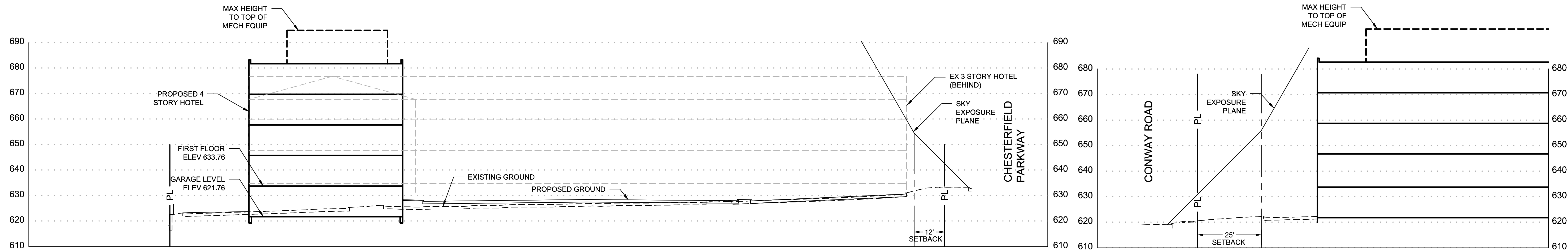
JOB NO: CV18-0409.00
DRAWN BY: GAS
CHECKED BY: TBS
DATE: 10/28/2019

SHEET NO.
LOWER LEVEL PARKING
PLAN
C002A

PRELIMINARY - NOT FOR CONSTRUCTION



SECTION A-A
(NORTH - SOUTH)



SECTION B-B
(EAST - WEST)

SECTION C-C
SKY EXPOSURE PLANE

ATTACHMENT A

All provisions of the City of Chesterfield City Code shall apply to this development except as specifically modified herein.

I. SPECIFIC CRITERIA

A. PERMITTED USES

1. The uses allowed in this Planned Commercial District shall be:
 - a. Hotel and Motel
 - b. Restaurant, sit-down
2. Hours of Operation.
 - a. Hours of operation for this "PC" District shall not be restricted.
3. Telecommunication facilities siting permits may be issued for wireless telecommunication facilities per the requirements of the City Code.

B. FLOOR AREA, HEIGHT, BUILDING AND PARKING STRUCTURE REQUIREMENTS

1. Floor Area
 - a. If the hotel and motel use is developed in conjunction with the standalone use "restaurant, sit down," the hotel shall not exceed three (3) stories and a room count of ninety-two (92) rooms. Building height shall be measured from the average finished ground elevation of each building and shall be exclusive of rooftop mechanical equipment and screening. The total gross floor area of the freestanding sit-down restaurant shall not exceed 5,400 square feet.
 - b. If the hotel and motel use is not developed in conjunction with the standalone use "restaurant, sit down," the hotel shall not exceed four (4) stories and a room count of two hundred (200) rooms. Building height shall be measured from the average finished ground elevation of each building and shall be exclusive of rooftop mechanical equipment and screening.
2. Height

The maximum height of the building, exclusive of rooftop mechanical equipment and screening, shall not exceed 65 feet.

3. Building Requirements

- a. A minimum of 26% open space is required for this development.
- b. This development shall have a maximum F.A.R. of 0.86.

C. SETBACKS

1. Structure Setbacks

No building or structure, other than: a freestanding project identification sign, light standards, or flag poles will be located within the following setbacks:

- a. 25 feet from the right-of-way of Conway on the southern boundary of the Planned Commercial "PC" District.
- b. 15 feet from the right-of-way of Chesterfield Parkway East on the eastern boundary of the "PC" District.
- c. 10 feet from the northern boundary of the "PC" District.
- d. 10 feet from the western boundary of the "PC" District.

2. Parking Setbacks

No parking stall, loading space, internal driveway, or roadway, except points of ingress or egress, will be located within the following setbacks:

- a. 10 feet from the right-of-way of Conway on the southern boundary of the Planned Commercial "PC" District.
- b. 15 feet from the right-of-way of Chesterfield Parkway East on the eastern boundary of the "PC" District.
- c. 5 feet from the western boundary of the "PC" District.
- d. Parking shall not be permitted along the northern boundary of the "PC" District.

D. PARKING AND LOADING REQUIREMENTS

1. Parking and loading spaces for this development will be as required in the City of Chesterfield Code.
2. Parking lots shall not be used as streets.

3. No construction related parking shall be permitted within right of way or on any existing roadways. All construction related parking shall be confined to the development.
4. Provide adequate temporary off-street parking for construction employees. Parking on non-surfaced areas shall be prohibited in order to eliminate the condition whereby mud from construction and employee vehicles is tracked onto the pavement causing hazardous roadway and driving conditions.

E. LANDSCAPE AND TREE REQUIREMENTS

1. The development shall adhere to the Landscape and Tree Preservation Requirements of the City of Chesterfield Code.
2. The width of the required landscape buffers along Conway Road and Chesterfield Parkway East shall correspond to the parking setbacks.

F. SIGN REQUIREMENTS

1. Signs shall be permitted in accordance with the regulations of the City of Chesterfield Code or a Sign Package may be submitted for the planned district. Sign Packages shall adhere to the City Code and are reviewed and approved by the City of Chesterfield Planning Commission.
2. Ornamental Entrance Monument construction, if proposed, shall be reviewed by the City of Chesterfield, and/or the St. Louis County Department of Transportation (or MoDOT), for sight distance considerations prior to installation or construction.

G. LIGHT REQUIREMENTS

Provide a lighting plan and cut sheet in accordance with the City of Chesterfield Code.

H. ARCHITECTURAL

1. The development shall adhere to the Architectural Review Standards of the City of Chesterfield Code.
2. Trash enclosures: All exterior trash areas will be enclosed with a minimum six (6) foot high sight-proof enclosure complemented by adequate landscaping. The location, material, and elevation of any trash enclosures will be as approved by the City of Chesterfield on the Site Development Plan.

I. ACCESS/ACCESS MANAGEMENT

1. Access to the development shall be as shown on the Preliminary Site Plan and adequate sight distance shall be provided, as directed by the City of Chesterfield, and St. Louis County Department of Transportation, as applicable.
2. If adequate sight distance cannot be provided at the access location(s), acquisition of right-of-way, reconstruction of pavement and other off-site improvements may be required to provide the required sight distance as required by the City of Chesterfield and the agency in control of the right of way off which the access is proposed.

J. PUBLIC/PRIVATE ROAD IMPROVEMENTS, INCLUDING PEDESTRIAN CIRCULATION

1. Any request to install a gate at the entrance to this development must be approved by the City of Chesterfield and the agency in control of the right of way off of which the entrance is constructed. No gate installation will be permitted on public right of way.
2. Existing sidewalk along Chesterfield Parkway and Conway Road shall remain and at the time of construction shall be evaluated and updated, as necessary, to conform to ADA standards. The sidewalk shall provide for future connectivity to adjacent developments and/or roadway projects and shall provide an internal connection from the existing sidewalk onto the site as shown on the Preliminary Plan.
3. Prior to improvement / construction plan approval, the engineer shall provide a signed and sealed note on the plans for both residential and commercial projects, stating that the unimproved existing sidewalk/pedestrian path along the project frontage meets current St. Louis County / ADA Standards.
4. Obtain approvals from the City of Chesterfield and the St. Louis County Department of Transportation as necessary for locations of proposed curb cuts and access points, areas of new dedication, and roadway improvements.
5. Improve Chesterfield Parkway East right-of-way, as directed by the Saint Louis County Department of Transportation.
6. Additional right-of-way and road improvements shall be provided, as required by the St. Louis County Department of Transportation and the City of Chesterfield.

The Professional Engineer's seal and signature apply only to the document to which they are affixed. The Engineer expressly disclaims any responsibility for all other plans, specifications, estimates, reports or other documents or instruments relating to or intended to be used for any part of the engineering project.

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JOB NO:	CV18-0409.00
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CHECKED BY:	TBS
DATE:	10/28/2019

SHEET NO.
SITE SECTIONS &
ORDINANCE

C003

K. TRAFFIC STUDY

1. Provide a traffic study as directed by the City of Chesterfield. The scope of the study shall include internal and external circulation and may be limited to site specific impacts, such as the need for additional lanes, entrance configuration, geometrics, sight distance, traffic signal modifications or other improvements required, as long as the density of the proposed development falls within the parameters of the City's traffic model. Should the density be other than the density assumed in the model, regional issues shall be addressed as directed by the City of Chesterfield.

L. POWER OF REVIEW

The development shall adhere to the Power of Review requirements of the City of Chesterfield Code.

M. STORM WATER

1. The site shall provide for the positive drainage of storm water and it shall be discharged at an adequate natural discharge point or connected to an adequate piped system.
2. Detention/retention and channel protection measures are to be provided in each watershed as required by the City of Chesterfield and the Metropolitan St. Louis Sewer District. The storm water management facilities shall be operational prior to paving of any driveways or parking areas in non-residential developments or issuance of building permits exceeding sixty percent (60%) of the approved dwelling units in each plat, watershed or phase of residential developments. The location and types of storm water management facilities shall be identified on all Site Development Plans.
3. Emergency overflow drainage ways to accommodate runoff from the 100-year storm event shall be provided for all storm sewers, as directed by the City of Chesterfield.
4. Offsite storm water shall be picked up and piped to an adequate natural discharge point. Such bypass systems must be adequately designed.
5. The lowest opening of all structures shall be set at least two (2) feet higher than the one hundred (100) year high water elevation in detention/retention facilities. All structures shall be set at least 30 feet horizontally from the limits of the one hundred (100) year high water.

6. Locations of site features such as lakes and detention ponds must be approved by the City of Chesterfield and the Metropolitan Saint Louis Sewer District.
7. Storm sewers shall be as approved by the Metropolitan St. Louis Sewer District and the City of Chesterfield.
8. Formal MSD review, approval, and permits are required prior to construction.

N. SANITARY SEWER

1. Sanitary sewers shall be as approved by the City of Chesterfield and the Metropolitan St. Louis Sewer District.

O. GEOTECHNICAL REPORT

Prior to Site Development Plan approval, the developer shall provide a geotechnical report, prepared by a registered professional engineer licensed to practice in the State of Missouri, as directed by the City of Chesterfield. The report shall verify the suitability of grading and proposed improvements with soil and geologic conditions and address the existence of any potential sinkhole, ponds, dams, septic fields, etc., and recommendations for treatment. A statement of compliance, signed and sealed by the geotechnical engineer preparing the report, shall be included on all Site Development Plans and Improvement Plans.

P. MISCELLANEOUS

1. All utilities will be installed underground.
2. An opportunity for recycling will be provided. All provisions of Chapter 25, Article VII, and Section 25-122 thru Section 25-126 of the City Code shall be required where applicable.
3. Prior to record plat approval, the developer shall cause, at his expense and prior to the recording of any plat, the reestablishment, restoration or appropriate witnessing of all Corners of the United States Public Land Survey located within, or which define or lie upon, the out boundaries of the subject tract in accordance with the Missouri Minimum Standards relating to the preservation and maintenance of the United States Public Land Survey Corners, as necessary.
4. Retaining walls along public right of way shall be private and remain private forever and shall be located such that it is not necessary to support any public improvements.

5. Prior to final release of subdivision construction deposits, the developer shall provide certification by a registered land surveyor that all monumentation depicted on the record plat has been installed and United States Public Land Survey Corners have not been disturbed during construction activities or that they have been reestablished and the appropriate documents filed with the Missouri Department of Natural Resources Land Survey Program, as necessary.
6. The developer is advised that utility companies will require compensation for relocation of their facilities within public road right-of-way. Utility relocation cost shall not be considered as an allowable credit against the petitioner's traffic generation assessment contributions. The developer should also be aware of extensive delays in utility company relocation and adjustments. Such delays will not constitute a cause to allow occupancy prior to completion of road improvements.
7. Road improvements and right-of-way dedication shall be completed prior to the issuance of an occupancy permit. If development phasing is anticipated, the developer shall complete road improvements, right-of-way dedication, and access requirements for each phase of development as directed by the City of Chesterfield. Delays due to utility relocation and adjustments will not constitute a cause to allow occupancy prior to completion of road improvements.

II. TIME PERIOD FOR SUBMITTAL OF SITE DEVELOPMENT CONCEPT PLANS AND SITE DEVELOPMENT PLANS

- A.** The developer shall submit a concept plan within eighteen (18) months of City Council approval of the change of zoning.
- B.** In lieu of submitting a Site Development Concept Plan and Site Development Plans, the petitioner may submit a Site Development Plan for the entire development within eighteen (18) months of the date of approval of the change of zoning by the City.
- C.** Failure to comply with these submittal requirements will result in the expiration of the change of zoning and will require a new public hearing.
- D.** Said Plan shall be submitted in accordance with the combined requirements for Site Development and Concept Plans. The submission of Amended Site Development Plans by sections of this project to the Planning Commission shall be permitted if this option is utilized.

ENFORCEMENT

- A.** The City of Chesterfield, Missouri will enforce the conditions of this ordinance in accordance with the Plan approved by the City of Chesterfield and the terms of this Attachment A.
- B.** Failure to comply with any or all the conditions of this ordinance will be adequate cause for revocation of approvals/permits by reviewing Departments and Commissions.
- C.** Non-compliance with the specific requirements and conditions set forth in this Ordinance and its attached conditions or other Ordinances of the City of Chesterfield shall constitute an ordinance violation, subject, but not limited to, the penalty provisions as set forth in the City of Chesterfield Code.
- D.** Waiver of Notice of Violation per the City of Chesterfield Code.
- E.** This document shall be read as a whole and any inconsistency to be integrated to carry out the overall intent of this Attachment A.

V. TRUST FUND CONTRIBUTION

As this development is not subject to traffic generation assessment, the roadway improvements required herein represent the developer's road improvement obligation. These improvements will not exceed an amount established by multiplying the ordinance-required parking spaces by the following applicable rates:

Type of Development	Required Contribution
Hotel	\$1,546.62/parking space
Loading Space	\$3,796.14/parking space

(Parking spaces as required by the City of Chesterfield Code.)

If types of development differ from those listed, rates shall be provided by St. Louis County Department of Transportation.

If a portion of the improvements required herein are needed to provide for the safety of the traveling public, their completion as a part of this development is mandatory.

Allowable credits for required roadway improvements will be awarded as directed by the Saint Louis County Department of Transportation and the City of Chesterfield. Sidewalk construction and utility relocation, among other items, are not considered allowable credits.

The applicable rates limiting required road improvements shall be adjusted on January 1, 2020 and on the first day of January in each succeeding year thereafter in accord with the construction cost index as determined by the Saint Louis County Department of Transportation.

Prior to Special Use Permit issuance by the Saint Louis County Department of Transportation, a special cash escrow or a special escrow supported by an Irrevocable Letter of Credit, must be established with the Saint Louis County Department of Transportation to guarantee completion of the required roadway improvements.

VI. RECORDING

Within sixty (60) days of approval of any development plan by the City of Chesterfield, the approved Plan will be recorded with the St. Louis County Recorder of Deeds. Failure to do so will result in the expiration of approval of said plan and require re-approval of a plan by the Planning Commission.

12. Zoning district lines, subdivision name, lot number, dimensions, and area, and zoning of adjacent parcels where different than site.
13. Floodplain boundaries.
14. Depict existing and proposed improvements within 150 feet of the site as directed. Improvements include, but are not limited to, roadways, driveways and walkways adjacent to and across the street from the site, significant natural features, such as wooded areas and rock formations, and other karst features that are to remain or be removed.
15. Depict all existing and proposed easements and rights-of-way within 150 feet of the site and all existing or proposed off-site easements and rights-of-way required for proposed improvements.
16. Indicate the location of the proposed storm sewers, detention basins, sanitary sewers and connection(s) to the existing systems.
17. Depict existing and proposed contours at intervals of not more than one (1) foot, and extending 150 feet beyond the limits of the site as directed.
18. Address trees and landscaping in accordance with the City of Chesterfield Code.
19. Comply with all preliminary plat requirements of the City of Chesterfield Subdivision Regulations per the City of Chesterfield Code.
20. Signed and sealed in conformance with the State of Missouri Department of Economic Development, Division of Professional Registration, Missouri Board for Architects, Professional Engineers and Land Surveyors requirements.
21. Provide comments/approvals from the appropriate Fire District, Monarch Levee District, Spirit of St. Louis Airport, Metropolitan St. Louis Sewer District (MSD) and the Missouri Department of Transportation.
22. Compliance with Sky Exposure Plane.
23. Compliance with the current Metropolitan Sewer District Site Guidance as adopted by the City of Chesterfield.

K. TRAFFIC STUDY

1. Provide a traffic study as directed by the City of Chesterfield. The scope of the study shall include internal and external circulation and may be limited to site specific impacts, such as the need for additional lanes, entrance configuration, geometrics, sight distance, traffic signal modifications or other improvements required, as long as the density of the proposed development falls within the parameters of the City's traffic model. Should the density be other than the density assumed in the model, regional issues shall be addressed as directed by the City of Chesterfield.

L. POWER OF REVIEW

The development shall adhere to the Power of Review requirements of the City of Chesterfield Code.

M. STORM WATER

1. The site shall provide for the positive drainage of storm water and it shall be discharged at an adequate natural discharge point or connected to an adequate piped system.
2. Detention/retention and channel protection measures are to be provided in each watershed as required by the City of Chesterfield and the Metropolitan St. Louis Sewer District. The storm water management facilities shall be operational prior to paving of any driveways or parking areas in non-residential developments or issuance of building permits exceeding sixty percent (60%) of the approved dwelling units in each plat, watershed or phase of residential developments. The location and types of storm water management facilities shall be identified on all Site Development Plans.
3. Emergency overflow drainage ways to accommodate runoff from the 100-year storm event shall be provided for all storm sewers, as directed by the City of Chesterfield.
4. Offsite storm water shall be picked up and piped to an adequate natural discharge point. Such bypass systems must be adequately designed.
5. The lowest opening of all structures shall be set at least two (2) feet higher than the one hundred (100) year high water elevation in detention/retention facilities. All structures shall be set at least 30 feet horizontally from the limits of the one hundred (100) year high water.

6. Locations of site features such as lakes and detention ponds must be approved by the City of Chesterfield and the Metropolitan Saint Louis Sewer District.
7. Storm sewers shall be as approved by the Metropolitan St. Louis Sewer District and the City of Chesterfield.
8. Formal MSD review, approval, and permits are required prior to construction.

N. SANITARY SEWER

1. Sanitary sewers shall be as approved by the City of Chesterfield and the Metropolitan St. Louis Sewer District.

O. GEOTECHNICAL REPORT

Prior to Site Development Plan approval, the developer shall provide a geotechnical report, prepared by a registered professional engineer licensed to practice in the State of Missouri, as directed by the City of Chesterfield. The report shall verify the suitability of grading and proposed improvements with soil and geologic conditions and address the existence of any potential sinkhole, ponds, dams, septic fields, etc., and recommendations for treatment. A statement of compliance, signed and sealed by the geotechnical engineer preparing the report, shall be included on all Site Development Plans and Improvement Plans.

P. MISCELLANEOUS

1. All utilities will be installed underground.
2. An opportunity for recycling will be provided. All provisions of Chapter 25, Article VII, and Section 25-122 thru Section 25-126 of the City Code shall be required where applicable.
3. Prior to record plat approval, the developer shall cause, at his expense and prior to the recording of any plat, the reestablishment, restoration or appropriate witnessing of all Corners of the United States Public Land Survey located within, or which define or lie upon, the out boundaries of the subject tract in accordance with the Missouri Minimum Standards relating to the preservation and maintenance of the United States Public Land Survey Corners, as necessary.
4. Retaining walls along public right of way shall be private and remain private forever and shall be located such that it is not necessary to support any public improvements.

5. Prior to final release of subdivision construction deposits, the developer shall provide certification by a registered land surveyor that all monumentation depicted on the record plat has been installed and United States Public Land Survey Corners have not been disturbed during construction activities or that they have been reestablished and the appropriate documents filed with the Missouri Department of Natural Resources Land Survey Program, as necessary.
6. The developer is advised that utility companies will require compensation for relocation of their facilities within public road right-of-way. Utility relocation cost shall not be considered as an allowable credit against the petitioner's traffic generation assessment contributions. The developer should also be aware of extensive delays in utility company relocation and adjustments. Such delays will not constitute a cause to allow occupancy prior to completion of road improvements.
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22. Compliance with Sky Exposure Plane.
23. Compliance with the current Metropolitan Sewer District Site Guidance as adopted by the City of Chesterfield.

- E.** Where due cause is shown by the developer, the City Council may extend the period to submit a Site Development Concept Plan or Site Development Plan for eighteen (18) months.

III. COMMENCEMENT OF CONSTRUCTION

- A.** Substantial construction shall commence within two (2) years of approval of the Site Development Concept Plan or Site Development Plan, unless otherwise authorized by ordinance.
- B.** Where due cause is shown by the developer, the City Council may extend the period to commence construction for two (2) additional years.

IV. GENERAL CRITERIA

A. SITE DEVELOPMENT PLAN SUBMITTAL REQUIREMENTS

The Site Development Plan shall include, but not be limited to, the following:

1. Location map, north arrow, and plan scale. The scale shall be no greater than one (1) inch equals one hundred (100) feet.
2. Outboundary plat and legal description of property.
3. Density calculations.
4. Parking calculations. Including calculation for all off street parking spaces, required and proposed, and the number, size and location for handicap designed.
5. Provide openspace percentage for overall development including separate percentage for each lot on the plan.
6. Provide Floor Area Ratio (F.A.R.).
7. A note indicating all utilities will be installed underground.
8. A note indicating signage approval is separate process.
9. Depict the location of all buildings, size, including height and distance from adjacent property lines, and proposed use.
10. Specific structure and parking setbacks along all roadways and property lines.
11. Indicate location of all existing and proposed freestanding monument signs.

The Professional Engineer's seal and signature apply only to the document to which they are affixed. The Engineer expressly disclaims any responsibility for all other plans, specifications, estimates, reports or other documents or instruments relating to or intended to be used for any part of the engineering project.
© 2018 G&W Engineering Corp.



CHESTERFIELD VILLAGE LODGING, LLC
1850 CRAIGSHIRE, SUITE 103
ST LOUIS, MO 63146

AMENDED SITE DEVELOPMENT PLAN
SPRINGHILL SUITES / FAIRFIELD SUITES
1065 East Chesterfield Parkway
Chesterfield, Missouri 63017
A TRACT OF LAND BEING NEW PARCEL A OF A RESUBDIVISION OF ADJUSTED LOT 3C OF A BOUNDARY ADJUSTMENT PLAT OF LOTS 3B AND 3C OF THE SUBDIVISION OF LOT OF HERMAN STEMMER OFFICE PARK, PB 345 PG 482 OF THE ST LOUIS COUNTY RECORDS.

ISSUE DATE	DESCRIPTION
11-27-2019	Revision - City Comments

JOB NO: CV18-0409.00
DRAWN BY: GAS
CHECKED BY: TBS
DATE: 10/28/2019

SHEET NO. ORDINANCE
C004

PRELIMINARY - NOT FOR CONSTRUCTION

Architects Statement of Design

The Springhill Suites + Fairfield Inn is designed to create an integration of dual brands of Marriott hotel properties to create a singular experience and to provide for the long term satisfaction of the guests, minimizing undesirable impacts on the surrounding neighbors. The existing three story hotel located on the site will be converted to a Fairfield Inn and will contain 92 guest rooms. A new four story Springhill Suites hotel will be constructed adjacent to the existing and will contain 88 guest rooms for a total of 180 hotel rooms on the site. An existing underutilized restaurant building on the site will be demolished to create the opportunity for the expansion of the hotel. The building is located within the setback requirements and easements. The site has been designed in keeping with the open space requirements and compliments the neighborhood. The automobile parking remains in the approximate current location and an underground parking level has been created beneath the new Springhill Suites. The site is fully landscaped in order to provide pleasing views from the adjacent roads and properties. Efforts will be made throughout the project to incorporate recycling opportunities.

Site lighting is limited to the parking areas and safety lighting around the hotel and will not illuminate off the site. Care has been taken to minimize spillage of light from the site in consideration of the surrounding property owners.

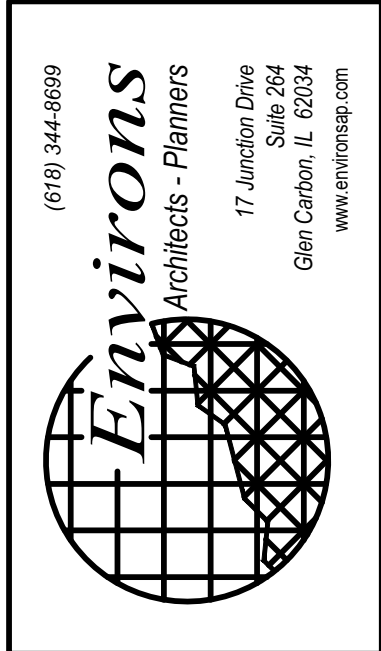
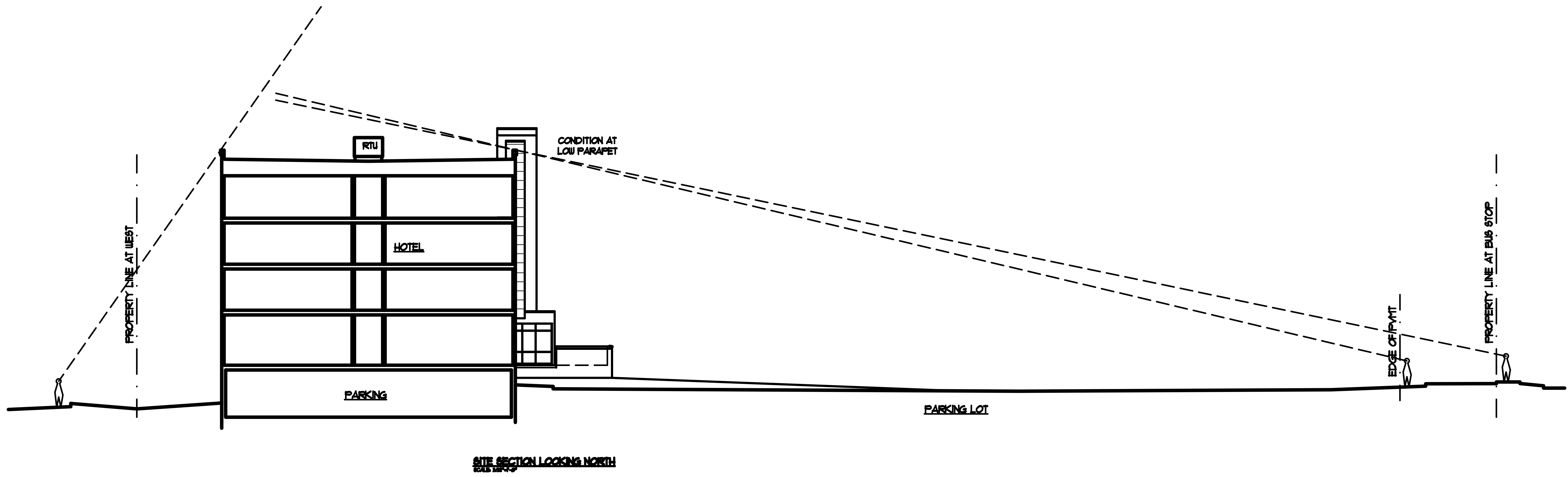
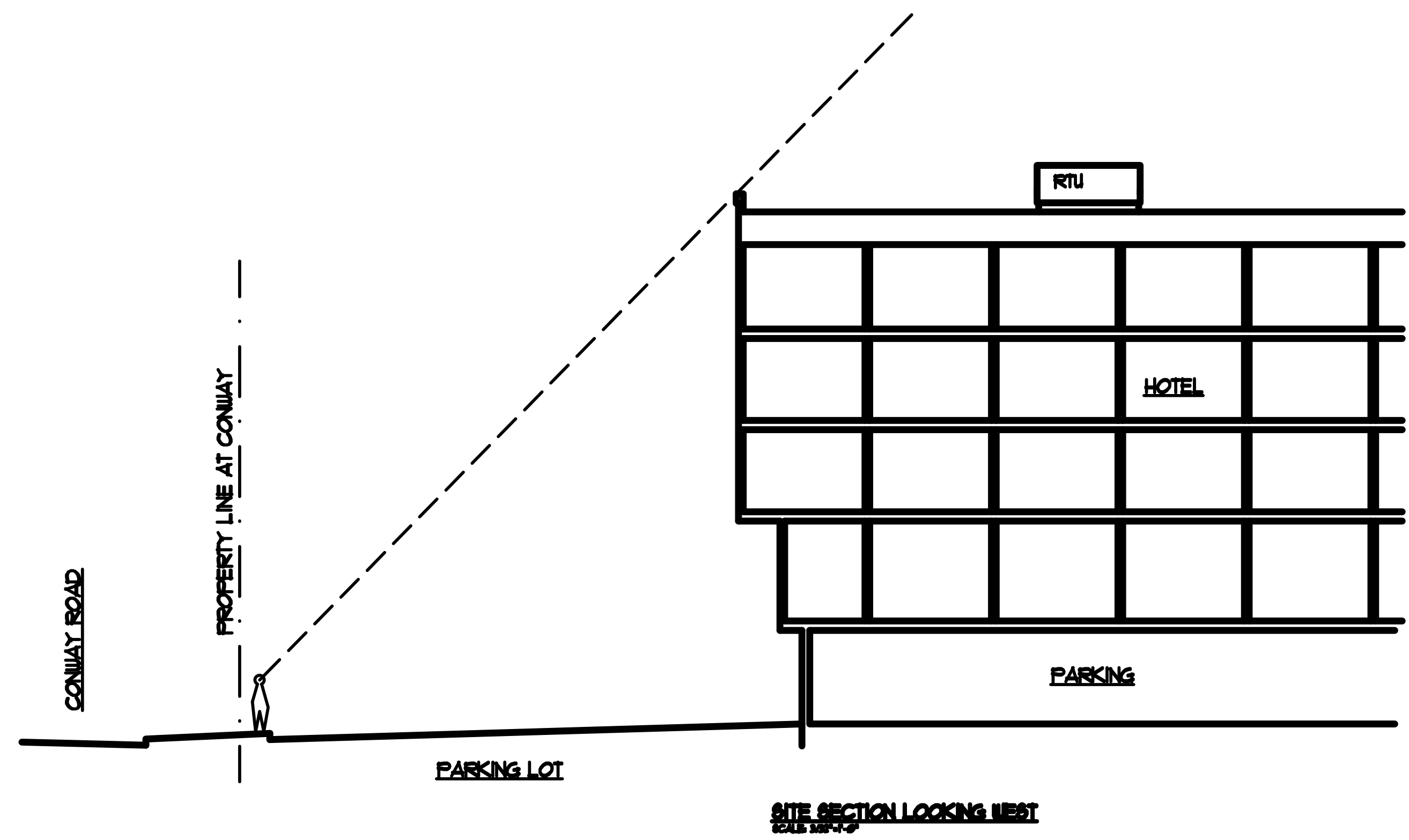
The building is set back from the roadway to allow for good visibility for vehicular traffic, pedestrians and bicyclers. The parking proposed provides the most direct and safe access to the building. There are proposed access points are located on Conway Road to the south and Chesterfield Parkway East Blvd. to the east. Pedestrian access points to the site are provided from the north and from the south. The trash enclosure will be screened by a minimum 6' tall enclosure constructed of materials similar to the proposed building.

This building has been custom designed for this specific site to enhance the property and existing building including many upgrades. The entirety of the building is made up of a combination brick complimented by exterior insulated finish systems and fiber cement panel accents. The existing building has a sloping roof structure and design features have been added to integrate the new with the old structure. The new building will have a flat roof structure providing a high quality visual appearance for all users within contact of the building. The brick has been selected from a residential collection with a warm earth tone feeling to match the existing brick. The exterior of the new hotel building has been designed using a contemporary style in an appropriate human scale with multiple offsets and material / color changes. All elevations of the existing hotel will be updated to incorporate the contemporary style to create a unified and complementary appearance. A diversity of high quality materials have been used to provide a pleasing and harmonious appearance. The roof parapets have been designed with a variety of heights to create interest and complexity to the building exterior.

This building is designed with efficient systems that allow control over unoccupied rooms adjusting heating and cooling on systems to lower levels when unoccupied. Utility locations and connections to the building have been coordinated so that all utilities are underground or screened from view or landscaped in order to minimize the visual impact on public streets.



Michael F. Sapp
Environs Architects-Planners



JOB NO.
18016

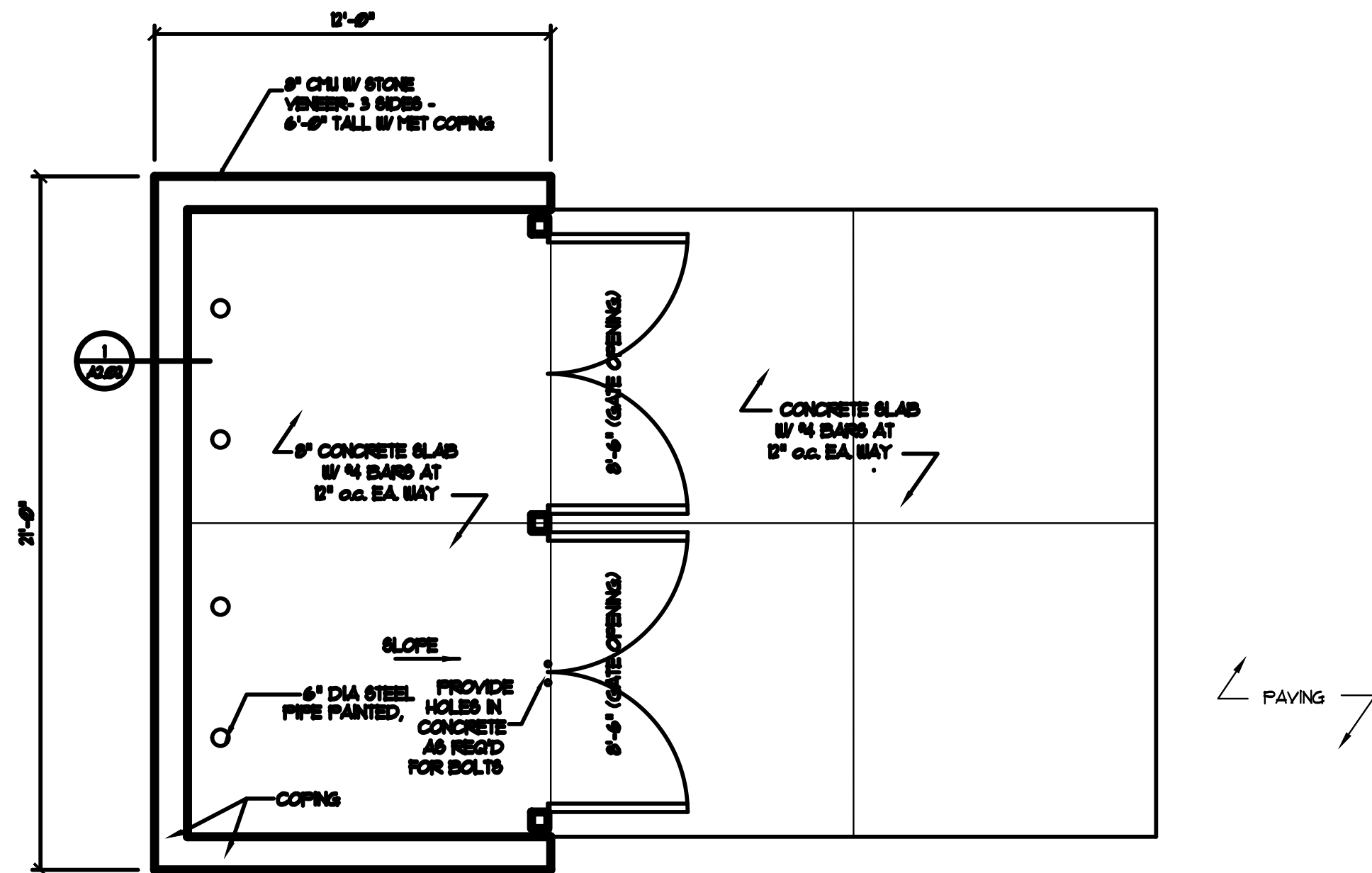
DATE:
FEBRUARY 18, 2020
REVISED:

A NEW HOTEL + CONVERSION FOR:
SPRINGHILL SUITES + FAIRFIELD INN
BY MARRIOTT
CHESTERFIELD, MO

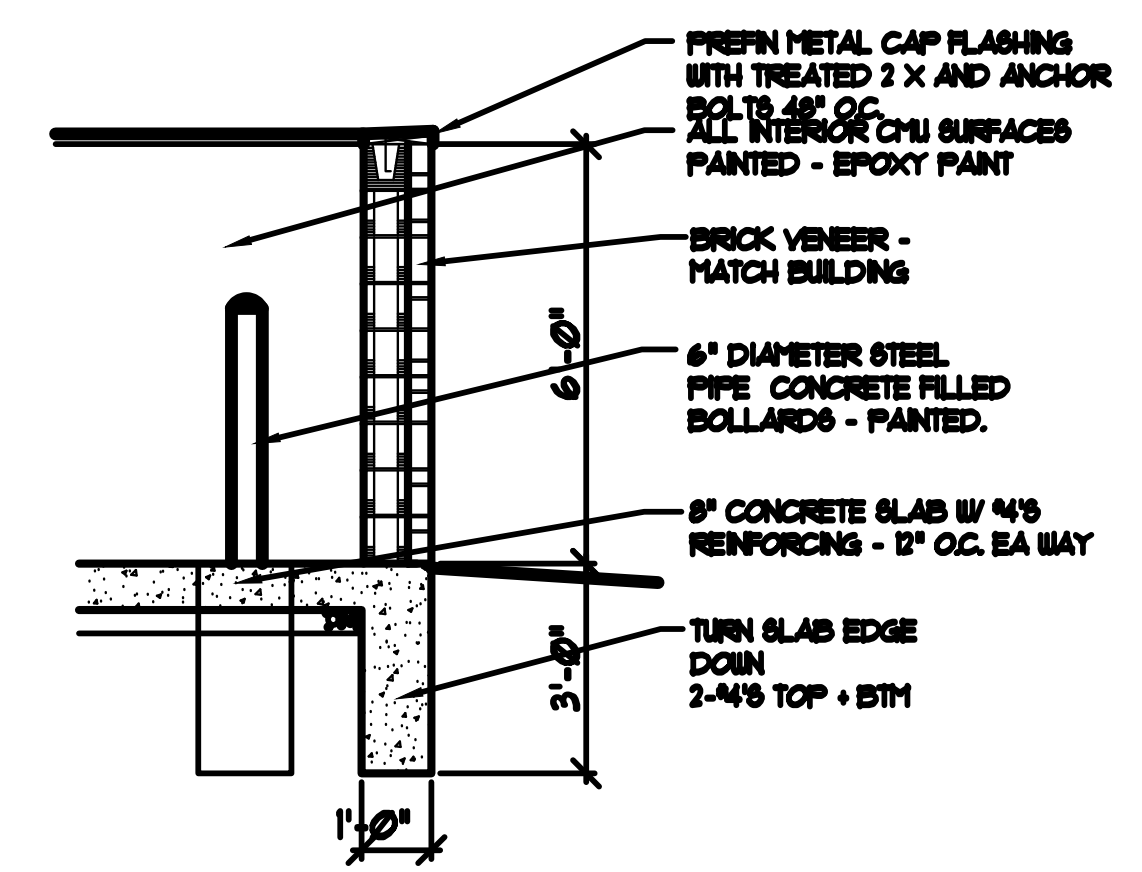
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OF XX

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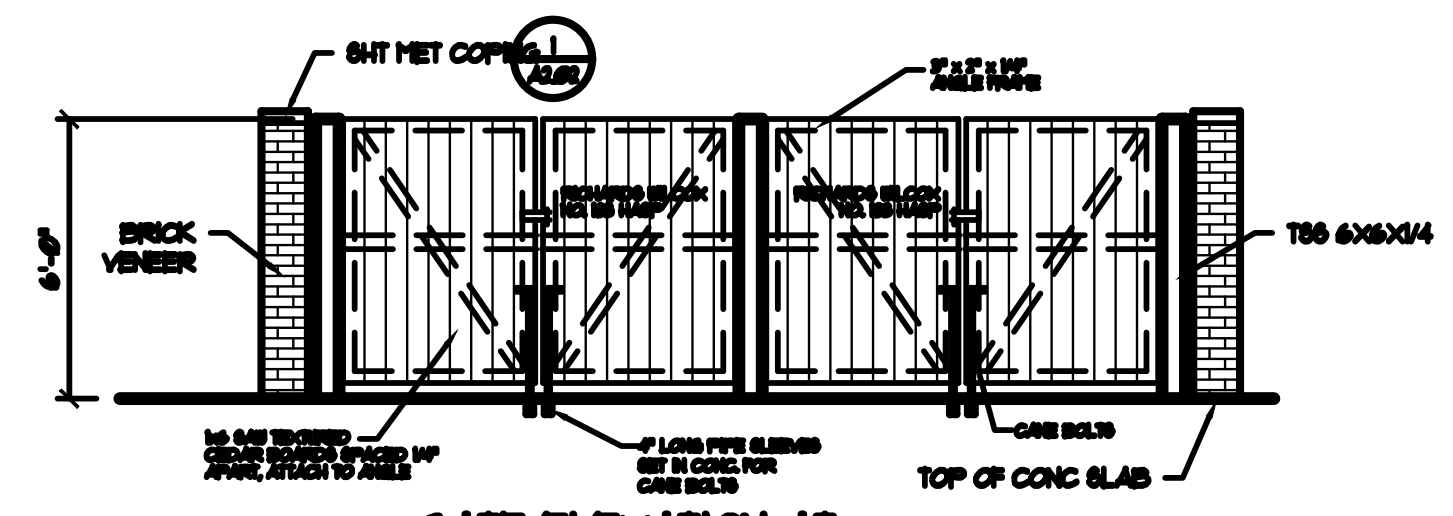
SITE LINE STUDY



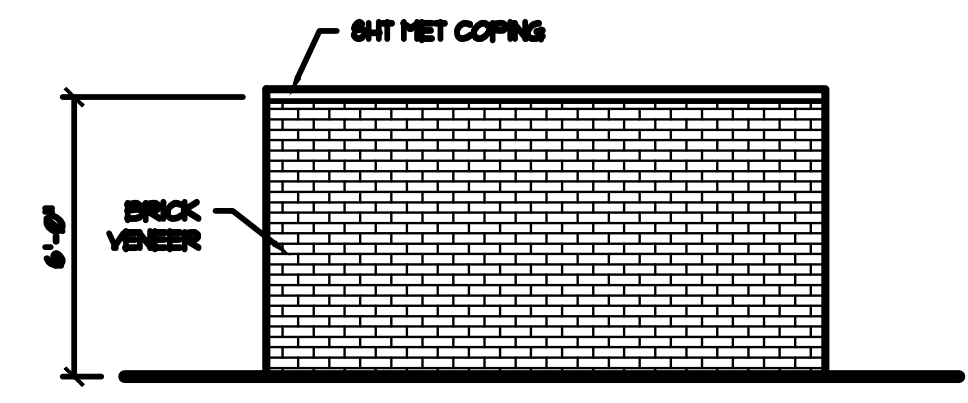
TRASH ENCLOSURE
SCALE: 1/4" = 1'-0"



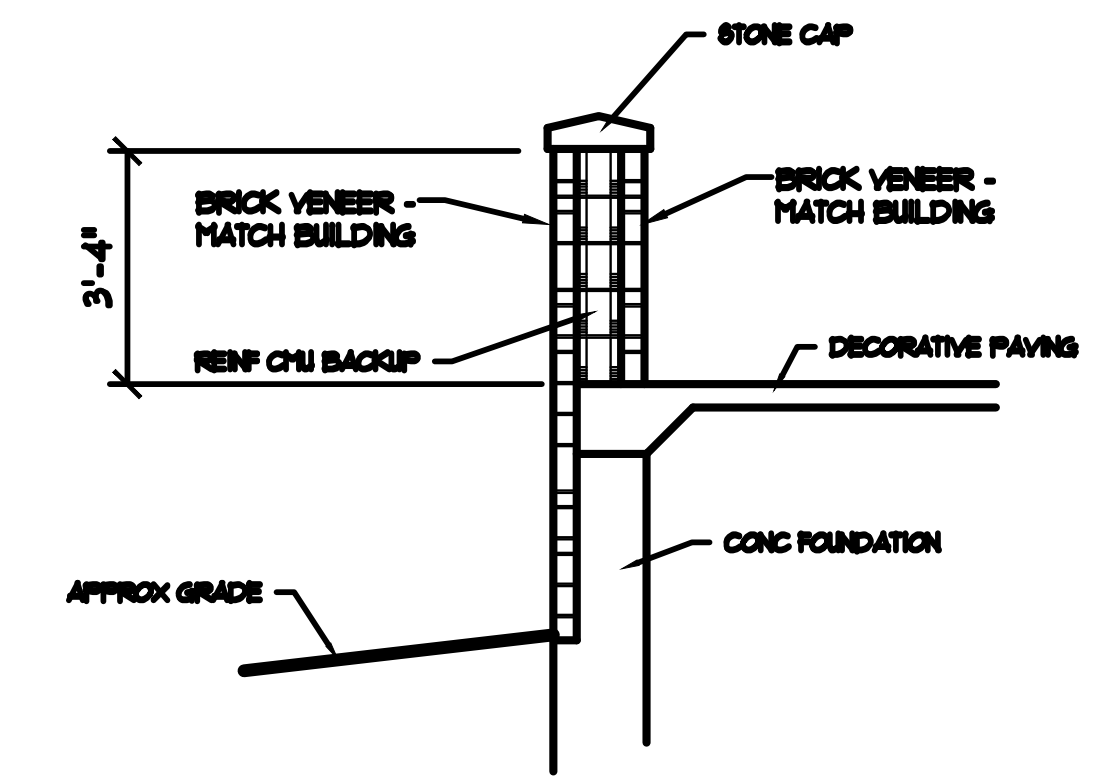
SECTION THRU TRASH ENCLOSURE
SCALE: 3/8" = 1'-0"



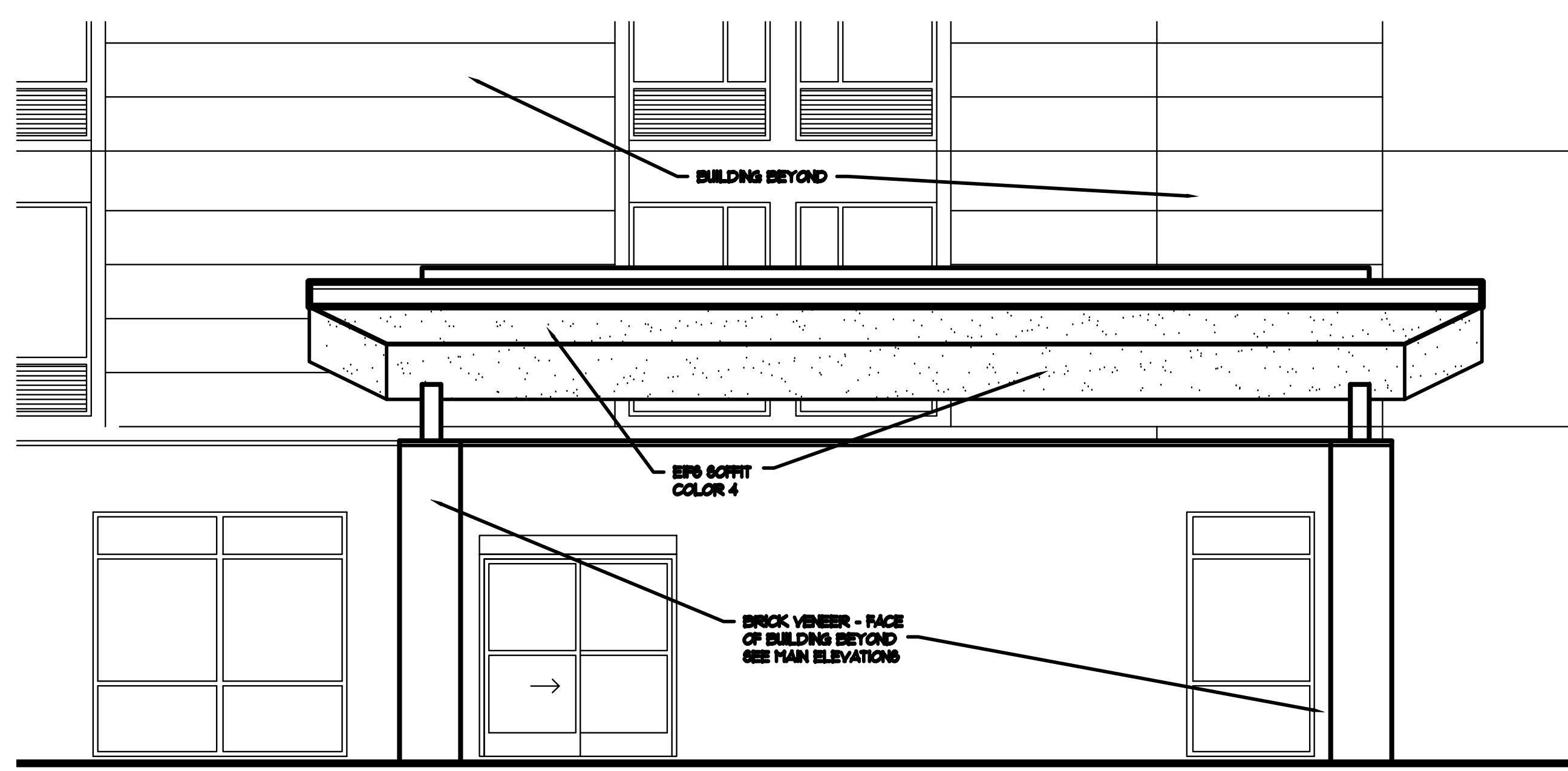
GATE ELEVATION AT TRASH ENCLOSURE
SCALE: 1/4" = 1'-0"



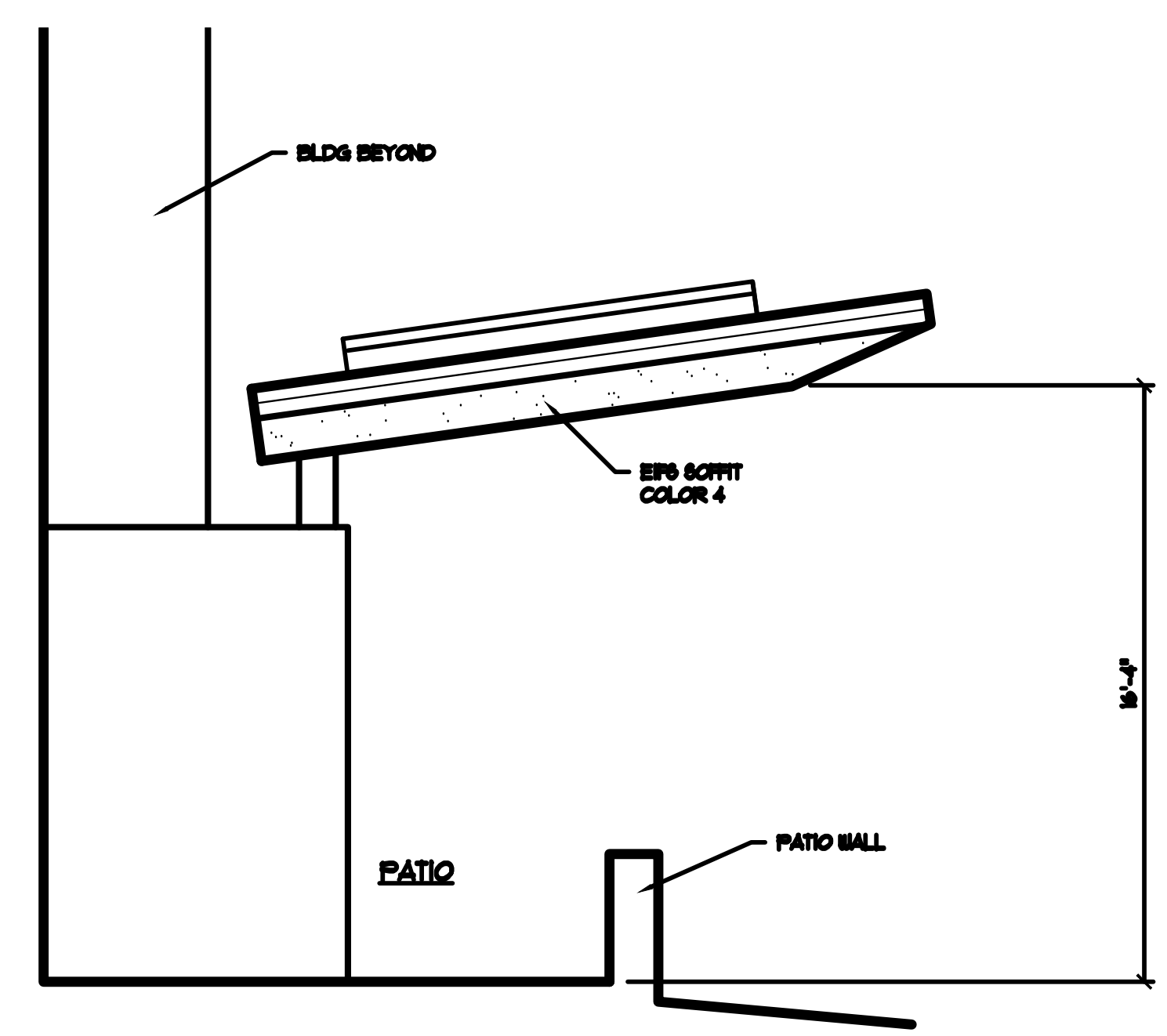
SIDE ELEVATION AT TRASH ENCLOSURE
SCALE: 1/4" = 1'-0"



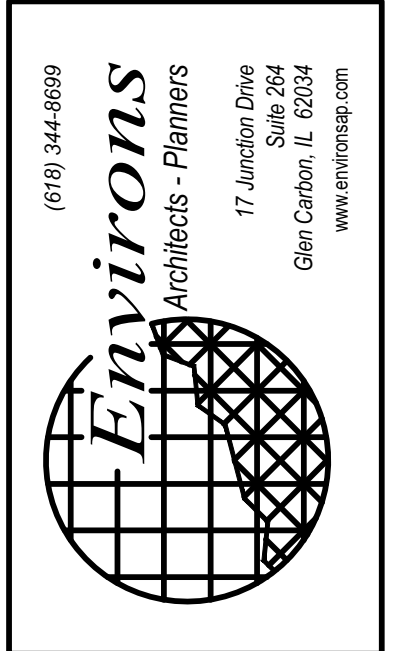
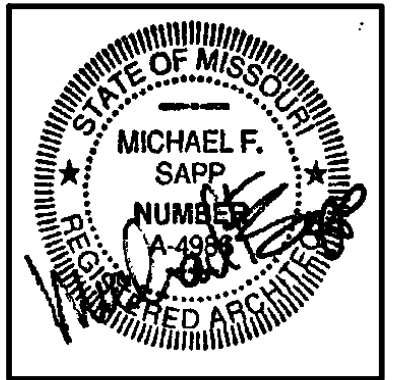
SECTION THRU PATIO WALL AT FRONT
SCALE: 3/8" = 1'-0"



FRONT ELEVATION - CANOPY
SCALE: 1/4" = 1'-0"



SIDE ELEVATION - CANOPY
SCALE: 1/4" = 1'-0"



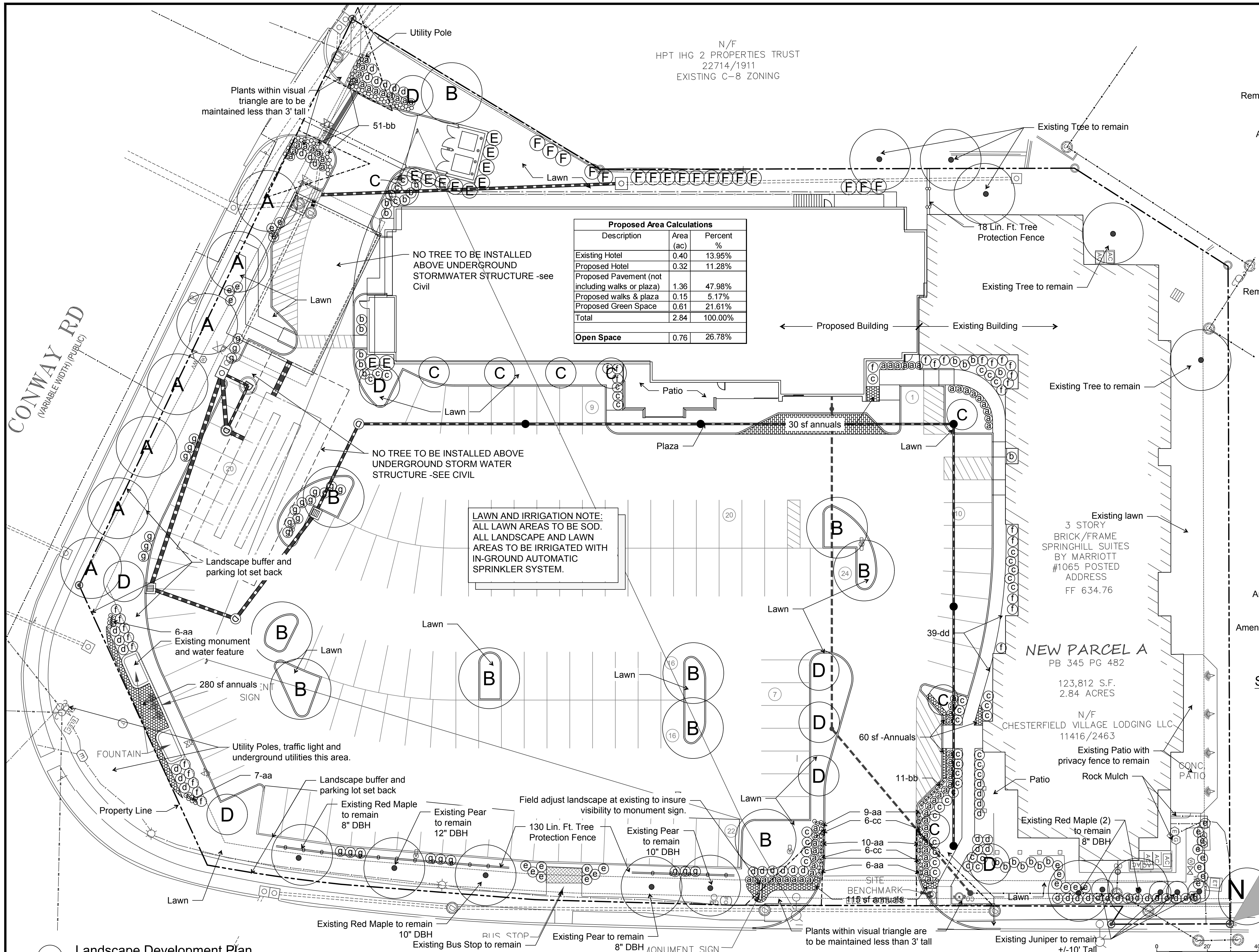
JOB NO.
18016

DATE:
FEBRUARY 10, 2020
REVISED:
OCTOBER 29, 2019

A NEW HOTEL + CONVERSION FOR:
SPRINGHILL SUITES + FAIRFIELD INN
 CHESTERFIELD, MO
 BY MARRIOTT
EXTERIOR DETAILS

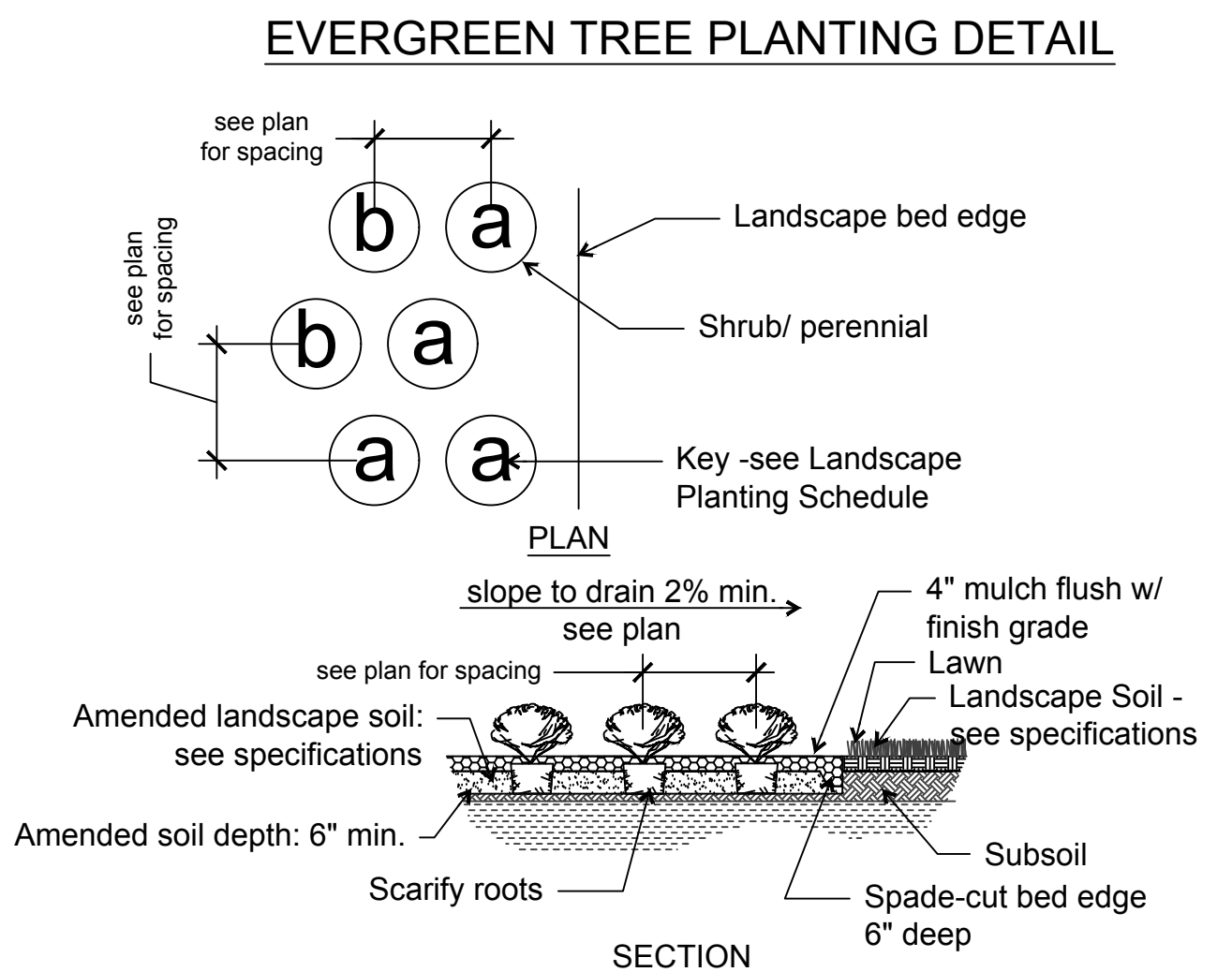
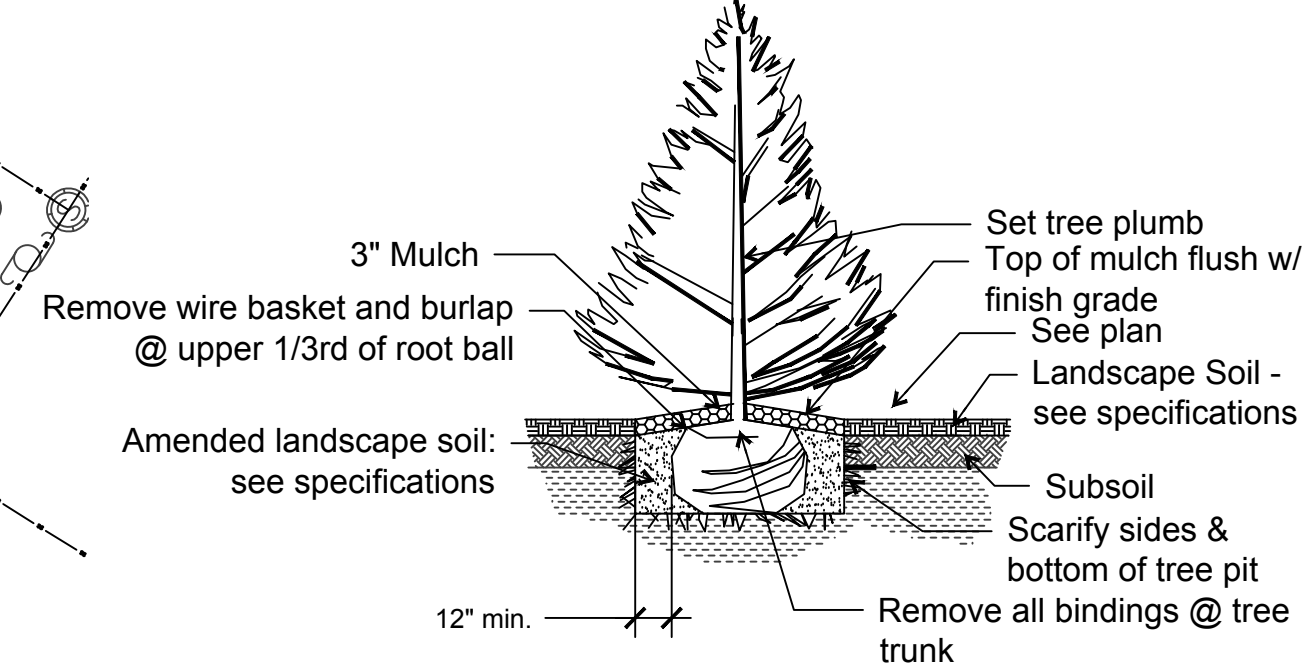
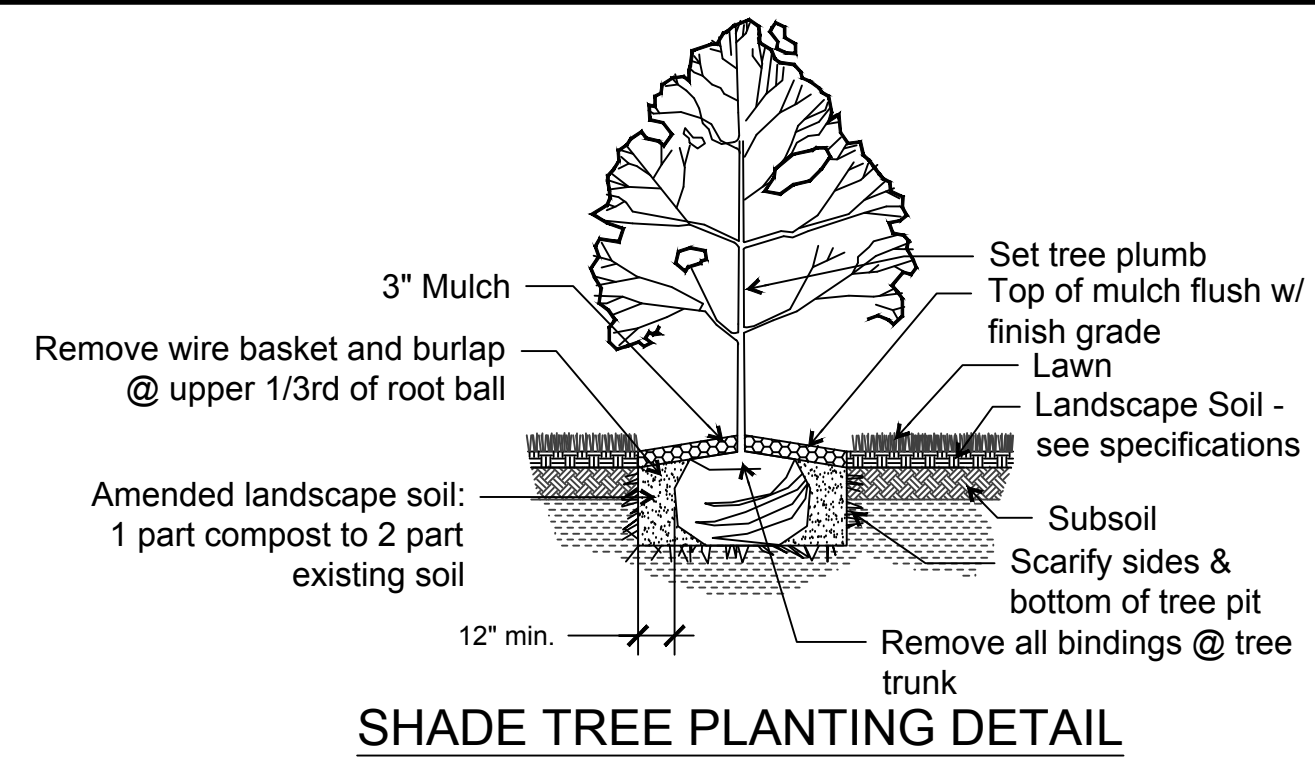
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N/F
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22714/1911
EXISTING C-8 ZONING

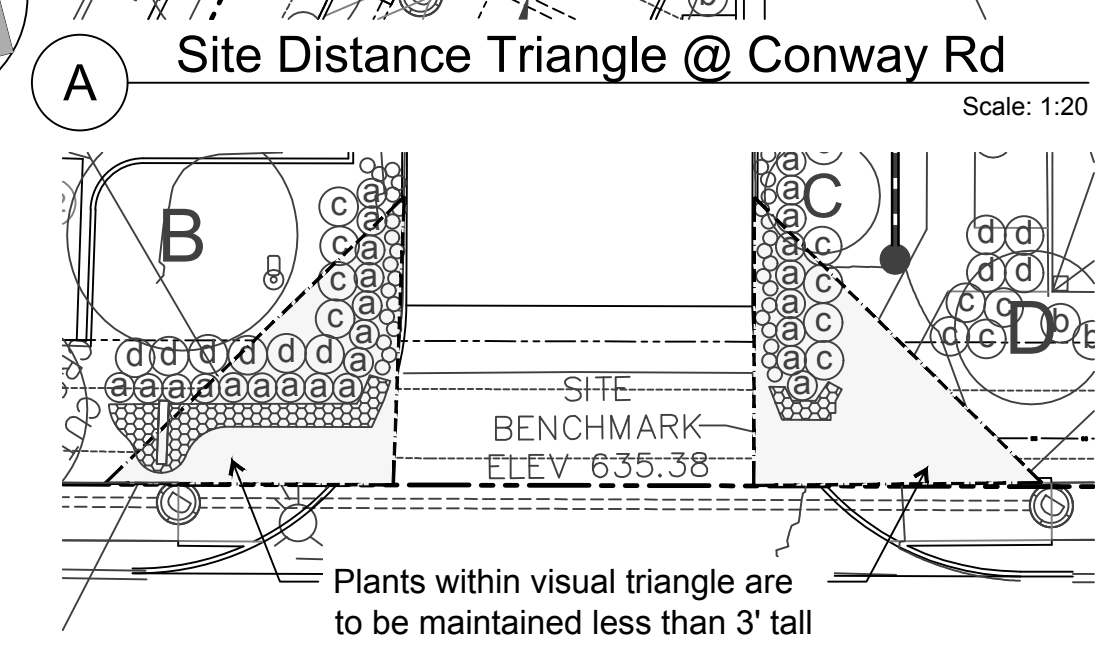
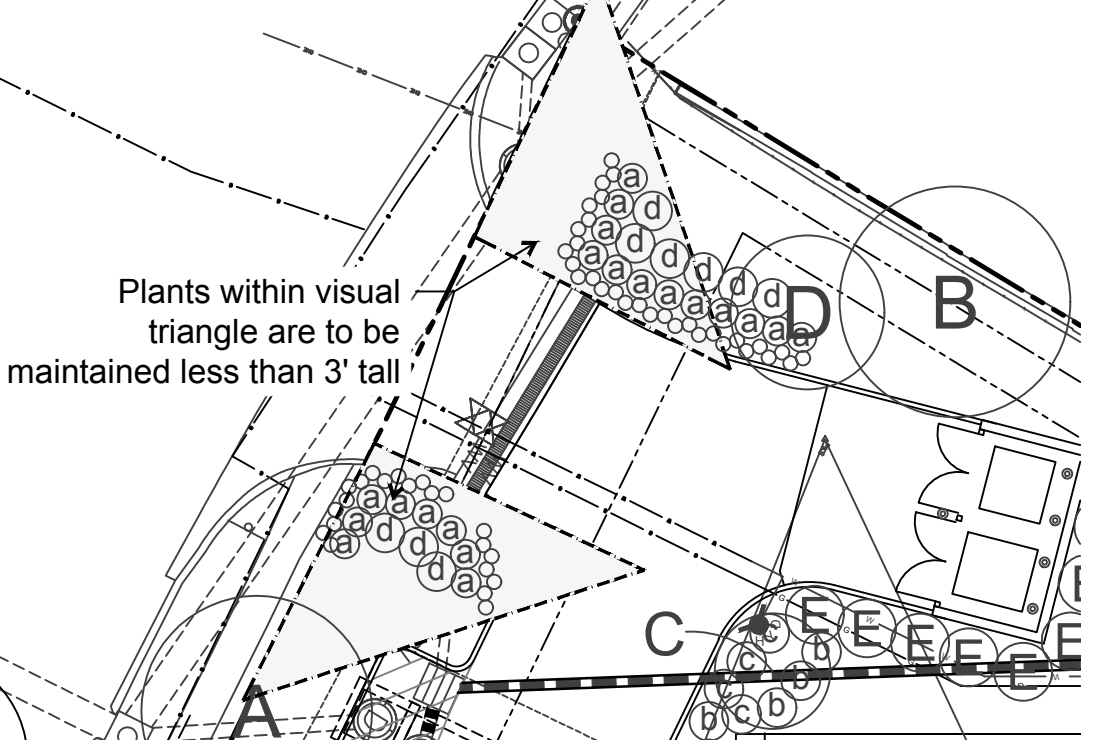


Proposed Area Calculations		
Description	Area (ac)	Percent %
Existing Hotel	0.40	13.95%
Proposed Hotel	0.32	11.28%
Proposed Pavement (not including walks or plaza)	1.36	47.98%
Proposed walks & plaza	0.15	5.17%
Proposed Green Space	0.61	21.61%
Total	2.84	100.00%
Open Space	0.76	26.78%

LAWN AND IRRIGATION NOTE:
ALL LAWN AREAS TO BE SOD.
ALL LANDSCAPE AND LAWN AREAS TO BE IRRIGATED WITH IN-GROUND AUTOMATIC SPRINKLER SYSTEM.



SHRUB/ PERENNIAL/ ANNUAL PLANTING DETAIL



1 Landscape Development Plan

Tree Planting Schedule/ Summary Table								
Key	Qty	Common Name	Botanical Name	Size	Type	Mature Height	Growth Rate	%
A	7	Green Vase Zelkova	Zelkova serrata 'Green Vase'	2.5" Cal.	Shade Tree	45' +	Medium/ Fast	11%
B	10	Honeylocust 'Sunburst'	Gleditsia triacanthos var. inermis 'Suncole'	2.5" Cal.	Shade Tree	45' +	Fast	16%
C	8	Upright Hornbeam	Carpinus betulus 'Fastigiata'	2.5" Cal.	Ornamental Tree	35-40' +	Slow/ Medium	13%
D	8	Redbud	Cercis canadensis	2.5" Cal.	Ornamental Tree	25-30' +	Fast	13%
E	11	Arborvitae	Thuja occidentalis 'Smaragd'	6" Tall	Evergreen Tree	20-25'	Fast	18%
F	17	Juniper Tree	Juniperus virginiana 'Canaertii'	8" Tall	Evergreen Tree	20-30'	Medium	28%

- GENERAL NOTES:**
- Plan provided for City of Chesterfield ARB, Planning and Zoning Commission and City Council review and approval.
 - Street trees Req. - 726 lf/50 ft = 14.72 or 15 street trees.
 - All street trees will be located at least 3' from existing sidewalk.
 - All street trees will be located at least 10' from all storm sewer structures.
 - All disturbed areas to be sodded
 - An in-ground irrigation system will be provided.

Shrub, Ornamental Grasses and Perennial Schedule					
a	b	c	d	e	f
74	22	46	45	28	29
Boxwood	Zinfin Doll Hydrangea	Dwarf Hydrangea	Amethyst	Red Switch Grass	Skyrocket Juniper
B. sempervirens 'Green Velvet'	Hydrangea paniculata 'SMNHPRZEP'	Hydrangea paniculata 'LITTLE LAMP'	Calliocalyx dichotoma 'Early Amethyst'	Panicum virgatum 'Shenandoah'	Juniper 'Skyrocket'
20-22"	5 Gal.	5 Gal.	5 Gal.	1 Gal.	7 Gal.
Ball & Burlap	from Monrovia Nursery	from Monrovia Nursery			4-5' Tall
g	28	29	28	29	28
Gold Tip Juniper		Gold Tip Juniper		Gold Tip Juniper	
5 Gal.		5 Gal.		5 Gal.	
aa	39	bb	62	cc	12
Purple Cone Flower	Variegated Liriope	Black Eyed Susan	Lily Turf		
Echinacea purpurea 'Prairie Splendor'	Liriope muscari 'Variegated'	Rudbeckia fulgida 'Goldstrum'	Liriope speciosa		
1 Gal.	1 Gal.	1 Gal.	1 Qt.		
24" OC	24" OC	24" OC	18" OC		
485	+/ - Sq. Ft. Annuals	Field select by owner	1 Qt.	8" OC	
148	+/ - Lin. Ft. Tree Protection Fence - see detail this sheet				
tbd	+/ - Sq. Ft. Mulch - Double Ground Bark Mulch				
tbd	+/ - Sq. Ft. Lawn - Fescue Sod				
tbd	+/ - Sq. Ft. Landscape Rock w/ Weed Fabric				
tbd	+/ - Lin. Ft. Metal Edging				



Consultants:
Civil Engineer:
G&W Engineering
138 Weldon Parkway
St. Louis, MO 63043

Landscape Development Plans for:
SPRINGHILL SUITES / FAIRFIELD SUITES
1065 East Chesterfield Parkway
Chesterfield, MO 63017

CHESTERFIELD VILLAGE LODGING, LLC
1850 Craigshire, Suite 103
St. Louis, MO 63146

Revisions:

Date	Description	No.
8/15/19	City Comment: add existing trees	1
9/12/19	City Comments	2
10/29/19	City Comments	3
12/30/19	City Comments	4

Drawn: EMD
Checked: DAD

deLong
Landscape Architecture, LLC
7620 West Bruno Ave
St. Louis, MO. 63117
(314) 346-4856
delong.la@gmail.com

Sheet Title: Landscape Development Plan
Sheet No: LDP
Date: 7/12/2019
Job #:



Douglas A. DeLong, Landscape Architect LA-81

Consultants:
Civil Engineer:
G&W Engineering
138 Weldon Parkway
St. Louis, MO 63043

Landscape Development Plans for:
SPRINGHILL SUITES / FAIRFIELD SUITES
1065 East Chesterfield Parkway
Chesterfield, MO 63017

CHESTERFIELD VILLAGE LODGING, LLC
1850 Craigshire, Suite 103
St. Louis, MO 63146

Revisions:

Date	Description	No.
8/15/19	City Comment: add existing trees	1
9/12/19	City Comments	2
10/29/19	City Comments	3
12/30/19	City Comments	4

Drawn: EMD
Checked: DAD

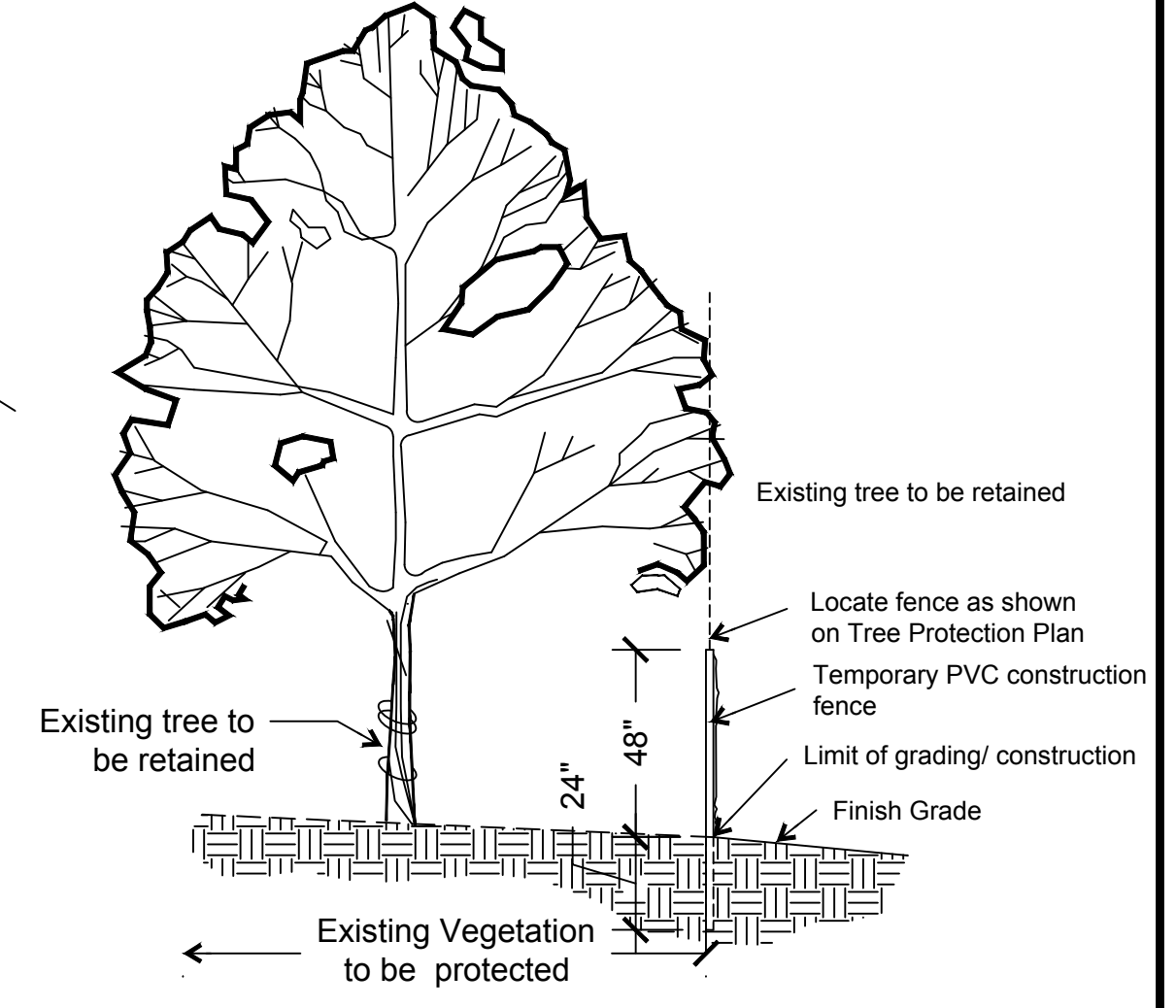
deLong
Landscape Architecture, LLC
7620 West Bruno Ave
St. Louis, MO. 63117
(314) 346-4856
delong.la@gmail.com
Missouri State Certificate of Authority: #2013000145

Sheet Title: **Tree Protection Plan**
Sheet No: **TPP**
Date: 7/12/2019
Job #:

LEGEND:

Symbol	Description
	Existing tree to remain
	Existing to be removed
	Approximate limit of construction -see Civil
	Proposed Tree Fence -no tree fence

TSD PLAN NOTES:
Tree observations made on July 9, 2019 to identify trees on site including condition and DBH. DBH measure at 4'-6" above finish grade.



TREE PROTECTION DETAIL
n.t.s.

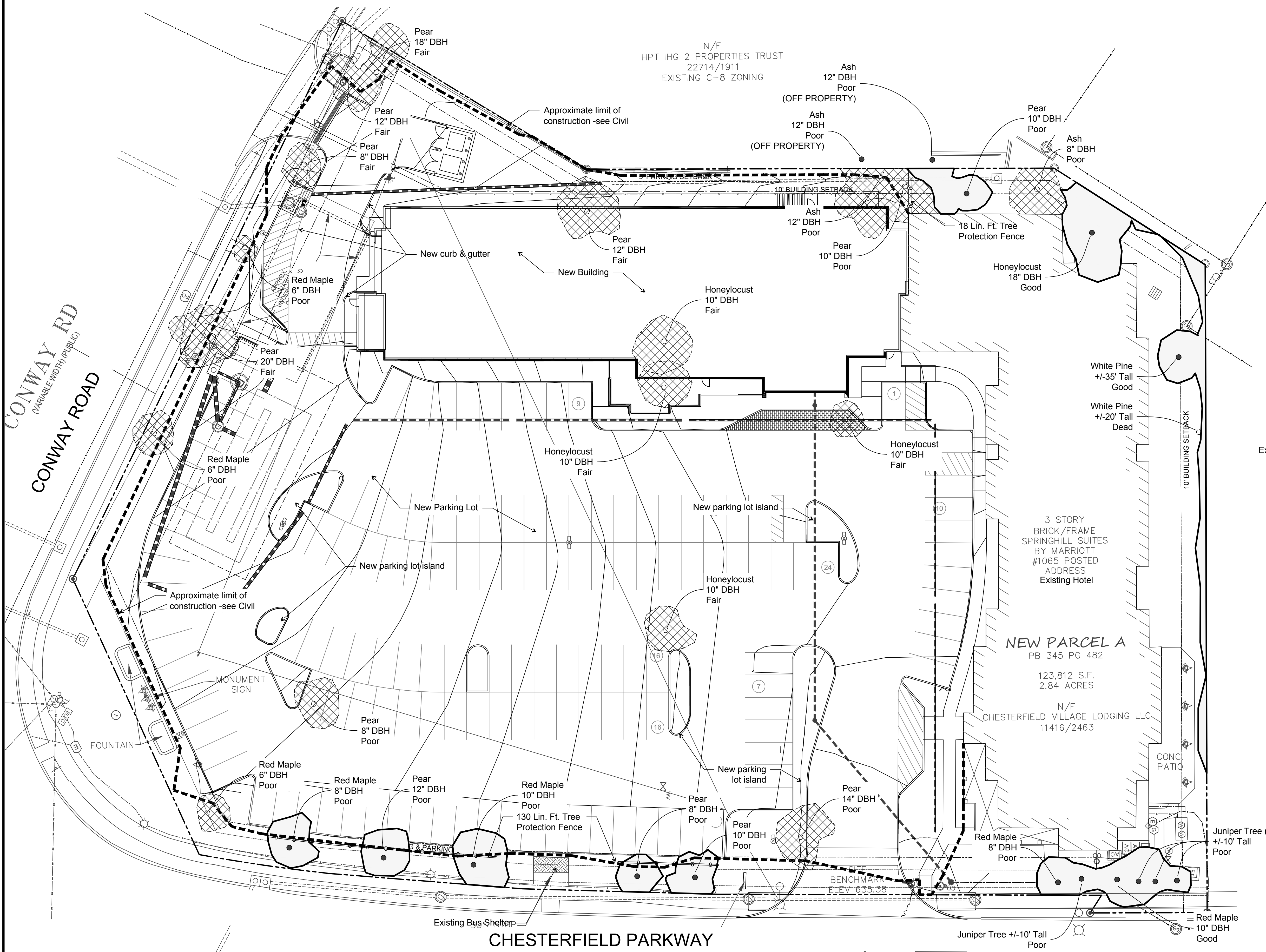
- Tree Protection Plan Notes:**
- No wooded area on-site. Tree canopy consist of individual trees installed at time of original development.
 - No monarch trees on-site

Total Site Area:	123,812 sq. ft.
Total existing on-site tree canopy:	9,600 sq. ft.
Proposed tree canopy to be removed:	5,157 sq. ft. or 53.7%
Proposed tree canopy for preservation:	4,423 sq. ft. or 46.3%

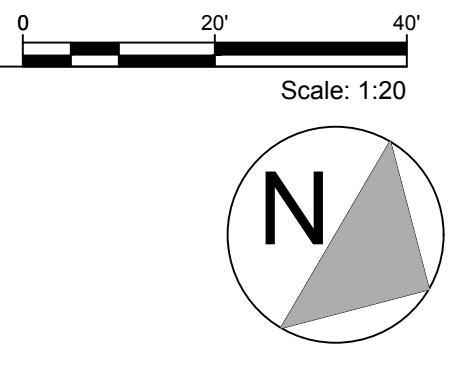
- Tree Protection Notes:**
- Clearing limits shall be rough staked or marked by the applicant's surveyor in order to facilitate location for trenching and fencing installation.
 - No clearing or grading shall begin in areas where tree treatment, preservation, and protection measures have not yet been completed.
 - Protective devices shall be PVC fencing as shown on plan detail
 - Trees to remain and to be protected shall be watered weekly and deep root injection fertilizer as determined by tree contractor.

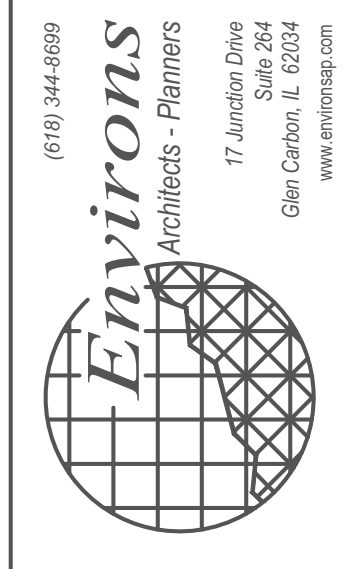
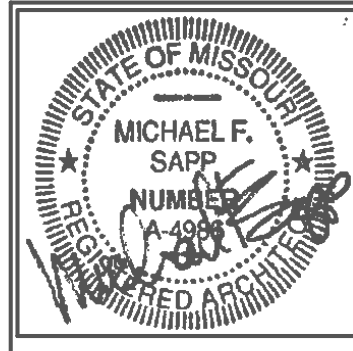
Construction standards for field practice.

- Protective fencing shall be installed along the limit of disturbance line to prevent damage to the roots, trunk, and tops of protected trees. This protective fence shall protect the tree and its roots from clearing, grading, soil filling, storage of materials, parking of vehicles, utility installation or other construction activity of any kind.
- Signs designating required tree protection areas, common open space areas, or green space preservation areas shall be posted along the limit of disturbance line.
- Root pruning or trenching shall occur when roots, within the critical root zone of a protected tree, would be damaged as a result of nearby excavation or the addition of fill over the root system.
- Trenches are not permitted inside the drip line of a tree's canopy. Sediment and erosion control structures must be used to keep eroded soil from covering roots of protected trees. Siltation screens, etc., are appropriate.
- Tunneling may be required when utilities are to run through a tree's critical root zone. Tunneling is required for permitted work within a tree's canopy coverage. Tunneling must adhere to the requirements set forth in Article 04 Development Requirements and Design Standards Chesterfield, MO Section 31-04-02 Tree preservation and landscape requirements, Table 1.



1 Tree Preservation Plan





JOB NO. 18016

DATE: DECEMBER 16, 2019
REVISED:

A NEW HOTEL + CONVERSION FOR:
SPRINGHILL SUITES + FAIRFIELD INN
 CHESTERFIELD, MO
 BY MARRIOTT
 SITE LIGHTING / PHOTOMETRIC PLAN

SHEET
SL-1
 OF XX

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- NOTES:
- INITIAL FC AVERAGES SHOWN
 - 18' POLE + 2' CONCRETE BASE FOR OA MOUNTING HEIGHT OF 20'

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
ALL CALC POINTS	Illuminance	Fc	2.28	7.1	0.0	N.A.	N.A.
PARKING & DRIVES	Illuminance	Fc	2.64	7.1	0.4	6.60	17.75

Symbol	Qty	Label	Description	Arr. Watts	Total Watts	Arrangement
+	3	A	BEACON VP-L-80L-180-4K7-4W-XXX-A-FINISH/SSS-B-18-40-A-1-B3-FINISH	180	540	SINGLE
+	3	B	BEACON (2) VP-L-80L-180-4K7-4W-UNV-A-FINISH / (1) SSS-B-18-40-A-1-B3-FINISH	360	1080	BACK-BACK
+	10	C	HUBBELL TRP2-24L-30-4K7-3-UNV-FINISH	27.9	279	SINGLE
+	2	D	SCOTT S9315-L24-4K-FINISH	26	52	SINGLE
○	2	E	PRESCOLITE LTR-6RD-H-SL06L-DM1 LTR-6RD-T-SL40K8WDS	7.8	15.6	SINGLE

SITE LIGHTING PHOTOMETRIC PLAN
SCALE: 1"=20'-0"



Calculations provided by: LEC-WARD BURTON & CO.
Date: 1/30/2020
Filename: SPRING HILL SUITES SITE LIGHTING R4.AGI
Designed by: EE



- | | | | |
|---|--------|---|----------------------|
|  | BRICK |  | EIFS 4 |
|  | EIFS 1 |  | FIBER CEMENT SIDING |
|  | EIFS 2 |  | WINDOWS + STOREFRONT |
|  | EIFS 3 |  | SHINGLE ROOFING |
| | |  | GLASS |

NEW BRICK SHALL MATCH EXISTING



Environs
Architects - Planners
17 Junction Drive
Suite 204
Glen Carbon, IL 62034
www.environs.com

JOB NO:
18016
DATE:
FEBRUARY 18, 2020
REVISED:
OCTOBER 29, 2019

BY MARRIOTT
A NEW HOTEL + CONVERSION FOR:
SPRINGHILL SUITES + FAIRFIELD INN
C-REGISTERED, MO
EXTERIOR BUILDING ELEVATIONS

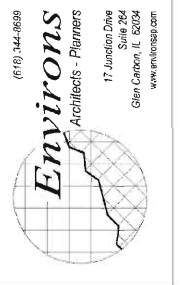
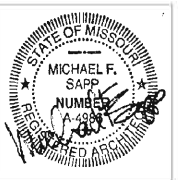
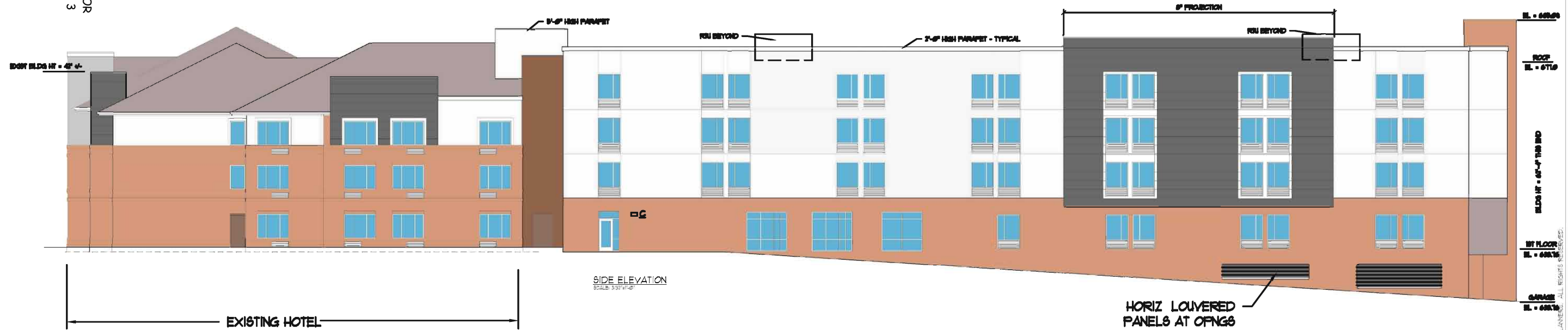
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SHEET
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02 XX



LOUVER PANEL COLOR SHALL MATCH EIFS 3

NEW BRICK SHALL MATCH EXISTING

- BRICK
- EIFS 1
- EIFS 2
- EIFS 3
- EIFS 4
- FIBER CEMENT SIDING
- WINDOWS + STOREFRONT
- SHINGLE ROOFING
- GLASS



JOB NO. 18016
 DATE: FEBRUARY 18, 2018
 REVISED: OCTOBER 23, 2018

BY MARRIOTT
 A NEW HOTEL + CONVERSION FOR:
SPRINGHILL SUITES + FAIRFIELD INN
 CHESTERFIELD, MO
 EXTERIOR BUILDING ELEVATIONS

SHEET
A2.02
 OF XX

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VIPER L OPTICS STRIKE

LARGE VIPER LUMINAIRE

Cat.#

Job **SRINGHILL SUITES □ FAIRFIELD INN - CHESTERFIELD □ MO**

Type **TYPE A + B**



Approvals

SPECIFICATIONS

Intended Use:

The Beacon Viper luminaire is available in two sizes with a wide choice of different LED wattage configurations and optical distributions designed to replace HID lighting up to 1000W MH or HPS. Luminaires are suitable for wet locations.

Construction:

- Manufactured with die cast aluminum.
- Coated with a polyester finish that meets ASTM B117 corrosion test requirements and ASTM D522 cracking and loss of adhesion test requirements.
- External hardware is corrosion resistant.
- One piece optical cartridge system consisting of an LED engine, LED lamps, optics, gasket and stainless steel bezel.
- Cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one piece optical system.
- Two-piece silicone and microcellular polyurethane foam gasket ensures a weather-proof seal around each individual optic.

Electrical:

- Luminaire accepts 100V through 277V, 50 Hz to 60 Hz (UNV), 347V, or 480V input.
- Power factor is $\geq .90$ at full load.
- Dimming drivers are standard, but must contact factory to request wiring leads for purpose of external dimming controls.
- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is certified by UL for use at 600VAC at 90°C or higher.
- Plug disconnects are certified by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only.
- Fixture electrical compartment shall contain all LED driver components and shall be provided with a push-button terminal block for AC power connections.
- Optional 7-pin ANSI C136.41-2013 twist-lock photo control receptacle available. Compatible with ANSI C136.41 external wireless control devices.
- Ambient operating temperature -40°C to 40°C
- Surge protection - 20kA.
- Lifeshield™ Circuit - protects luminaire from excessive temperature. The device shall activate at a specific, factory-preset temperature, and progressively reduce power over a finite temperature range. Operation shall be smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply, or faulty wiring connection to the drivers. The device shall be able to co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.).

Controls/Options:

- Available with an optional passive infrared (PIR) motion sensor capable of detecting motion 360° around the luminaire. When no motion is detected for the specified time, the motion response system reduces the wattage to factory preset level, reducing the light level accordingly. When motion is detected by the PIR sensor, the luminaire returns to full wattage and full light output. Please contact Beacon Products if project requirements vary from standard configuration.
- Available with Energeni for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night (see www.beaconproducts.com/products/energeni).
- In addition, Viper can be specified with **SiteSync™** wireless control system for reduction in energy and maintenance costs while optimizing light quality 24/7. For more details, see ordering information or visit: www.hubbelling.com/sitesync

Installation:

- Mounting options for horizontal arm, vertical tenon or traditional arm mounting available. Mounting hardware included.

Finish:

- IFS polyester powder-coat electrostatically applied and thermocured. IFS finish consists of a five stage pretreatment regimen with a polymer primer sealer and top coated with a thermoset super TGIC polyester powder coat finish.
- The finish meets the AAMA 2604 performance specification which includes passing a 3000 hour salt spray test for corrosion resistance and resists cracking or loss of adhesion per ASTM D522 and resists surface impacts of up to 160 inch-pounds.

Certifications/Ratings:

- DesignLights Consortium (DLC) qualified, consult DLC website for more details: <http://www.designlights.org/QPL>
- Certified to UL 1598, UL 8750, and CSA C22.2
- 3G rated for ANSI C136.31 high vibration applications with MAF mounting
- IDA approved
- This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at: http://www.beaconproducts.com/products/viper_large

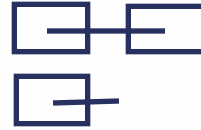
Warranty:

Five year limited warranty for more information visit: www.hubbelling.com/resources/warranty

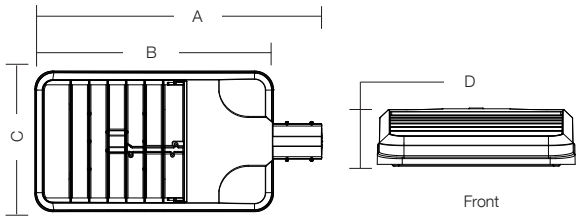
PRODUCT IMAGE(S)



SYMBOL

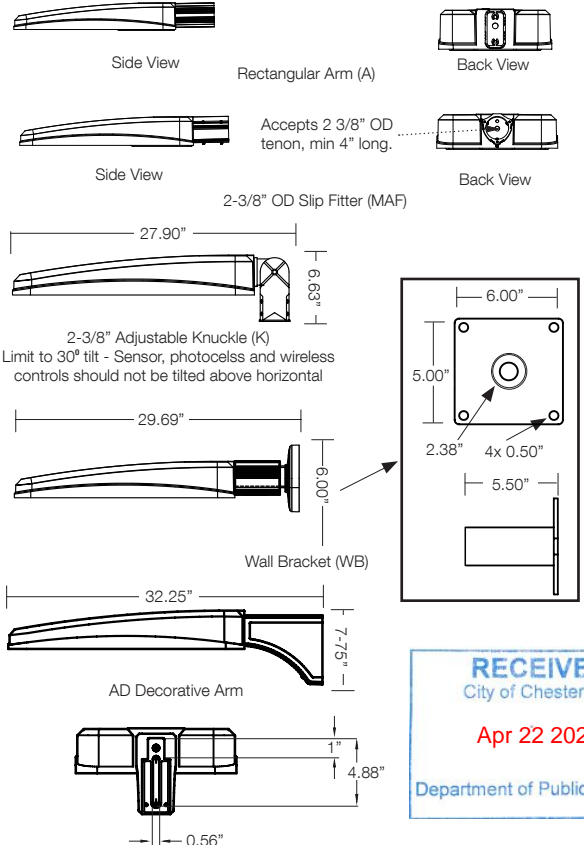


DIMENSIONS



A	B	C	D	Weight:	EPA
29.9"	24.19"	14.25"	4.13"	25.0 lbs	1.2 ft ²
(741 mm)	(614 mm)	(362 mm)	(105 mm)	(11.3 kg)	

MOUNTING OPTIONS



RECEIVED
City of Chesterfield
Apr 22 2020
Department of Public Services

CERTIFICATIONS/LISTINGS



*3000K and warmer CCTs only



Beacon Products • 2041 58th Avenue Circle East Bradenton, FL 34203 • Phone: 800-345-4928

Due to our continued efforts to improve our products, product specifications are subject to change without notice.

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ORDERING INFORMATION ORDERING EXAMPLE: VPL/96L-280/4K7/4W/UNV/A/DB/7PR-TL/GENI-04/BC

VPL								
SERIES	LED ENGINE	CCT/CRI ⁷	ROTATION	VOLTAGE	COLOR	OPTIONS		
VPL Viper	64L-135 135W LED array 80L-180 180W LED array 80L-235 235W LED array 96L-220 220W LED array 96L-280 280W LED array 96L-315 315W LED array 96L-395 395W LED array	3K7 3000K, 70 CRI 4K7 4000K, 70 CRI 5K7 5000K, 70 CRI	Leave blank for no rotation L ⁵ Optic rotation left R ⁵ Optic rotation right	UNV 120-277V 120 120V 208 208V 240 240V 277 277V 347 347V 480 480V	BL Black Textured DB Dark Bronze Textured GYS Light Gray Smooth PS Platinum Silver Smooth WH White Textured CC Custom Color	F Fusing BSP Bird Spikes BC Backsheid (available for FR, 2, 3, 4, 4W Optics)		

DISTRIBUTION

- FR Type 1/Front Row
- 2 Type 2
- 3 Type 3
- 4 Type 4
- 4W Type 4 Wide
- 5QM Type 5QM
- 5QN Type 5QN
- 5R Type 5R (rectangular)
- 5W Type 5W (round wide)
- TC Tennis Court

MOUNTING

- A Rectangular Arm (formerly RA) for square or round pole
- MAF Mast Arm Fitter (formerly SF2) for 2-3/8" OD horizontal arm
- K Knuckle (formerly PK2) limit to 30° tilt or 2-3/8" OD horizontal arm or vertical tenon
- WB Wall Bracket
- AD Universal Arm for square pole
- AD3 Universal Arm for 2.4"-4.1" round pole
- AD4 Universal Arm for 4.2"-5.3" round pole
- AD5 Universal Arm for 5.5"-5.9" round pole
- AD6 Universal Arm for 6.0"-6.5" round pole

CONTROL OPTIONS

- 7PR 7-Pin Receptacle only (shorting cap, photo control, or wireless control provided by others)
- 7PR-SC 7-Pin Receptacle w/Shorting Cap
- 7PR-TL 7-Pin Receptacle w/Twist Lock photo control
- SCP/_F^{1,2,6} Programmable Occupancy Sensor w/daylight control
- GENI-XX³ ENERGENI
- SWP^{1,4} SiteSync Pre-Commission
- SWPM^{1,2,4} SiteSync Pre-Commission w/ Sensor

HOUSE SIDE SHIELD ACCESSORIES

- HSS/EVP-L/90-FB/XXX 90° shield front or back
- HSS/EVP-L/90-LR/XXX 90° shield left or right
- HSS/EVP-L/270-FB/XXX 270° shield front or back
- HSS/EVP-L/270-LR/XXX 270° shield left or right
- HSS/EVP-L/360/XXX Full shield

(Replace XXX with notation for desired finish color)
(Refer to page 5 for shield images)

MOUNTING ACCESSORIES

- VPL-AD-RPA3 2.4"-4.1" Round Pole Adapter for AD arm
- VPL-AD-RPA4 4.2"-5.3" Round Pole Adapter for AD arm
- VPL-AD-RPA5 5.5"-5.9" Round Pole Adapter for AD arm
- VPL-AD-RPA6 6.0"-6.5" Round Pole Adapter for AD arm

¹ Not available with other wireless control or sensor options
² Specify mounting height; 8 = 8" or less, 40 = 9" to 40"
³ Specify routine setting code (example GENI-04). See ENERGENI brochure and instructions for setting table and options. Not available with sensor or SiteSync options.
⁴ Specify group and zone at time of order. See www.hubbellighting.com/sitesync for further details. Order at least one SiteSync interface accessory SWUSB or SWTAB. Each option contains SiteSync License, GUI, and Bridge Node
⁵ Only available with FR, 2, 3, 4, 4W and 5R distributions
⁶ Order at least one SCP-REMOTE per project location to program and control the occupancy sensor
⁷ This product is approved by the Florida Fish and Wildlife Conservation Commission. Separate spec available at: http://cdn.beaconproducts.com/content/products/specs/specs_files/Viper_Large_LED_turtle_spec_sheet.pdf

PRECOMMISSIONED SITESYNC ORDERING INFORMATION: When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project location, Group information, and Operating schedules. For more detailed information please visit www.hubbell-automation.com/products/sitesync/ or contact Hubbell Lighting tech support at (800) 345-4928.

SiteSync fixtures with Motion control (SWPM) require the mounting height of the fixture for selection of the lens.

Examples: VPL-80L-235/4K7/3/UNV/A/DB/SWP/ SiteSync only
 VPL-80L-235/4K7/3/UNV/A/DB/SWPM-40F/ SiteSync with Motion Control

Accessories and Services (Ordered Separately)

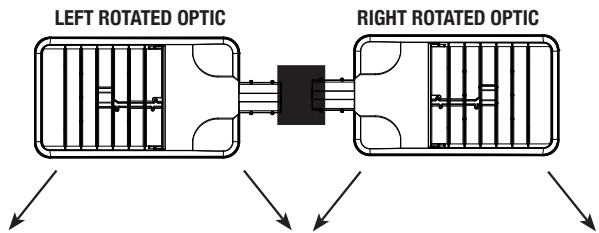
Catalog Number	Description
SCP-REMOTE	Remote Control for SCP/_F option. Order at least one per project to program and control the occupancy sensor
SWUSB*	SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node
SWTAB*	Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node.
SWBRG	SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested.
SW7PR+	SiteSync 7 Pin on fixture module On/Off/Dim, Daylight Sensor 120-480VAC

* When ordering SiteSync at least one of these two interface options must be ordered per project.
 + Available as a SiteSync retrofit solution for fixtures with an existing 7pin receptacle.

Hubbell Control Solutions - Accessories (sold separately)

Catalog Number	Description	HCS System
NXOFM-1R1D-UNV	On-fixture Module (7-pin), On / Off / Dim, Daylight Sensor with HubbNET Radio and Bluetooth® Radio, 120-480VAC	NX Distributed Intelligence™
WIR-RME-L	On-fixture Module (7-pin or 5-pin), On / Off / Dim, Daylight Sensor with wiSCAPE Radio, 110-480VAC	wiSCAPE® Lighting Control

For additional information related to these accessories please visit www.hubbellcontrolsolutions.com. Options provided for use with integrated sensor, please view specification sheet ordering information table for details.



SiteSync 7-Pin Module



- SiteSync features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)
- Does not interface with occupancy sensors



PERFORMANCE DATA

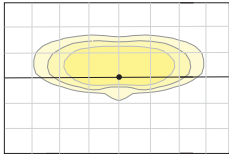
# LED'S	DRIVE CURRENT (MILLIAMPS)	SYSTEM WATTS	DISTRIBUTION TYPE	5K (5000K nominal, 70 CRI)					4K (4000K nominal, 70 CRI)					3K (3000K nominal, 70 CRI)				
				LUMENS	LPW ¹	B	U	G	LUMENS	LPW ¹	B	U	G	LUMENS	LPW ¹	B	U	G
64	625 mA	135W	1A	18220	132	2	0	2	18783	137	2	0	2	16341	119	2	0	2
			2	17228	125	2	0	2	17761	129	2	0	2	15452	112	2	0	2
			3	17257	125	2	0	3	17791	129	2	0	3	15478	112	2	0	3
			4	16864	123	1	0	4	17386	126	1	0	4	15125	110	1	0	3
			4W	15106	112	2	0	4	15573	115	2	0	4	13237	98	2	0	3
			5QM	17259	125	4	0	2	17792	129	4	0	2	15479	112	4	0	2
			5QN	18023	131	4	0	0	18580	135	4	0	0	16165	117	4	0	0
			5R	17410	127	4	0	4	17948	130	4	0	4	15615	113	4	0	4
			5W	16498	120	4	0	2	17009	124	4	0	3	14797	108	4	0	2
			TC	15925	110	2	1	2	16417	113	2	1	2	14283	98	1	1	2
80	700 mA	180W	1A	23230	128	2	0	2	23948	132	2	0	2	20835	115	2	0	2
			2	21965	121	3	0	3	22645	125	3	0	3	19701	109	2	0	3
			3	22003	121	2	0	4	22683	125	3	0	4	19734	109	2	0	4
			4	21502	119	2	0	4	22167	122	2	0	4	19285	106	2	0	4
			4W	19260	107	2	0	4	19856	110	2	0	4	16877	94	2	0	4
			5QM	22005	121	4	0	2	22686	125	4	0	2	19736	109	4	0	2
			5QN	22979	127	4	0	1	23689	131	4	0	1	20610	114	4	0	0
			5R	22197	122	4	0	4	22884	126	4	0	4	19909	110	4	0	4
			5W	21035	116	5	0	3	21686	120	5	0	3	18867	104	4	0	3
			TC	19906	110	2	1	2	20522	113	2	1	2	17854	98	2	1	2
80	875 mA	235W	1A	27849	121	2	0	2	28711	125	2	0	2	24978	108	2	0	2
			2	26334	114	3	0	3	27148	118	3	0	4	23619	102	3	0	3
			3	26378	114	3	0	4	27194	118	3	0	4	23659	103	3	0	4
			4	25777	112	2	0	4	26575	115	2	0	5	23120	100	2	0	4
			4W	23090	98	2	0	5	23805	101	2	0	5	20234	86	2	0	4
			5QM	26381	114	4	0	2	27196	118	4	0	2	23661	103	4	0	2
			5QN	27548	119	5	0	1	28400	123	5	0	1	24708	107	5	0	1
			5R	26611	115	5	0	5	27434	119	5	0	5	23868	104	4	0	4
			5W	25218	109	5	0	3	25998	113	5	0	3	22619	98	5	0	3
			TC	23864	103	2	1	2	24602	107	2	1	2	21404	93	2	1	2
96	700 mA	220W	1A	27876	128	2	0	2	28738	132	2	0	2	25002	115	2	0	2
			2	26359	121	3	0	3	27174	125	3	0	4	23641	109	3	0	3
			3	26403	121	3	0	4	27220	125	3	0	4	23681	109	3	0	4
			4	25802	119	2	0	4	26600	122	2	0	5	23142	106	2	0	4
			4W	23111	105	2	0	5	23826	108	2	0	5	20252	92	2	0	4
			5QM	26406	121	4	0	2	27222	125	4	0	2	23684	109	4	0	2
			5QN	27575	127	5	0	1	28427	131	5	0	1	24732	114	5	0	1
			5R	26637	122	5	0	5	27460	126	5	0	5	23891	110	4	0	4
			5W	25242	116	5	0	3	26023	120	5	0	3	22640	104	5	0	3
			TC	23887	110	2	1	2	24626	113	2	1	2	21424	98	2	1	2
96	875 mA	280W	1A	33419	121	3	0	2	34453	125	3	0	2	29974	108	2	0	2
			2	31600	114	3	0	4	32577	118	3	0	4	28342	102	3	0	4
			3	31654	114	3	0	5	32633	118	3	0	5	28390	103	3	0	4
			4	30933	112	2	0	5	31889	115	2	0	5	27744	100	2	0	5
			4W	27708	99	3	0	5	28564	102	3	0	5	24280	87	2	0	5
			5QM	31657	114	5	0	3	32636	118	5	0	3	28393	103	4	0	2
			5QN	33058	119	5	0	1	34080	123	5	0	1	29650	101	5	0	1
			5R	31933	115	5	0	5	32921	119	5	0	5	28641	104	5	0	5
			5W	30262	109	5	0	4	31198	113	5	0	4	27142	98	5	0	3
			TC	28642	104	2	1	3	29528	107	2	1	3	25690	93	2	1	2
96	1000mA	315W ²	1A	35666	113	3	0	2	36769	117	3	0	2	31989	101	2	0	2
			2	33725	107	3	0	4	34768	110	3	0	4	30248	96	3	0	4
			3	33782	107	3	0	5	34827	110	3	0	5	30299	96	3	0	4
			4	33012	105	2	0	5	34033	108	2	0	5	29609	94	2	0	5
			4W	29571	94	3	0	5	30485	97	3	0	5	25913	82	2	0	5
			5QM	33785	107	5	0	3	34830	110	5	0	3	30302	96	5	0	2
			5QN	35280	112	5	0	1	36371	115	5	0	1	31643	100	5	0	1
			5R	34080	108	5	0	5	35134	111	5	0	5	30567	97	5	0	5
			5W	32302	102	5	0	4	33301	106	5	0	4	28972	92	5	0	4
			TC	30568	97	2	1	3	31513	100	3	1	3	27416	87	2	1	3
96	1225mA	395W ²	1A	39569	101	3	0	4	43125	110	3	0	3	37518	96	3	0	2
			2	39569	101	3	0	4	40793	104	3	0	4	35490	91	3	0	4
			3	39619	101	3	0	5	40845	104	3	0	5	35535	91	3	0	5
			4	38723	98	3	0	5	39921	101	3	0	5	34731	88	2	0	5
			4W	34691	86	3	0	5	35764	89	3	0	5	30400	76	3	0	5
			5QM	39623	101	5	0	3	40848	104	5	0	3	35538	90	5	0	3
			5QN	41394	105	5	0	1	42675	109	5	0	1	37127	95	5	0	1
			5R	39969	102	5	0	5	41205	105	5	0	5	35848	91	5	0	5
			5W	37877	97	5	0	4	39048	100	5	0	4	33986	87	5	0	4
			TC	35850	90	3	1	3	36959	93	3	1	3	32154	81	3	1	3

¹ Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application.
² 315W and 395W 3000K versions are not DLC QPL listed. Reference highlighted cells in table.

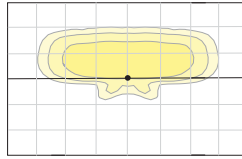


PHOTOMETRICS

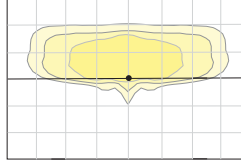
Type FR - Front Row/Auto Optic



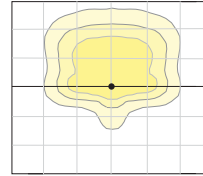
Type 2



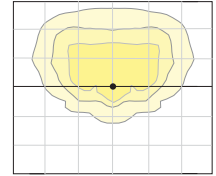
Type 3



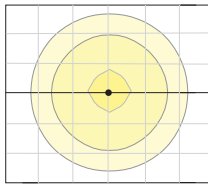
Type 4



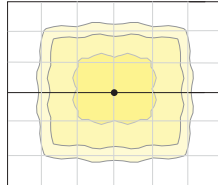
Type 4W



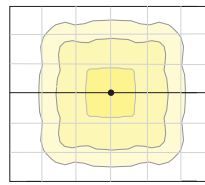
Type 5W



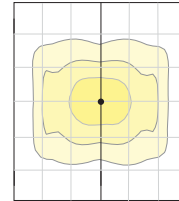
Type 5QN



Type 5QM



Type 5R



ELECTRICAL DATA

# OF LEDS	NUMBER OF DRIVERS	DRIVE CURRENT (mA)	INPUT VOLTAGE (V)	SYSTEM POWER (w)	CURRENT (Amps)
64	1	625 mA	120	135	1.4
			277		0.6
			347		0.5
			480		0.3
80	2	700 mA	120	180	1.8
			277		0.8
			347		0.6
			480		0.5
80	2	875 mA	120	235	2.4
			277		1.0
			347		0.8
			480		0.6
96	2	700 mA	120	220	2.2
			277		1.0
			347		0.8
			480		0.6
96	2	875 mA	120	280	2.8
			277		1.2
			347		1.0
			480		0.7
96	2	1000 mA	120	315	3.2
			277		1.4
			347		1.1
			480		0.8
96	2	1225 mA	120	395	4.0
			277		1.7
			347		1.4
			480		1.0

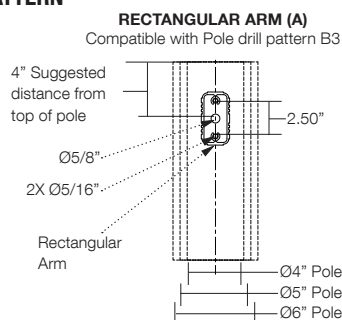
PROJECTED LUMEN MAINTENANCE

AMBIENT TEMP.	0	25,000	50,000	TM-21-11 60,000	100,000	Calculated L70 (HOURS)
25°C / 77°C	1	0.98	0.97	0.97	0.96	>377,000

¹ Projected per IESNA TM-21-11

Data references the extrapolated performance projections for the 700mA base model in a 25°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

DRILL PATTERN



EPA

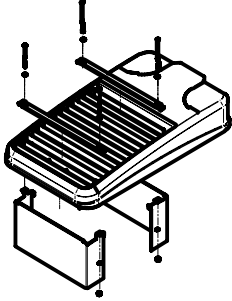
Config.	EPA	Config.	EPA
1	1.2	3 @ 120°	3.0
2 @ 90°	1.9	3 @ 90°	3.1
2 @ 180°	2.4	4 @ 90°	3.8

TENON TOP POLE BRACKET ACCESSORIES (Order Separately)

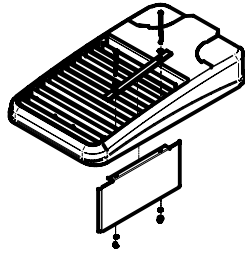
(2 3/8" OD tenon)

Catalog Number	Description
SETAVP-XX	Square tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
RETAVP-XX	Round tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
TETAVP-XX	Hexagonal tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
SETA2XX	Square tenon adapter (4 at 90°) for AD - Universal Arm mounting option only
RETA2XX	Round tenon adapter (4 at 90°) for AD3 - Universal Arm mounting option only
TETA2XX	Hexagonal tenon adapter (3 at 120°) for AD - Universal Arm mounting option only

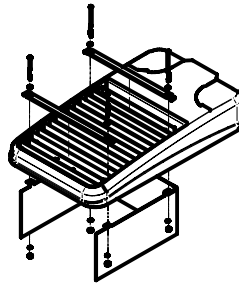
HOUSE SIDE SHIELD FIELD INSTALL ACCESSORIES



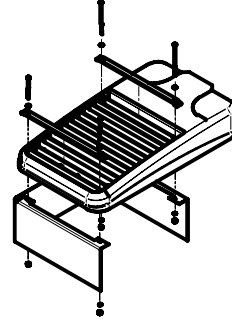
HSS/EVP-L/90-FB/XXX
90° shield front or back
(2 shields shown)



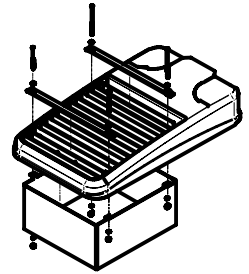
HSS/EVP-L/90-LR/XXX
90° shield left or right
(1 shield shown in left orientation)



HSS/EVP-L/270-FB/XXX
270° shield front or back
(1 shield shown in back orientation)



HSS/EVP-L/270-LR/XXX
270° shield left or right
(1 shield shown in right orientation)

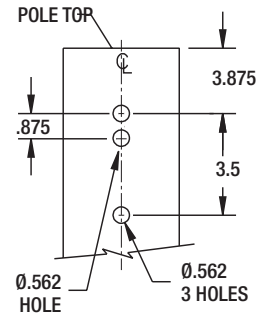
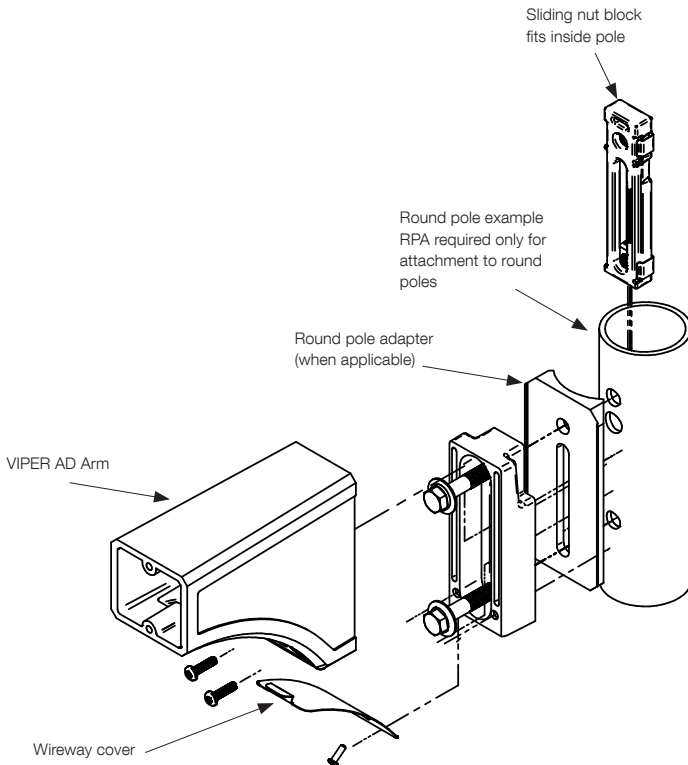


HSS/EVP-L/360/XXX
Full shield
(1 shield shown)

AD ARM MOUNTING INSTRUCTIONS

DECORATIVE ARM (AD)

Compatible with pole drill pattern S2



GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

SYMBOL



FEATURES

- Mid sized architectural wallpacks in three stylish shapes
- Capable of replacing up to 400w HID luminaires
- Type I, II, III and IV distributions for a wide variety of applications
- Integral battery backup options
- Control capabilities offer additional energy savings options
- Zero uplight distributions
- Inverted mounting capable for under canopy and facade lighting



RELATED PRODUCTS

- [RD11 GeoPak](#)
 [TRP1 GeoPak](#)
 [QSP1 GeoPak](#)



CONTROL TECHNOLOGY



SPECIFICATIONS

CONSTRUCTION

- Die-cast aluminum housing and door
- Seven powder coat standard finishes, plus custom color options

OPTICS

- 24 or 32 high power LEDs deliver up to 10,800 lumens
- Up to 146 lumens per watt
- Different lenses offer a variety of distribution patterns - Type I, II, III and IV (Forward throw)
- 3000K - 70 CRI, 4000K - 70 CRI and 5000K - 70 CRI, CCT nominal

INSTALLATION

- Quick-mount adapter with gasket seal provides easy installation to wall or to recessed junction box (4" square junction box). Fixture attaches by two Allen-head hidden fasteners for tamper resistance
- Black box accessory available for surface conduit application
- Optional inverted/up mounting (must specify when ordering)

ELECTRICAL

- Optional Dual Drivers & Dual Power Feeds for 50, 70 and 90 watt versions
- 120-277, 347 and 480 voltage, 50/60Hz
- Power factor \geq 90%
- THD (Total Harmonic Distortion) <20%

ELECTRICAL (CONTINUED)

- Ambient operating temperature -40°C to 40°C
- 20kA surge protection (series); Automatically takes fixture off-line when device is consumed
- Integral Battery Backup provides emergency lighting for the required 90 minute path of egress
- Includes a long-life Lithium Iron Phosphate battery with optional battery heater for cold temperature application
- Utilizes 4 LEDs in emergency mode with 657 lumens. Each of the 4 LEDs in emergency are designed to function independently in the unlikely event of a single LED malfunction
- Spectron® self-testing/self-diagnostic electronics are included standard
- Independent dedicated driver and LED array for battery/emergency mode operation

CONTROLS

- Drivers are 0-10V dimming standard
- Universal button photocontrol for dusk to dawn energy savings
- Photocell and occupancy sensor options available for complete on/off and dimming control
- Occupancy sensor options available for complete on/off and dimming control

CONTROLS (CONTINUED)

- In addition, GeoPak Size 2 can be specified with SiteSync™ wireless control system for reduction in energy and maintenance cost while optimizing light quality 24/7. See ordering information or visit www.hubbellighting.com/sitesync for more details

CERTIFICATIONS

- IP65 rated housing
- DesignLights Consortium® (DLC) qualified. Please refer to the DLC website for specific product qualifications at www.designlights.org
- Zero uplight (U0), dark sky, neighbor friendly
- Drivers IP66 and RoHS compliant

WARRANTY

- 5 year limited warranty
- See [HLI Standard Warranty](#) for additional information

KEY DATA	
Lumen Range	3,200-11,000
Wattage Range	28-87
Efficacy Range (LPW)	112-146
Fixture Projected Life (Hours)	L70>60K
Weights lbs. (kg)	16-18 (7.3-8.2)

GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

ORDERING GUIDE

Example: TRP2-24L30-3K7-2-UNV-DB

 CATALOG #

ORDERING INFORMATION

Series	# LEDs - Wattage	CCT/CRI	Distribution	Voltage	Secondary Mounting
TRP2 Trapezoid	24L-30 24 LEDs, 30 watts	3K7 3000K, 70 CRI	1 TYPE I	UNV 120-277V	BLANK Downlight Only
RD12 Radius	24L-50 24 LEDs, 50 watts	4K7 4000K, 70 CRI	2 TYPE II	120 120V	NV² Inverted/Up Mounting
QSP2 Qtr-sphere	24L-70 24 LEDs, 70 watts	5K7 5000K, 70 CRI	3 TYPE III	208 208V	
	24L-90 24 LEDs, 90 watts		4 TYPE IV	240 240V	
	32L-70 32 LEDs, 70 watts			277 277V	
	32L-90 32 LEDs, 90 watts			UNV¹ 347/480V	
				347¹ 347V	
				480¹ 480V	

Color	Control Options Network	Options	Notes:
BL Black textured	PC Button Photocontrol	SF³ Single Fuse & fuse holder	1 70 & 90 watt versions only
DB Dark bronze textured	SCP^{4,5} Programmable occupancy sensor, factory default is 10% light output	DF³ Double fuse & fuse holder	2 Not available with SCP, SCO, SWPM sensor and E/EH battery options
GT Graphite textured	SCO⁴ Sensor Control, On/Off	E³ Battery pack (0°C)	3 Must specify voltage (120, 277 or 347V only for SWP & SWP, 120 or 277V only for E & EH)
GR Gray textured matte	SWP^{3,7} SiteSync Pre-Commission	EH³ Battery pack (-30°C) with heater	4 PCU option not applicable, included in sensor
GYS Light gray smooth	SWPM^{3,4,7,8} SiteSync Pre-Commission w/ Occupancy Sensor	2DR⁶ Dual Drivers	5 Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings
PS Platinum silver smooth	Spec SCP/SCO & SWPM Mount Height	2PF⁶ Dual power feeds	6 Not available with 30w version
WH White textured	-8F Up to 8ft mount height	CS Comfort shield	7 Not available with E/EH options. Must specify group and zone information at time of order. See www.HubbellLighting.com/product/sitesync for future details.
CC Custom color	-20F Up to 20ft mount height		8 Specify time delay, dimming level and mounting height

ACCESSORIES (ORDERED SEPARATELY)

Catalog Number	Description
<input type="checkbox"/> SCP-REMOTE*	Remote control for SCP option. Order at least one per
<input type="checkbox"/> BB-GEO-XX	Black box with 4-1/2" threaded conduit holes, specify finish by replacing "XX" with finish selection, eg. Dark Bronze "DB"
<input type="checkbox"/> SWUSB**	SiteSync loaded on USB flash drive (Windows based only)
<input type="checkbox"/> SWTAB**	SiteSync Windows Tablet
<input type="checkbox"/> SWBRG+	SiteSync Wireless Bridge Node

Notes:

- * Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings.
- ** When ordering with SiteSync, one of the following interface options must be chosen an ordered separately. Each option contains the SiteSync License, GUI and Bridge Node.
- + If needed, an additional Bridge Node can be ordered

GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

INPUT POWER CONSUMPTION

# of LEDs	Drive Current (mA)	Input Voltage (V)	Current (Amps)	System Power (w)
24	350mA	120	0.23	28
		277	0.10	28
	625mA	120	0.41	49
		277	0.18	49
	900mA	120	0.59	71
		277	0.25	71
		347	0.20	71
		480	0.15	71
	70	120	0.72	87
		277	0.31	87
		347	0.25	87
		480	0.18	87
32	110	120	0.56	67
		277	0.24	67
		347	0.19	67
		480	0.14	67
	140	120	0.69	83
		277	0.30	83
		347	0.24	83
		480	0.17	83

GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

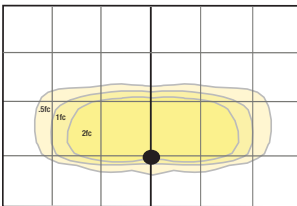
PERFORMANCE DATA

Description	Nominal Wattage	System Watts	Dist. Type	5K (5000K NOMINAL 70 CRI)					4K (4000K NOMINAL 70 CRI)					3K (3000K NOMINAL 80 CRI)				
				Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
24	350mA	28	1	4,075	146	1	0	0	4,065	146	1	0	0	3,660	131	0	0	0
			2	3,747	134	1	0	1	3,738	134	1	0	1	3,366	121	1	0	1
			3	3,756	135	1	0	1	3,747	134	1	0	1	3,374	121	1	0	1
			4	3,656	131	0	0	1	3,647	131	0	0	1	3,284	118	0	0	1
	625mA	49	1	6,329	130	1	0	0	6,313	130	1	0	0	5,685	117	1	0	0
			2	5,820	120	1	0	1	5,806	119	1	0	1	5,228	108	1	0	1
			3	5,833	120	1	0	2	5,819	120	1	0	2	5,240	108	1	0	2
			4	5,678	117	1	0	2	5,664	117	1	0	2	5,100	105	1	0	2
	900mA	71	1	8,613	122	1	0	1	8,592	122	1	0	1	7,737	110	1	0	1
			2	7,921	112	1	0	2	7,902	112	1	0	2	7,115	101	1	0	2
			3	7,939	112	1	0	2	7,920	112	1	0	2	7,131	101	1	0	2
			4	7,728	109	1	0	2	7,709	109	1	0	2	6,942	98	1	0	2
	1100mA	87	1	10,791	124	1	0	1	10,765	124	1	0	1	9,694	112	1	0	1
			2	9,924	114	2	0	2	9,900	114	1	0	2	8,915	103	1	0	2
			3	9,946	115	1	0	2	9,922	114	1	0	2	8,935	103	1	0	2
			4	9,682	112	1	0	2	9,659	111	1	0	2	8,696	100	1	0	2
32	650mA	67	1	8,621	129	1	0	1	8,600	128	1	0	1	7,744	116	1	0	1
			2	7,928	118	1	0	2	7,909	118	1	0	2	7,122	106	1	0	2
			3	7,946	119	1	0	2	7,927	118	1	0	2	7,137	107	1	0	2
			4	7,735	115	1	0	2	7,716	115	1	0	2	6,948	104	1	0	2
	850mA	83	1	10,806	130	1	0	1	10,780	130	1	0	1	9,705	117	1	0	1
			2	9,938	120	2	0	2	9,914	119	1	0	2	8,927	108	1	0	2
			3	9,960	120	1	0	2	9,936	120	1	0	2	8,947	108	1	0	2
			4	9,695	117	1	0	2	9,672	117	1	0	2	8,709	105	1	0	2

PHOTOMETRY

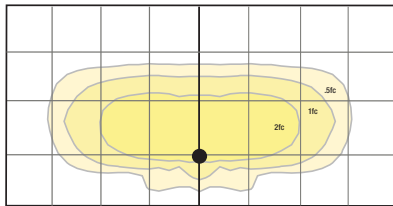
The following diagrams represent the general distribution options offered for this product. For detailed information on specific product configurations, see [website photometric test reports](#).

TRP2-24L-50-4K7-1



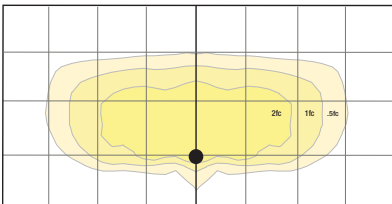
Mounting Height: 15'

TRP2-24L-50-4K7-2



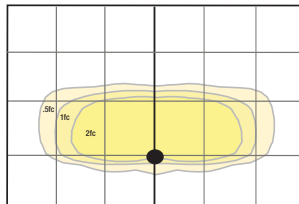
Mounting Height: 15'

TRP2-24L-50-4K7-3



Mounting Height: 15'

TRP2-24L-50-4K7-4

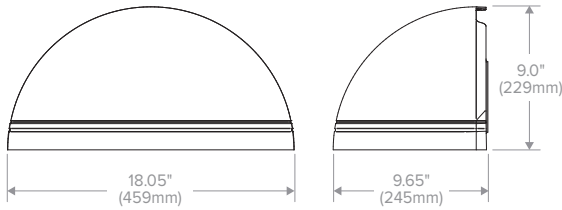


Mounting Height: 15'

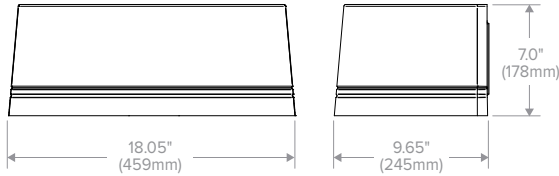
GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

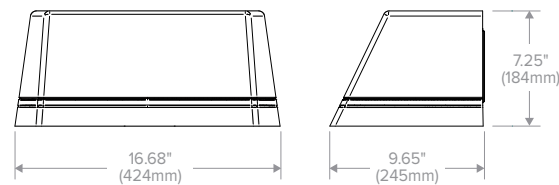
DIMENSIONS



QSP2
Weight:
15 lbs (6.8 kg)



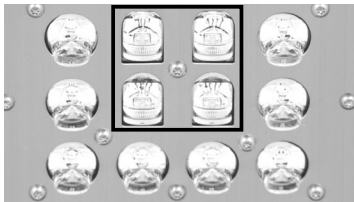
RD12
Weight:
16 lbs (7.3 kg)



TRP2
Weight:
16 lbs (7.3 kg)

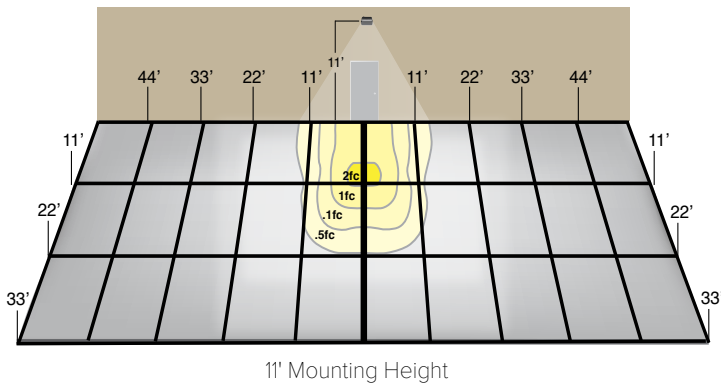
ADDITIONAL INFORMATION (CONT'D)

E & EH EMERGENCY BATTERY BACKUP



24 or 32 high power LEDs generate up to 11,000 lumens in normal mode and use 4 LEDs for up to 700 lumens in emergency mode.

PHOTOMETRICS - BATTERY BACK UP



Provides Life Safety Code average illuminance of 1.0 fc. Assumes open space with no obstructions and mounting height of 11'.

Diagrams for illustration purposes only, please consult factory for application layout.

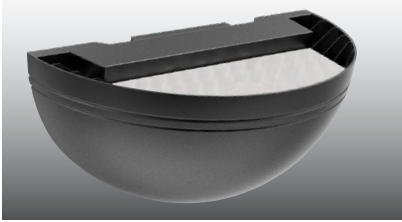
Battery backup units consume 6 watts when charging a dead battery and 2 watts during maintenance charging. EH (units with a heater) consume up to an additional 8 watts when charging if the battery temp is lower than 10°C

GEOPAK Series 2

SIZE 2 - TRP2/QSP2/RD12

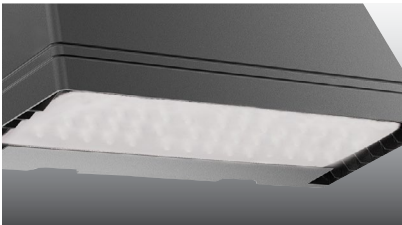
ADDITIONAL INFORMATION (CONT'D)

INVERTED MOUNTING



Inverted mounting capabilities for uplighting applications. Specially designed frosted acrylic diffuser softens output, improves uniformity and prevents water from collecting.

COMFORT SHIELD



Comfort shield option utilizes a frosted acrylic lens that softens output and improves uniformity. Available from the factory or as an accessory for field installation.

CONTROL OPTIONS

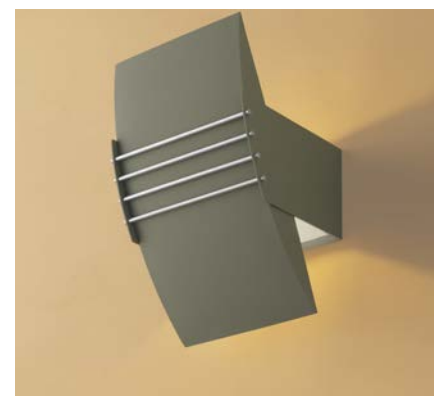
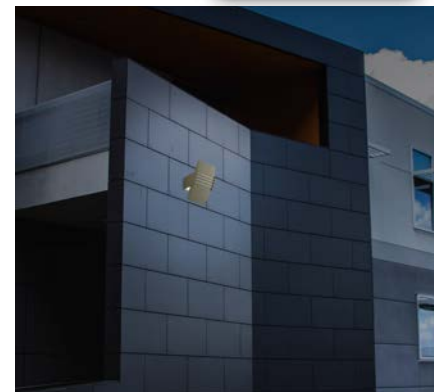
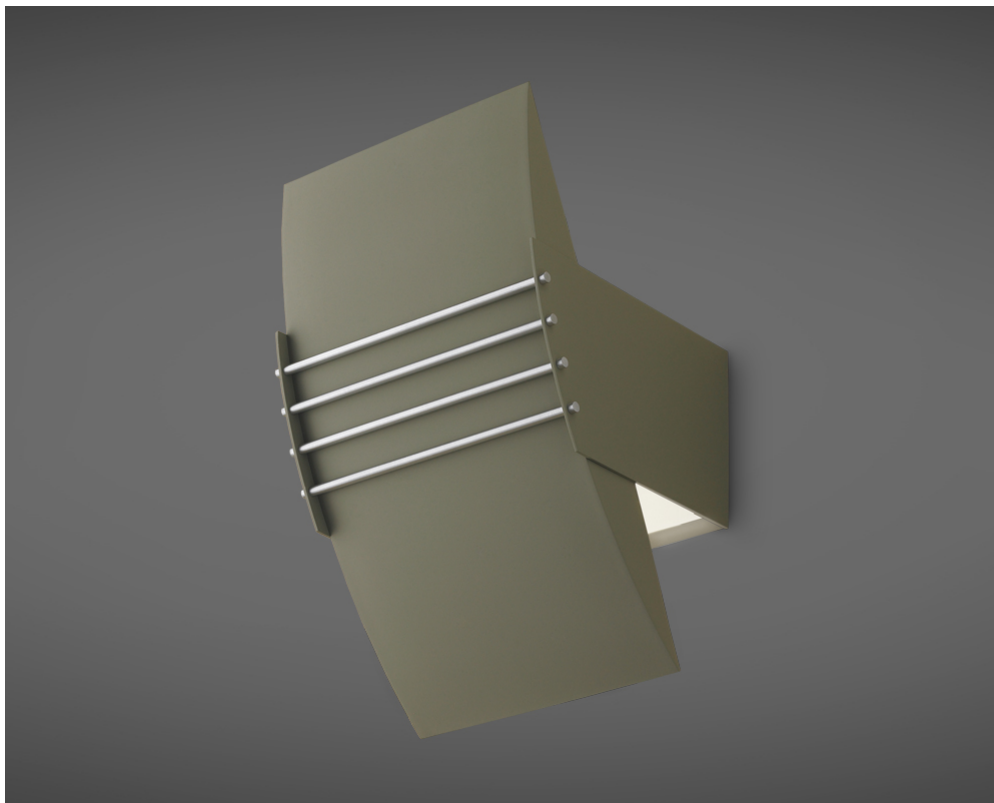


Programmable occupancy sensor offers greater control and energy savings with adjustable delay and dimming levels (Factory default is 10%)

USE OF TRADEMARKS AND TRADE NAMES

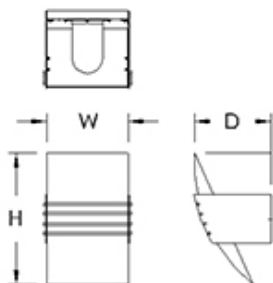
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S9315 Series



DIMENSIONS

SYMBOL



W	H	D	MC	BASE MODEL NO.
11 3/4"	19"	11"	9 5/8"	S9315-L24

SPECIFICATIONS

Driver: 0-10V dimming to 1%, 120/277

Mounting: Mounts to all Standard Electrical Junction Boxes (by others) With Hardware Provided. Silicone Seal Required (by others).

FEATURES

- Solid Aluminum Material
- UL Listed for Wet Location
- LED 0-10V Dimming Driver

ORDER AS A COMPLETE UNIT:

Model No. + Lamp Code + CCT + Finish + Option Code

S9315-L24 + 27K + PT + Option
 30K + BA
 35K
 40K ←

FINISHES

BA Brushed Aluminum **PT** Powder Coated Finishes*

*(Specify Color Code from the list of Powder Coating Finishes [except interior only metallics])

OPTIONS

EML Emergency Battery Pack with LED Lighting (Remote)

LIGHT OUTPUT

LXX = ~ 48 LPW Delivered Lumens (Example: L24= 24 x 48 = 1152 Lumens)

** Try our new **Shimmer Metallic Paints**, Formulated for Exterior Conditions.

UPLIGHT SHINES ONTO SOFFIT OF PORTE COCHERE AND DOES NOT TRESPASS BEYOND ROOF



LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

SYMBOL



LITEISTRY™



FEATURES

- 6" architectural LED downlight delivering 600 – 9000 lm
- Four beam distributions from 0.3 to 1.1 Spacing Criteria
- Quiet reflector appearance with superior 50° optical cutoff
- 2700K – 5000K, 80+ and 90+ CRI options
- Available for New Construction (non-IC), Retrofit (non-IC), IC and Chicago Plenum applications
- Variety of dimming protocol options including 0–10V, DALI, DMX, Lutron Forward Phase, and EcoSystem
- NX Distributed Intelligence™ wired and wireless controls capability available



CONTROL TECHNOLOGY



SPECIFICATIONS

CONSTRUCTION

- Standard Non-IC. Chicago Plenum, IC and Retrofit options
- New Construction: Painted black durable steel platform with pre-installed bar hangers
- Retrofit: Die cast aluminum mounting ring with 5-axis adjustable junction box
- Retrofit housing allows below ceiling installation without removing existing fixture
- Pre-wired junction box with snap-on covers for easy access
- Snap-in connection from driver compartment allows easy installation
- Light Engine connections use plenum rated (CMP) cable

OPTICS

- Visually pleasing 50° cutoff to source and source image
- The light distribution is free of distracting bright spots or pixelation and the perimeter has a smooth transition
- Optical grade silicone lens integral to light engine
- High purity spun aluminum reflector, self-flanged
- Flush Mount flange option with mud-in ring available
- Large selection of anodized finishes and colors
- Painted cones and flange options available

ELECTRICAL

- Chip-on-board LED with 2 SDCM
- Multiple CCTs, 80+ or 90+ CRI
- Long LED life: L90 at >55,000 hours (TM-21)
- Universal voltage 120V–277V driver, 347V optional
- UL Class 2, inherent short circuit and overload protection, RoHS compliant
- Flicker free 0-10V dimming with 1% or <1% performance
- DALI, DMX, and Lutron Forward Phase and EcoSystem options
- NX or Lutron Vive control options available
- Integral and remote controller and battery pack options available
- Refer to additional spec sheets for information on SpectraSync™ Tunable White or Dim-to-Warm or [PowerHUBB™ PoE enabled](#) solutions

INSTALLATION

- Accommodates ceiling thickness up to 2" (SL, ML, HL); up to 1.25" (VL, XL)
- Universal adjustable mounting brackets also accept 0.5" EMT conduit or 1.5" or 0.75" lathing channel (by others) or Prescolite accessory bar hangers (B24 or B6).
- Light Engine/Driver fully serviceable from above or below the ceiling

RELATED PRODUCTS

Ø 3" LITEISTRY Family

Ø 4" LITEISTRY Family

Ø 6" LITEISTRY Family

CERTIFICATIONS

- cCSAus certified to UL 1598
- For ≥70L: Marked spacing required 36" fixture center to center; 36" fixture center to building member; 0.5" above fixture
- Suitable for wet locations, covered ceiling
- EM/EMR: Certified under UL 924 standard for emergency lighting and power equipment
- Approved for 8 (4 in/4 out) No. 12AWG conductors rated for 90°C through wiring
- ENERGY STAR® certified models available (See list and additional information on page 8)

WARRANTY

- 5 year warranty
- See [HLI Standard Warranty](#) for additional information

KEY DATA	
Lumen Range	600-9000
Wattage Range	8-99
Efficacy Range (LPW)	94-104*
Reported Life (Hours)	L90 / >55,000
Input Current (mA)	65-825 (120V)

*Based on Specular, 35K, 80 CRI



LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

DATE: _____ LOCATION: _____

TYPE: _____ PROJECT: _____

CATALOG #: _____

ORDERING GUIDE

Example: LTR-6RD-H-SL10L-DM1-LTR-6RD-T-SL35K8MDS

CATALOG #

HOUSING

LTR-6RD-H		Lumen Package		Lumen Output		Driver Options ³		Control Options		Voltage		Housing Options ¹¹									
Aperture/Shape/Function																					
LTR-6RD-H	6" Round Downlight New Construction Housing	SL	Standard Lumen	06L	600	DM1	0-10V Dimming to 1%	NXE	NX Enabled, Dual SmartPorts ⁴	Standard	120-277V	CP	Chicago Plenum ⁹								
				10L	1000									DMO1	0-10V Dimming to < 1%	NXWE	NX Wireless Enabled ⁴	34	347V ⁸	IC	IC rated ¹⁰
				15L	1500																
LTR-6RD-RFH	6" Round Downlight Retrofit Housing ¹⁷	ML	Medium Lumen	20L	2000	DMX	DMX with RDM dimming to < 0.1% ³	NXWD	NX Wireless Enabled, Dual SmartPorts ⁴			EM	Emergency Battery Pack with integral test switch and indicator light								
				25L	2500									DALI	DALI Dimming to 1%	LV	Lutron Vive Enabled, 0-10V (requires 0-10V driver)	EMR	Emergency Battery Pack with remote test switch and indicator light		
				30L	3000																
				35L	3500																
LTR-6RD-RFHW	6" Round Downlight Retrofit Housing (for Wide Diameter) ¹⁷	HL	High Lumen	40L	4000	2DM	Lutron Hi-Lume 2-wire Dimming to 1% (120V Forward Phase only) ³	LVE	Lutron Vive Enabled, EcoSystem, (requires EDM)			DTS	Device Transfer Switch								
				45L	4500									EDM	Lutron Hi-Lume EcoSystem Dimming to 1% ³	GTD	Generator Transfer Device				
				50L	5000																
				55L	5500																
				60L	6000																
XL	Extra high Lumen ¹⁵	70L	7000	F	Fuse																
		80L	8000																		
		90L	9000																		

TRIM

LTR-6RD-T		Lumen Package		CCT		CRI		Distribution	
Aperture/Shape/Function									
LTR-6RD-T	6" Round Downlight Light Engine/Trim Assembly	SL	Standard Lumen	27K	2700K	8	80+CRI	NR	Narrow (0.3 SC)
		ML	Medium Lumen	30K	3000K	9	90+CRI	MD	Medium (0.6 SC)
		HL	High Lumen	35K	3500K			WD	Wide (0.9 SC)
		VL	Very High Lumen	40K	4000K			XW	Extra Wide (1.1 SC)
		XL	Extra High Lumen ¹⁵	50K	5000K ²				

TRIM CONTINUED

Reflector Finish		Reflector Color		Flange Color Options		Lower Trim Options		Reflector Options	
<i>Finish not applicable with painted reflectors (WC or BC)</i>		Standard Clear		Standard matches reflector color		EM Pre-punched reflector for EM integral test switch and indicator		AM Antimicrobial Coating ⁶	
S	Specular	CG	Champagne Gold	WT	White Flange ⁵	FM	Flush Mount Mud-in Ring ¹²		
SS	Semi-Specular	BL	Black	BT	Black Flange ⁵	WF	Wide Flange		
MFC	American Matte™	LW	Light Wheat						
VS	Softglow®	PW	Pewter						
VSS	SoftSheen™	WC	Painted White Cone and Flange						
		BC	Painted Black Cone and Flange						

Notes:

- 1 RFH and RFHW available up to 30L; not available with Controls or Housing options.
- 2 5000K available in 80+ CRI only.
- 3 2DM, EDM, DMX available in 10L-35L. DMO1, DALI not available on >55L.
- 4 NX requires DM1 driver option, not available on >60L.
- 5 WT not needed for WC, BT not needed for BC.
- 6 Clear reflector or WC only, consult factory for other colors.
- 7 See line art for compatibility with existing aperture diameters.
- 8 347V requires DM1 driver option; available 10L - 60L not available with Controls, F, GTD, DTS, EM, EMR.
- 9 CP available up to 20L; not available with DMX, Controls, or EMR options.
- 10 IC available up to 20L; not available with Controls options.
- 11 Housing options (except Fuse) not available in combination.
- 12 Flush Mount Flange (FM) requires FMR accessory (sold separately).
- 13 DM1 on >60L is 0-10V to 5% dimming.
- 14 Not for use with Retrofit housings (RFH/RFHW)
- 15 XL (70L-90L) require marked spacing. See line art for more details.

Accessories

- B24** Set of two (2) 24" bar hangers for T-bar ceilings¹⁴
- B6** Set of two bar hangers for ceiling joist up to 24" centers¹⁴
- FMR6-R** Flush Mount Mud-In Ring, 6" Round
- LiteGear** LiteGear® Inverter, 125VA-250VA
- LPS Series** LightPower Micro-Inverter, 20VA-55VA

LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

DATE:	LOCATION:
TYPE:	PROJECT:
CATALOG #:	

CONTROLS

NX Distributed Intelligence™ Lighting Controls:

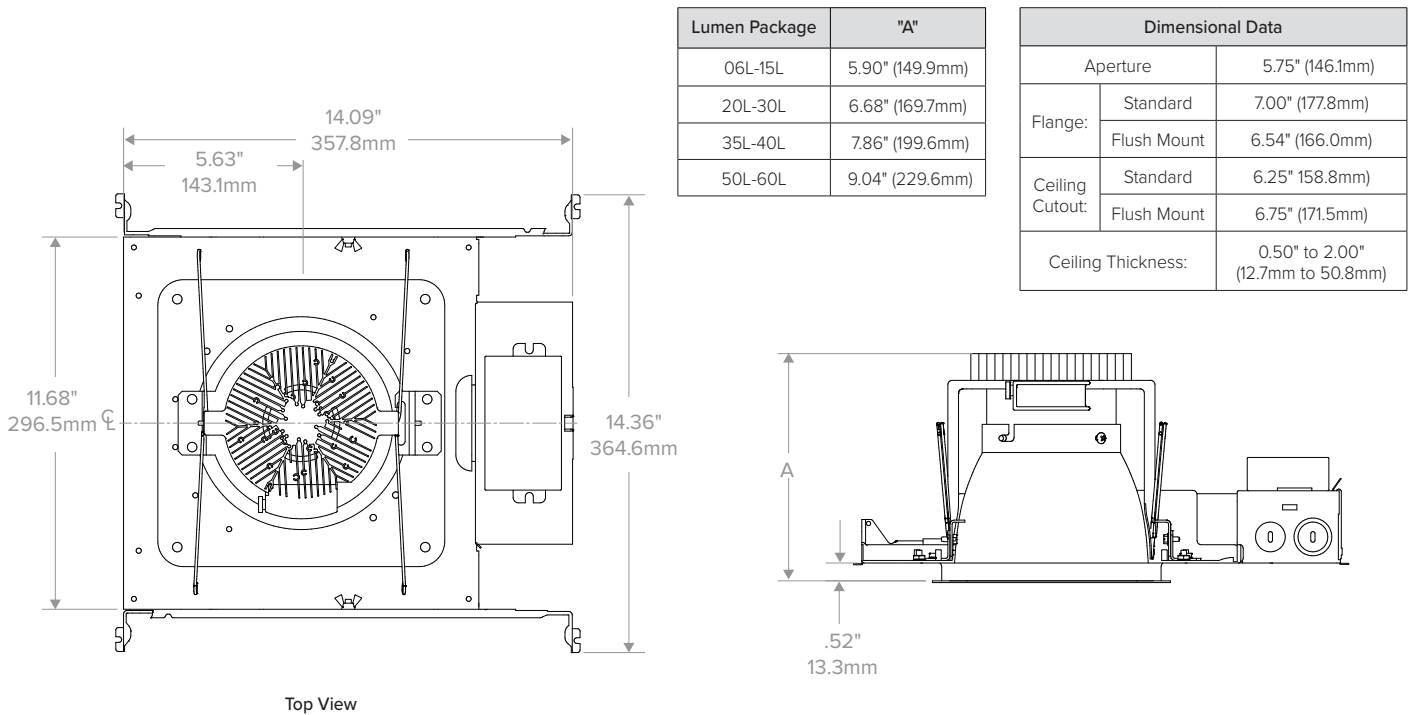
Supports applications in a variety of deployment options- wired, wireless, hybrid. Integrates with and enables a wide array of luminaires including those with SpectraSync™ Color Tuning Technology.



NX INTEGRATED CONTROLS REFERENCE								
NX Option	Sensor	Networkable	Scheduling	Occupancy	Daylight Harvesting	0-10V Dimming	On/off Control	Bluetooth® App Programming
NX Networked – Wired								
NXE	N/A	Yes	Yes	No	No	Yes	Yes	Requires NXBTC/R ¹
NX Networked – Wireless								
NXWE ²	N/A	Yes	Yes	No	No	Yes	Yes	No ³
NX Networked – Wired/Wireless								
NXWD	N/A	Yes	Yes	No	No	Yes	Yes	Requires NXBTC/R ^{1,3}

- 1 NXBTC/R needs to be plugged into an available NX SmartPort™ on the fixture network
- 2 Programming via App requires factory assistance
- 3 To program NXWE option, need to consult factory. If connected to an area controller, programming can be done from that

DIMENSIONS



LTR-6RD-H (06L - 60L) New Construction

LTR-6RD

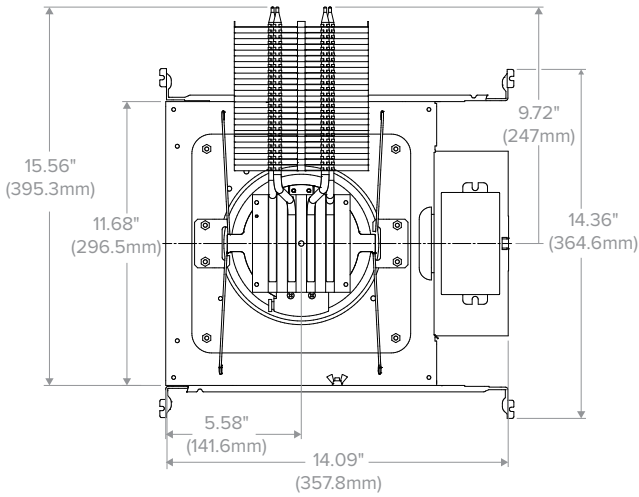
LITEISTRY 6" ROUND DOWNLIGHT

DATE: _____ LOCATION: _____

TYPE: _____ PROJECT: _____

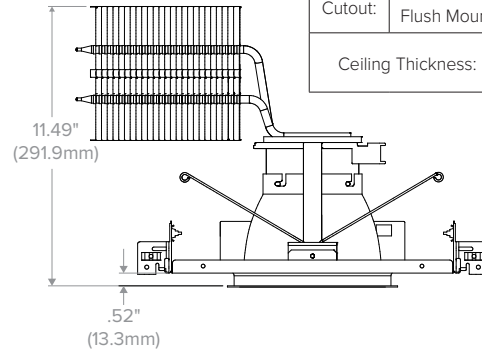
CATALOG #: _____

DIMENSIONS CONTINUED



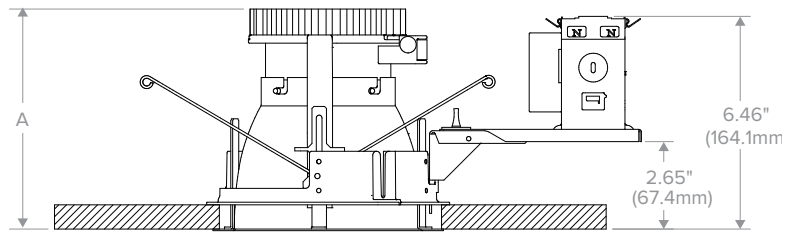
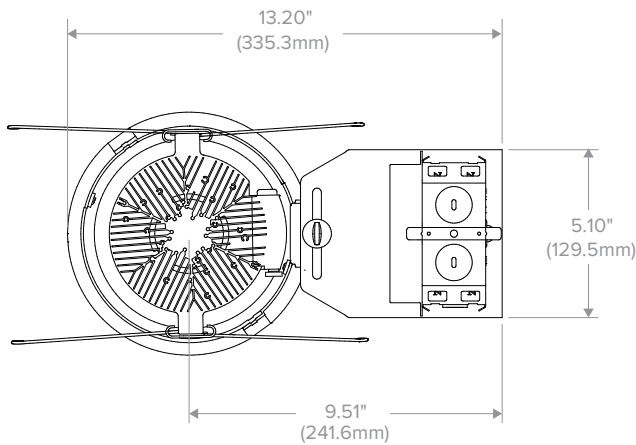
Top View

Marked spacing required:
36" fixture center to center;
36" center to building member;
0.50" above fixture



Dimensional Data		
Aperture		5.75" (146.1mm)
Flange:	Standard	7.00" (177.8mm)
	Flush Mount	6.54" (166.0mm)
Ceiling Cutout:	Standard	6.25" (158.8mm)
	Flush Mount	6.75" (171.5mm)
Ceiling Thickness:		0.50" to 1.25" (12.7mm to 31.8mm)

LTR-6RD-H (70L - 90L) New Construction



Housing Compatibility Guide			
Existing Frame Opening**		Use Housing	Use Flange Option
MIN	MAX		
6.25" (156.3mm)	6.50" (165.1mm)	-RFH	(Standard)
6.63" (168.4mm)	6.88" (172mm)	-RFHW	WF

**Measure the existing plaster frame opening at its narrowest point

Dimensional Data		
Aperture		5.75" (146.1mm)
Flange:	Standard	7.00" (177.8mm)
	Flush Mount	6.54" (166.0mm)
	Wide (WF)	7.75" (196.9mm)
Ceiling Cutout:	Standard	6.25" (158.8mm)
	Flush Mount	6.75" (171.5mm)
Ceiling Thickness:		0.50" to 2.00" (12.7mm to 50.8mm)

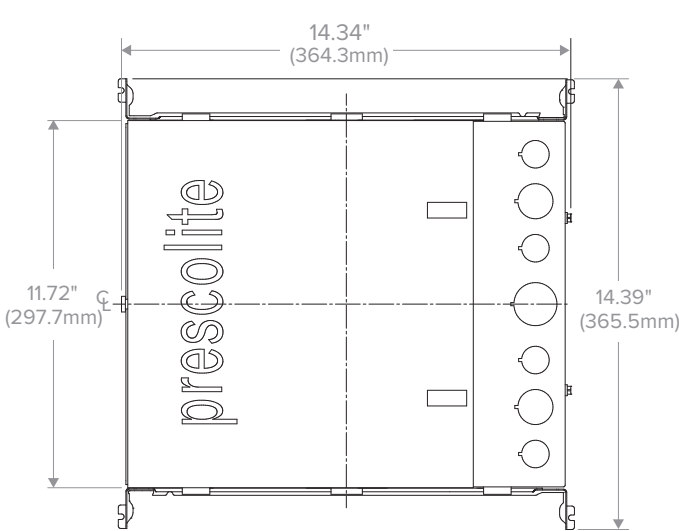
Lumen Package	"A"
06L-15L	5.90" (149.9mm)
20L-30L	6.68" (169.7mm)

LTR-6RD-RFH/-RFHW

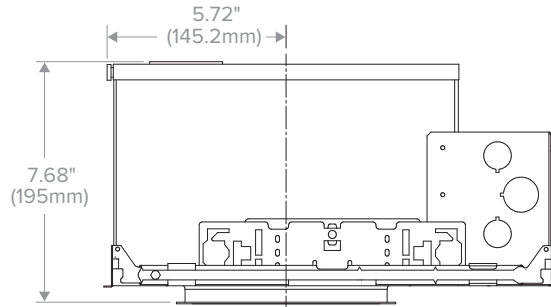
LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

DIMENSIONS CONTINUED



LTR-6RD-IC



Dimensional Data		
Aperture		5.75" (146.1mm)
Flange:	Standard	7.00" (177.8mm)
	Flush Mount	6.54" (166.0mm)
Ceiling Cutout:	Standard	6.25" 158.8mm)
	Flush Mount	6.75" (171.5mm)
Ceiling Thickness:		0.50" to 2.00" (12.7mm to 50.8mm)

PHOTOMETRY

LTR-6RD-H-ML20L-DM1 / LTR-6RD-T-ML35K8NRS

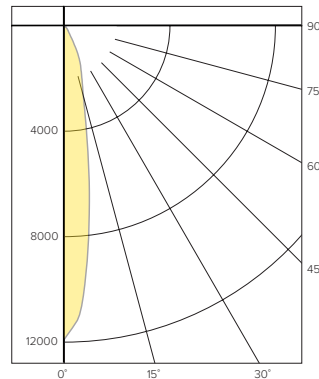
LUMINAIRE DATA

Test No.	19.00588
Description	2000 lm, Narrow, 3500K, 80 CRI
Delivered Lumens	2355
Watts	22.6W
Efficacy	104.0
Mounting	Recessed
Spacing Criterion	0.3
Beam Angle (FWHM)	18

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	2290	97.2
0-60	2355	100.0
0-90	2355	100.0
0-180	2355	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	11881
5	9399
15	2776
25	1236
35	255
45	74
55	0
65	0
75	0
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	6247
55°	0
65°	0
75°	0
85°	0

*Candela/Square Meter

LTR-6RD-H-ML20L-DM1 / LTR-6RD-T-ML35K8MDS

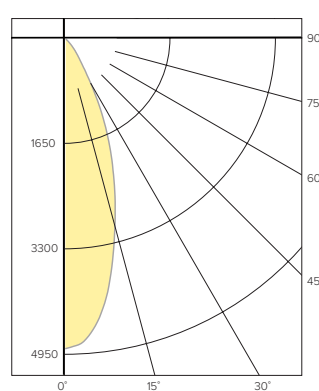
LUMINAIRE DATA

Test No.	19.00587
Description	2000 lm, Medium, 3500K, 80 CRI
Delivered Lumens	2265
Watts	22.6W
Efficacy	100.0
Mounting	Recessed
Spacing Criterion	0.6
Beam Angle (FWHM)	37

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	2171	95.9
0-60	2262	99.9
0-90	2265	100.0
0-180	2265	100.0

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	4851
5	4619
15	3007
25	1450
35	386
45	99
55	6
65	2
75	1
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	8357
55°	624
65°	282
75°	231
85°	0

*Candela/Square Meter

LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

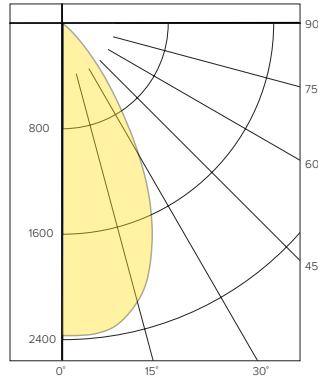
PHOTOMETRY CONTINUED

LTR-6RD-H-ML20L-DM1 / LTR-6RD-T-ML35K8WDS

LUMINAIRE DATA

Test No.	19.00585
Description	2000 lm, Wide, 3500K, 80 CRI
Delivered Lumens	2180
Watts	22.6W
Efficacy	96.1
Mounting	Recessed
Spacing Criterion	0.9
Beam Angle (FWHM)	59

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	2368
5	2371
15	2189
25	1591
35	726
45	177
55	10
65	3
75	1
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	14942
55°	1041
65°	424
75°	231
85°	0

*Candela/Square Meter

ZONAL LUMEN SUMMARY

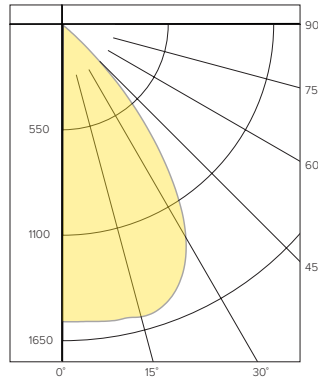
Zone	Lumens	% Luminaire
0-40	2014	92.4
0-60	2176	99.8
0-90	2180	100.0
0-180	2180	100.0

LTR-6RD-H-ML20L-DM1 / LTR-6RD-T-ML35K8XWS

LUMINAIRE DATA

Test No.	19.00586
Description	2000 lm, Extra Wide, 3500K, 80 CRI
Delivered Lumens	2139
Watts	22.7W
Efficacy	94.4
Mounting	Recessed
Spacing Criterion	1.1
Beam Angle (FWHM)	76

POLAR GRAPH



CANDELA DISTRIBUTION

Degree	Candela
0	1547
5	1552
15	1576
25	1461
35	1007
45	301
55	9
65	3
75	1
85	0
90	0

LUMINANCE DATA*

Vertical Angle	Average
45°	25409
55°	937
65°	424
75°	231
85°	0

*Candela/Square Meter

ZONAL LUMEN SUMMARY

Zone	Lumens	% Luminaire
0-40	1875	87.7
0-60	2134	99.8
0-90	2139	100.0
0-180	2139	100.0

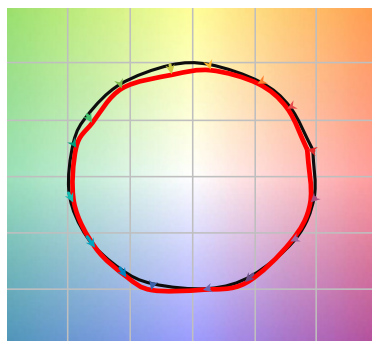
LUMEN MULTIPLIER

Option	27K8	30K8	35K8	40K8	50K8	27K9	30K9	35K9	40K9
Multiplier	0.94	0.98	1.00	1.01	1.02	0.81	0.84	0.85	0.85

Photometrics are published below at a nominal 3500 Kelvin, 80+ CRI. This table may be used to approximate the lumen values at different Kelvin temperatures. Power consumption would stay the same.

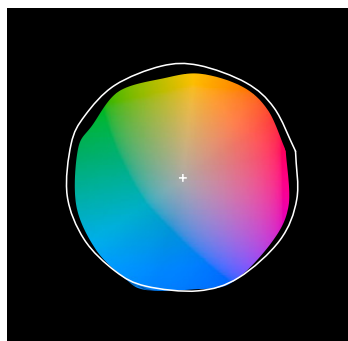
TM-30 DATA

COLOR VECTOR GRAPHIC 3500K, 90 CRI



— Reference Illuminant — Test Source

COLOR DISTORTION GRAPHIC 3500K, 90 CRI



TEST RESULTS - 3500K		
Value	80+ CRI	90+ CRI
R _f	84	88
R _g	95	95
CCT (K)	3411	3419
D _{uv}	0.0015	0.0042
x	0.4120	0.4147
y	0.3974	0.4052
CIE R _a	84	93
CIE R _g	11	62

LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

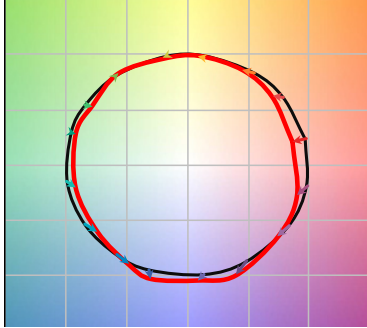
DATE: _____ LOCATION: _____

TYPE: _____ PROJECT: _____

CATALOG #: _____

TM-30 DATA CONTINUED

COLOR VECTOR GRAPHIC
3500K, 80 CRI



— Reference Illuminant — Test Source

COLOR DISTORTION GRAPHIC
3500K, 80 CRI



ELECTRICAL DATA

DRIVER DATA		
Input Voltage	120-277 V	347 V
Input Frequency	50/60 Hz	50/60 Hz
Power Factor	≥0.90	≥0.90
THD	<20%	<20%
EMI Filtering (FCC 47 CFR Part 15)	Class A	Class A

* Values for DMI option shown, values for other dimming options may vary.

WATTAGE DATA		
Lumen Output	Nominal Lumens	WATTAGE
06L	600	8
10L	1000	12
15L	1500	19
20L	2000	23
25L	2500	28
30L	3000	35
35L	3500	43
40L	4000	52
45L	4500	55
50L	5000	49
55L	5500	54
60L	6000	61
70L	7000	72
80L	8000	85
90L	9000	99

* Wattage may vary based on configuration and options selected



LTR-6RD

LITEISTRY 6" ROUND DOWNLIGHT

DATE: _____ LOCATION: _____

TYPE: _____ PROJECT: _____

CATALOG #: _____

ADDITIONAL INFORMATION

DIMMING COMPATIBILITY CHART		
Dimming Driver	Manufacturer	Web Link
DM1 /DM01	Lutron DDTV	http://bit.ly/1ljSvZg
DM1	Leviton AWRMG-7xx, AWSMG-7xx, AWSMT-7xx	http://bit.ly/1BJn2R9
EDM	Lutron	http://bit.ly/1vtjHAI
2DM	Lutron	http://bit.ly/1S4WjXK

DMX

See instruction sheet on www.prescolite.com for connection & installation information.

Central Inverters

For full fixture output in back-up mode, we recommend you visit www.dual-lite.com for your Central Lighting Inverter options. Please contact your local Hubbell representative for any assistance with proper sizing and loading of your inverter selection. Central lighting inverters must be ordered separately.

LiteGear: www.dual-lite.com/products/litegear_lg_series

LPS Series: www.dual-lite.com/products/lps

ENERGY STAR®

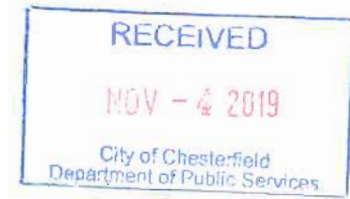
The following stock items are ENERGY STAR® certified models. (See www.energystar.gov for more details.)

ENERGY STAR® Certified Models
LTR-6RD-H-SL10L-DM1 + LTR-6RD-T-SL35K8WDSS
LTR-6RD-H-SL10L-DM1 + LTR-6RD-T-SL35K8WDSSWT
LTR-6RD-H-SL15L-DM1 + LTR-6RD-T-SL35K8WDSS
LTR-6RD-H-SL15L-DM1 + LTR-6RD-T-SL35K8WDSSWT
LTR-6RD-H-ML20L-DM1 + LTR-6RD-T-ML35K8WDSS
LTR-6RD-H-ML20L-DM1 + LTR-6RD-T-ML35K8WDSSWT
LTR-6RD-H-ML30L-DM1 + LTR-6RD-T-ML35K8WDSS
LTR-6RD-H-ML30L-DM1 + LTR-6RD-T-ML35K8WDSSWT
LTR-6RD-H-HL40L-DM1 + LTR-6RD-T-HL35K8WDSS
LTR-6RD-H-HL40L-DM1 + LTR-6RD-T-HL35K8WDSSWT
LTR-6RD-H-VL60L-DM1 + LTR-6RD-T-VL35K8WDSS

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November 1, 2019

Mr. Chris Dietz
City of Chesterfield
600 Chesterfield Parkway West
Chesterfield, MO 63017



RE: Fairfield Suites – Parking Demand Study
1065 East Chesterfield Parkway
Chesterfield, MO 63017
G&W Project No: CV18-0409.00

Mr. Dietz,

As you are aware, G&W Engineering is the civil engineer for the proposed project located at 1065 East Chesterfield Parkway. The existing 2.84-acre site has two buildings presently located on the tract of land. There is an existing 3-story hotel and a one-story former restaurant, with the former restaurant building slated to be demolished in order to allow for construction of a new hotel and parking facilities. The new hotel is planned to be 4-stories and will be connected to the existing hotel to create a dual-branded facility, Fairfield Suites by Marriott and Springhill Suites by Marriott, with a shared entry lobby. The existing hotel will be renovated as well.

It is notable that Chesterfield Village Lodging, LLC has maintained ownership of the existing 98-unit Springhill Suites for over twenty years and enjoyed a measure of success with the site to the extent that they are proposing such a major expansion. Due to their extensive history with the site, Chesterfield Village Lodging, LLC has a firm grasp on the demand for quality hotel rooms in the area, and the associated parking needs.

We are requesting your consideration to allow a parking reduction for the proposed Fairfield Suites/Springhill Suites. This parking reduction would be pursuant to the City's *Unified Development Code, Article 04 Development Requirements and Design Standards, Section 31-04-04 Off-street parking, stacking and loading space requirements*. Item 7. Minimum parking and loading requirements for commercial uses states the following requirements for hotel use:

1.2 parking spaces for each unit. If there are other accessory uses provided therein, additional off-street parking shall be provided for those accessory uses at the rate of 40% of the requirements for such uses.

Required parking for this project:

180 units x 1.2 = 216 parking spaces

Proposed parking for this project:

We are proposing 180 parking spaces, which includes 35 spaces in the lower level of the proposed new hotel, and also includes 5 accessible spaces.

This results in our request for a 36-space reduction, or a 17% ($36/216 = 0.17$) reduction of the requirement.

It is our opinion that the amount of parking that is proposed will serve the needs of the proposed hotels.

For your information, Marriot "Design Requirements" provides for one space per guest room, which is the standard requirement for many other hotel franchises as well. Below is an excerpt from the Fairfield Inn & Suites by Marriott Design Standards:

- C. Parking Spaces:** Provide one space per guestroom, dedicated to hotel use; include additional spaces to support expanded meeting and event activities.
1. Size (Standard Spaces): 9'-0" x 18'-0"; no wheel stops.
 2. Accessible Spaces: Comply with governing regulations for quantity, size and configuration.
 - a. Distribute spaces proximate to hotel entrances, so guests are not required to cross the drive aisles to access the building.
 - b. Distribute required quantities at building entrances.
 - c. Provide depressed curbs where accessible spaces are located, to facilitate access to sidewalks and building entries.
 - d. Do not use wheel stops.

The owner anticipates an average hotel occupancy of 70%, or 126 units/parking spaces being used by patrons.

There currently exists a Metro – St Louis bus stop on the project property, which will remain. Historically, a large portion of the current hotel staff has utilized this available means of public transit and the same is expected for the new hotel as well.

The Chesterfield Unified Development Code also gives the requirement for the number of loading spaces based on the gross floor area. Below is the Table B from the UDC showing the required number loading spaces:

Gross Floor Area (square feet)	Number of Loading Spaces	
	10 Feet By 25 Feet Minimum	10 Feet By 40 Feet Minimum¹
2,000 - 10,000	1	—
10,001 - 25,000	2	—
25,001 - 100,000	2	1
For each additional 100,000	—	1 additional

This project has a gross floor area of 106,590 square feet which requires two (2) 10' x 25' and one (1) 10' by 40' loading spaces. We are proposing two (2) 10' x 25' loading spaces and none of the larger 10' x 40' loading spaces. The owner has historically not received deliveries from the larger vehicles for the existing hotel and

does not expect the need to arise with the new hotel. Therefore, we are asking for consideration to eliminate the one (1) 10' x 40' loading space required.

Attached are two (2) examples of Marriott hotels in the Chesterfield area, each providing parking at one space per unit. TownePlace Suites by Marriott is located at 748 Premium Way in the Chesterfield Valley, and Courtyard by Marriott is located at 17369 Chesterfield Airport Road, also in the valley.

We respectfully request your consideration for this project to be served by the reduced number of parking and loading spaces as quantified above.

Thank you for your help in making this quality development in the City of Chesterfield.

Sincerely,



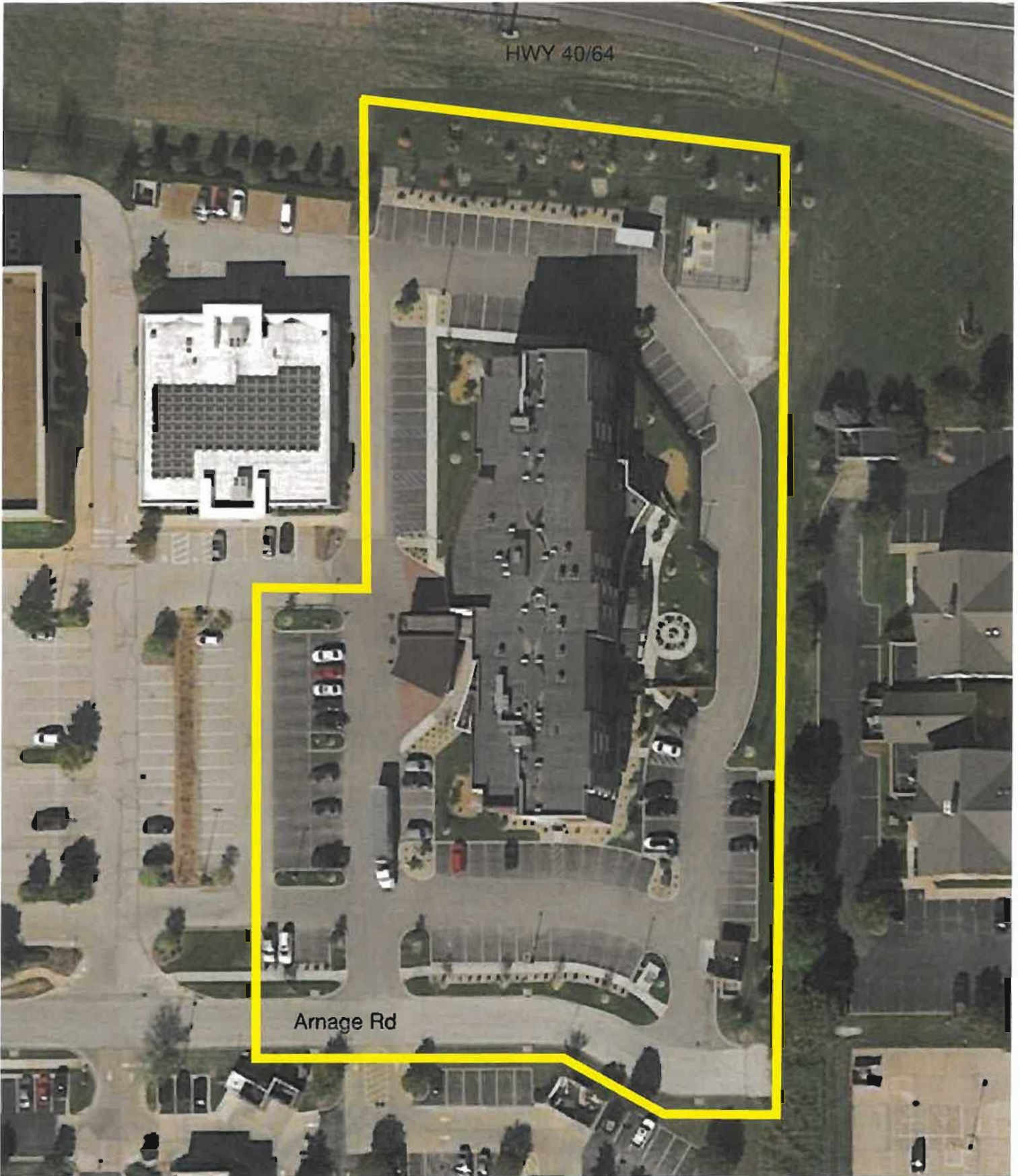
Andy Sutton
Project Manager



Todd B. Scheibe, PE
Operations Manager - Civil



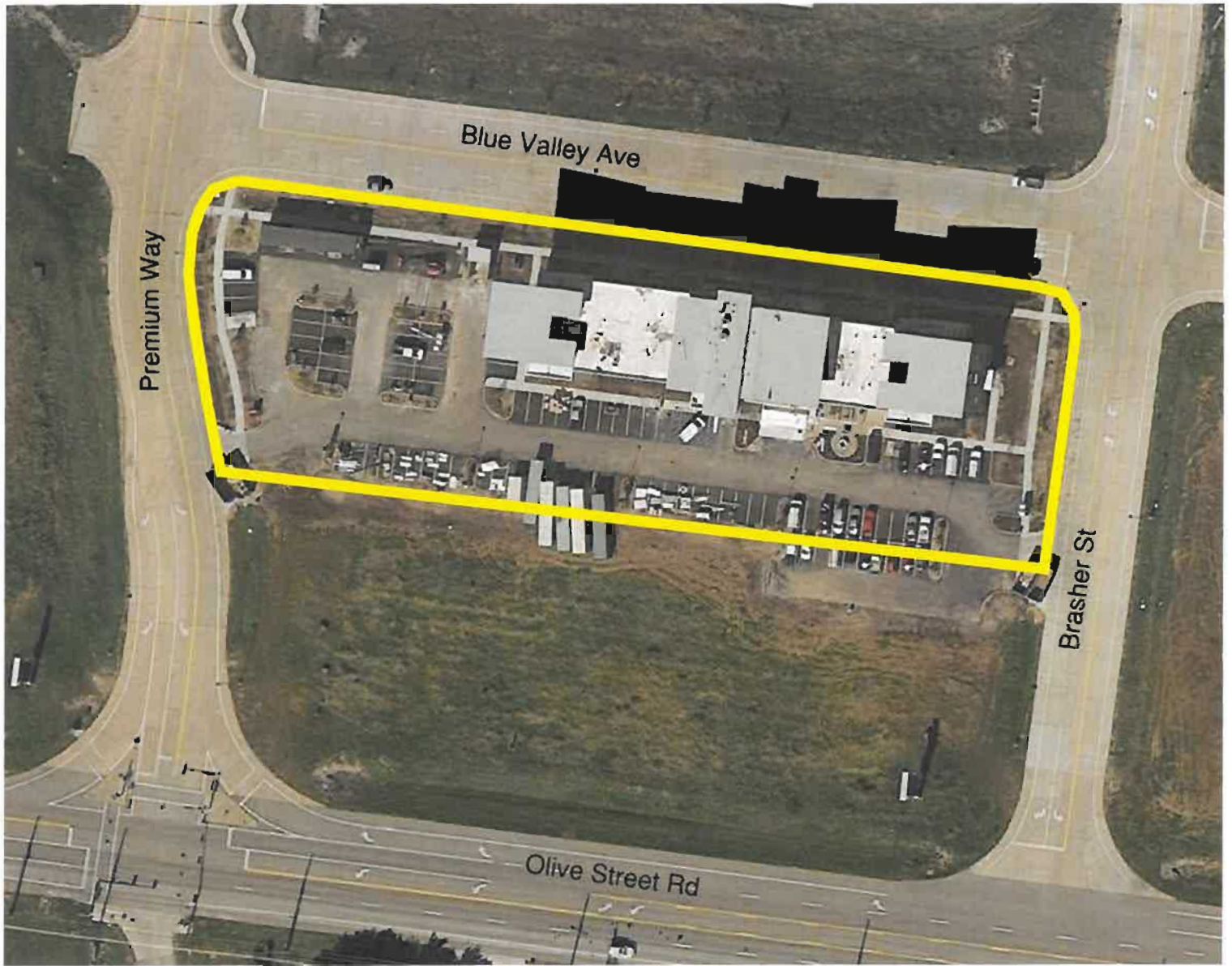
HWY 40/64



Arnage Rd

Courtyard by Marriott

17369 Chesterfield Airport Rd
112 units and meeting room, 122 spaces
1.09 spaces per unit



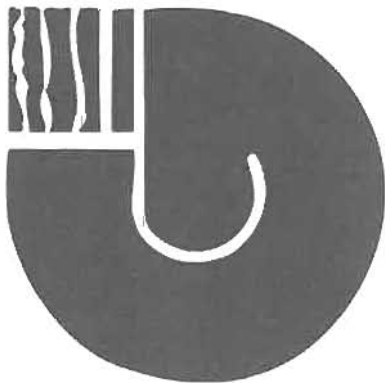
TownePlace Suites by Marriott

748 Premium Way

112 units and meeting room, 116 spaces

1.03 spaces per unit

GEOTECHNOLOGY INC
FROM THE GROUND UP



**GEOTECHNICAL EXPLORATION
SPRINGHILL SUITES EXPANSION
CHESTERFIELD, MISSOURI**

Prepared for:
**OTIS & CLARK PROPERTIES
ST. LOUIS, MISSOURI**

Prepared by:
**GEOTECHNOLOGY, INC.
ST. LOUIS, MISSOURI**

Date:
OCTOBER 18, 2019

Geotechnology Project No.:
J035393.01

**SAFETY
QUALITY
INTEGRITY
PARTNERSHIP
OPPORTUNITY
RESPONSIVENESS**



October 18, 2019

Mr. James J. Otis II
Otis & Clark Properties
1850 Craigshire Road, Suite 103
St. Louis, Missouri 63146

Re: Geotechnical Exploration
SpringHill Suites Expansion
Chesterfield, Missouri
Geotechnology Project No. J035393.01

Dear Mr. Otis:

Presented in this report are the results of our geotechnical exploration performed by Geotechnology, Inc. for the referenced project. The report includes our understanding of the project, observed site conditions, conclusions and/or recommendations, and support data as listed in the Table of Contents.

We appreciate the opportunity to provide geotechnical services for this project. If you have any questions regarding this report, or if we can be of additional service, please do not hesitate to contact us.

Respectfully submitted,

GEOTECHNOLOGY, INC.

Dennis F. Boll, P.E., R.G.
Principal Engineer

DFB/BJS/DWG:dfb/aat

Copies submitted: (2) hard copy
(1) pdf



Brian J. Sanders, P.E.
Project Manager



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EXECUTIVE SUMMARY

The executive summary is provided solely for the purpose of overview and a number of details are omitted, each of which could be crucial to the recommended application of this report. Parties who rely on this report should read the entire report.

- The project consists of expansion of the SpringHill Suites hotel in Chesterfield, Missouri. The expansion will include a 60- by 200-foot, four-story hotel addition atop a lower-level garage.
- Detailed loading information was not provided for the proposed structure. For the purpose of this report, maximum column loads of 250 kips and maximum wall loads of 5 kips per foot were assumed.
- The stratigraphy consists generally of fat clay fill to approximately depths of 5 to 8 feet, underlain by naturally occurring medium stiff, silt and lean clay soils. Stiff, fat clay soil occurs at an approximate depth of 17 feet. Auger refusal on apparent bedrock occurred at approximately 25 feet. Groundwater was observed at approximately 23.5 feet in one boring.
- The basement excavation will expose fat clay fill that must be overexcavated and replaced with compacted fill before building the structure. Geotechnology also recommends removing and replacing at least 1 foot of the fat clay fill where present in pavement areas.
- Shallow foundations can be used to support the proposed structure. However, ground improvement in the form of aggregate piers is needed to reduce settlement to tolerable amounts.
- Based on the results of the borings, our local knowledge of the soil conditions and the general procedures of the 2009 Edition of the International Building Code (IBC), the soil profile at the project site can be defined as Class C (Very Dense Soil and Soft Rock).
- Underground stormwater detention is proposed in the southern portion of the property. Field infiltration testing indicates the site soils do not allow infiltration of detained water.

**GEOTECHNICAL EXPLORATION
SPRINGHILL SUITES EXPANSION
CHESTERFIELD, MISSOURI**

October 18, 2019 | Geotechnology Project No. J035393.01

1.0 INTRODUCTION

Geotechnology, Inc. prepared this geotechnical report for the SpringHill Suites hotel expansion in Chesterfield, Missouri. The services documented in this report were provided in general accordance with the terms and scope of services described in Geotechnology's Proposal No. P035393.01 dated September 5, 2019.

The purpose of our services was to provide geotechnical recommendations for design and construction of the proposed hotel expansion. Our scope of services included review of previous geotechnical reports, site reconnaissance, geotechnical borings, laboratory testing, engineering analyses, and preparation of this report.

A copy of "Important Information about This Geotechnical-Engineering Report," published by the Geotechnical Business Council (GBC) of the Geoprofessional Business Association (GBA), is included in Appendix A for your review. The publication discusses report limitations and ways to manage risk associated with subsurface conditions.

2.0 PROJECT INFORMATION

The project consists of the expansion of the existing SpringHill Suites located at 1065 Chesterfield Parkway East in Chesterfield, Missouri. The site location and general topography of the area from the U.S.G.S. map of the vicinity are shown on Figure 1 in Appendix B.

The expansion will include a 60- by 200-foot, four-story hotel addition atop a lower-level garage. The addition will abut the southwest end of the existing hotel, which is at-grade, to form an L-shaped footprint. Geotechnology reviewed the geotechnical report¹ for the existing hotel and restaurant.

The proposed structure is anticipated to be wood-framed with a concrete podium and brick veneer. Detailed loading information was not provided for the structure. We assumed maximum column loads and wall loads of 250 kips and 5 kips per lineal foot, respectively. Underground stormwater detention is proposed in the southern portion of the property.

¹ Geotechnical Investigation for Fairfield Suites Hotel, Chesterfield, Missouri. Prepared for Otis & Clark Properties, St. Louis, Missouri, by Reitz & Jens, Inc., dated April 10, 1997.



The site of the proposed redevelopment currently contains asphalt parking and a single-story, brick restaurant which will be razed. The topography slopes downward to the south with an approximate relief of 9 feet. The proposed grading plan indicates 2 to 5 feet of fill will be placed on the redevelopment; however, the south end will remain close to existing grades.

3.0 GEOTECHNICAL EXPLORATION

3.1 Geotechnical Exploration

The geotechnical exploration consisted of drilling six borings, designated as B-1 through B-6, at approximately the locations shown on Figure 2 in Appendix B. The borings were drilled to approximate depths of 5 to 25 feet using a truck-mounted CME 85 rotary drill rig equipped with hollow stem augers. Standard Penetration Tests (SPTs) were performed using automatic hammers. Split-spoon samples and relatively undisturbed Shelby tube samples were obtained at the depths indicated on the boring logs presented in Appendix C. A legend of the terms and symbols used on the boring logs are included in Appendix C.

An engineer from Geotechnology provided direction during field exploration, observed drilling and sampling, assisted in obtaining samples, and prepared field logs of the material encountered. Included on each boring log is an estimated ground surface elevation² estimated from a preliminary grading plan prepared by G&W Engineering Corporation.

The boring logs represent conditions observed at the time of exploration and have been edited to incorporate results of the laboratory tests. Unless noted on the boring logs, the lines designating the changes between various strata represent approximate boundaries. The transition between materials could be gradual or could occur between recovered samples. The stratification given on the boring logs, or described herein, is for use by Geotechnology in its analyses and should not be used as the basis of design or construction cost estimates without realizing that there can be variation from that shown or described.

3.2 Laboratory Testing

Laboratory testing was performed to assess engineering and index properties of the soils. Laboratory testing of selected soil samples included the following: moisture content, Atterberg limits, unit weight determination, and unconfined compressive strength. Laboratory test results are presented on the borings logs in Appendix C.

3.3 Field Infiltration Tests

Three field infiltration test holes, designated as P-1 through P-3, were performed within the proposed footprint of the stormwater detention area, offset 5, 10, and 15 feet from Boring B-6. The tests were conducted in general accordance with Metropolitan St. Louis Sewer District guidelines for best management practice (BMP) facilities.

² Elevations are in units of feet referenced to the North American Vertical Datum of 1988 (NAVD 88).



Each percolation test hole was drilled to an approximate depth of 3 feet below grade, a nominal 5-inch PVC casing installed, and the hole was inundated with water and allowed to soak overnight. The following day, for each percolation test hole, the water level was adjusted to 24 inches above the hole bottom and a field infiltration test conducted for a period of 1 hour. The test was repeated four times for each test hole, for a total test period of 4 hours. Upon completion of the tests, the PVC casings were pulled and the test holes backfilled with soil cuttings. Field infiltration test results are summarized in Table 1.

Table 1. Field Infiltration Test Results

Test Location	Hole Depth (feet)	Change in Water Level after Pre-Soak (inches)	Test Infiltration Rate (inches per hour)
P-1	3.0	-0.2	0
P-2	3.0	-0.1	0
P-3	3.0	-0.1	0
Field Infiltration Rate for Design			0

4.0 SUBSURFACE CONDITIONS

4.1 Fat Clay Fill

Five of six borings contained fill consisting of fat clay with variable amounts of gravel. The depth of fill ranged from 5 to 8 feet in the borings. SPT N-values in the fill ranged from 5 to 15 blows per foot (bpf); the mean value was 7 bpf. Moisture contents ranged from 18 to 25 percent. A layer of gravel and asphalt occurred in Boring B-6 at an approximate depth of 4 feet.

4.2 Natural Stratigraphy

The underlying natural soils consisted of brown and gray, lean clay and silt underlain by reddish-brown and tan, fat clay. The lean clay and silt were low plasticity based on Atterberg limits test results. Shear strengths of 760 and 1,750 psf were obtained from unconfined compressive strength tests on Shelby tube samples. Moisture contents ranged from 22 to 29 percent.

Fat clay with rock fragments occurred at an approximate depth of 17 feet. The high plasticity clay was stiff to very stiff based on N-values in the range of 10 to 21 bpf. Moisture contents ranged from 17 to 57 percent.

Split-spoon sampler and auger refusal occurred at a depth of approximately 25 feet, apparently on limestone bedrock.

4.3 Groundwater

Groundwater was observed during drilling at an approximate depth of 23.5 feet in Boring B-3. Groundwater was not observed in the other borings. Groundwater levels might not have



stabilized before backfilling, which is typical in low permeability, cohesive soils. Consequently, the indicated or lack of observed groundwater levels in a particular boring might not represent present or future levels. Groundwater levels could vary over time due to the effects of seasonal variation in precipitation, recharge, or other factors not evident at the time of exploration.

5.0 SITE GRADING RECOMMENDATIONS

Geotechnical features that affect project construction include the presence of fat clay fill that appears to be marginally compacted and underlying, relatively soft, lean clay and silt natural soils that are potentially compressible. The fat clay is also potentially expansive. Geotechnology has prepared the following conclusions and recommendations based on our understanding of the proposed project, the field and laboratory data presented in this report, engineering analyses, and our experience and judgment.

5.1 Fat Clay Fill

The existing fill consists of fat clay that appears to be marginally compacted. Further, the fill consists of fat clay that can shrink and swell with changes in moisture content and damage the garage floor slab and parking lot pavements. The fill, if placed according to recommendations in the geotechnical report for the original hotel structure, was compacted to approximately 85 percent of the modified Proctor maximum dry density. This compactive effort may be considered sufficient by some to support pavements, but is less than what is needed to support building foundations.

Geotechnology recommends that the fat clay fill be entirely removed from the proposed building area. The overexcavation should extend at least 5 feet beyond the building perimeter, including foundations, and backfilled with compacted, lean clay (i.e., liquid limit less than 45 percent) or well-graded crushed rock. In planned pavement areas, the fill should be removed and replaced to a minimum depth of 1 foot below pavement subgrade elevations.

The proposed methods of fat clay remediation are based on generally accepted standards in the local engineering community. Clay properties, including plasticity, moisture content, unit weight, swell pressure, and mineralogy are variable and could, in some circumstances, be conducive to more severe swell pressures and volume change potential than can be mitigated by nominal treatment. Consequently, when building in an area where fat clay is present, the client should recognize that there is an inherent risk that damage associated with shrink or swell of the soil could occur, even with remedial treatment of subgrade soil.

5.2 Soft Natural Soils

After performing site preparation and overexcavating the existing fat clay fill, the exposed subgrade should be proofrolled using a heavily loaded truck (18,000 pounds per axle) under the review of the project geotechnical engineer or a representative thereof. Soft or yielding soils should be undercut to firm cohesive soil; the depth of undercut below proposed subgrade can be limited to 2 feet. The undercut should be backfilled with new compacted fill satisfying the material and compaction requirements presented in Section 5.3. The undercut soils can be



reused provided that they conform to the recommendations contained in this report regarding acceptable fill materials. Proofrolling can be waived if the project geotechnical engineer judges that it would disturb an otherwise acceptable subgrade.

If soft or yielding soils extend below the maximum undercut depth specified above, the subgrade can be stabilized using a biaxial or triaxial geogrid (e.g., Tensar BX-1100 or TriAx TX140) and an 8- to 12-inch lift of compacted well-graded crushed rock. The remainder of the undercut should be backfilled with well-graded crushed rock or cohesive soils satisfying the material and compaction requirements presented in Section 5.3. If cohesive soils are used, a separation geotextile fabric such as Mirafi 500X should be placed between the crushed rock layer and cohesive soil backfill.

5.3 Fill Placement and Compaction

Site Preparation. Existing pavement and landscaped areas should be stripped. The restaurant building and related below-grade components should be demolished and the debris removed from the site. Foundation walls, if any, footings, and associated backfill should be entirely removed along with below-grade utilities. Where the removals create excavations below the final proposed grade, the excavations should be brought to final grade with compacted fill. Masonry rubble and asphalt demolition material can be reused provided it is processed and placed as discussed in the following subsection.

Suitable Fill Materials. Low plasticity, cohesive soil or well-graded granular material can be used for site fill and backfill. The fill must be non-organic material designated as CL, ML, CL-ML by ASTM D 2487 with a liquid limit less than 45 and a plasticity index between 5 and 25. The existing, fat clay fill is not suitable fill material. Granular material must be designated as SW, GW, GM by ASTM D 2487.

Rubble from demolition can be used as fill in proposed parking areas, but must be processed to remove deleterious material (i.e., organics, steel, metal, plastic, construction debris, etc.). Oversized, irregular-shaped pieces of concrete and rubble should be processed to maximum particle sizes of 6 inches for use in non-building areas and in parking areas; alternatively, such material can be discarded. Large, flat pieces of rubble and concrete can be placed in pavement areas only provided the slab-like pieces are placed flat at least 2 feet below pavement subgrade. Rubble and asphalt should not be placed in drive lanes or utility corridors. Care should be taken when placing processed concrete and rubble to assure that they are not concentrated in a manner such that voids develop between nested pieces. A sufficient quantity of fines should be mixed with the rubble to fill voids between large pieces of rubble.

Fill and Backfill Placement. Fill or backfill should be placed in uniformly thick lifts and compacted. The loose lift thickness should not exceed 8 inches. The fill should be systematically compacted to the levels provided in the Compaction Summary. The soil should be placed at moisture contents compatible with the required unit weight as described in Table 2. Depending on the soil moisture at the time of construction, aeration or wetting might be required



to achieve the required compaction. Deleterious material should not be included in fill, and the fill should not be placed on soft materials or frozen ground.

Table 2. Percent compaction and moisture-conditioning requirements for fill and backfill.

Category	Minimum Compaction ^a
General soil fill	90%
Rock backfill	95%
Pavement and floor slab soil subgrade	90% ^b
Pavement and floor slab rock base course	95%
^a Measured as a percent of the maximum dry density as determined by the modified Proctor test in laboratory (ASTM D 1557).	
^b Moisture content within -1 to +3% of optimum moisture content	

Benching. Where fill is placed on a sloping surface that is steeper than 1V:6H, the fill should be placed on continuous horizontal benches up the slope. Benches should be least 5 feet wide to facilitate compaction. The initial bench should be located at the toe of the proposed fill. The benching operations should remove surficial soft soils and expose medium stiff to stiff native soils on the surfaces of the benches. The benches should not be made until the fill is ready to be placed. If groundwater seepage is noted on the benches, the project geotechnical engineer should be contacted for underdrainage recommendations before the soils are replaced and compacted.

Subgrade Protection. Maintaining the moisture content of bearing and subgrade soils within the acceptable range provided in Table 2 is important during and after construction for the proposed structure. The bearing and subgrade soils should not be allowed to become wet or dry during or after construction, and measures should be taken to hinder water from ponding on these soils and to reduce drying of these soils during droughts. Groundwater is not expected to have an adverse effect on the proposed earthwork construction; however, the contractor should be prepared to remove seepage that accumulates on fill surfaces or at subgrade levels.

Managing site water is important in successful performance of the pavement and foundation systems. Water from surface runoff, downspouts, and subsurface drains should be collected and discharged through a storm water collection system. Positive drainage should be established around the proposed structures to promote drainage of surface water away from the structures and reduce ponding of water adjacent to these structures.

We recommend that earthwork operations be carried out during drier times of the year and that a grade be maintained at the ground surface to reduce ponding of surface water. In our experience, weather conditions are historically more favorable for earthwork during the months of May through October. Asphalt, concrete, or fill should not be placed over frozen or saturated soils, and frozen or saturated soils should not be used as compacted fill or backfill.



5.4 Excavations

Excavation depths and inclinations (including adjacent existing slopes) should not exceed those specified in local, state or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 or successor regulations). The soil materials in project excavations are anticipated to consist of medium stiff, lean clay that can generally be classified as OSHA Type B soils. OSHA guidelines require that temporary slopes in Type B soils be constructed at 1V:1H or flatter. It is important to note that soils encountered in the construction excavations could vary across the site and that, even if the OSHA criteria are used, there is a potential for slope failure.

Temporary slopes left exposed more than 24 hours could undergo sloughing and fail. If the slope is expected to remain open for an extended time, polyethylene sheeting can be installed to reduce the potential for slope degradation and instability.

5.5 Seismic Site Classification and Seismic Design Parameters

The City of Chesterfield has adopted the 2009 International Building Code as adopted by St. Louis County Ordinance 24,444 dated July 21, 2010. Based on the boring data and our interpretation of the 2009 International Building Code (2009 IBC), it is our opinion that the site class and other seismic parameters in Table 3 are applicable for this project.

Table 3. Site class and seismic parameters.

Category/ Parameter	Designation/ Value	Reference
S _s	0.540g	2009 IBC Section 1613.5.1 amended by St. Louis County Ordinance 24,444
S ₁	0.180g	
Seismic Site Class	C	2009 IBC Table 1613.5.2
F _a	1.184	2009 IBC Table 1613.5.3(1)
F _v	1.620	2009 IBC Table 1613.5.3(2)
S _{MS}	0.639g	2009 IBC Equation 16-36
S _{M1}	0.292g	2009 IBC Equation 16-37
S _{DS}	0.426g	2009 IBC Equation 16-38
S _{D1}	0.194g	2009 IBC Equation 16-39

5.6 Shallow Foundations

Design. Strip and spread footings can be proportioned for net allowable bearing pressures of 1,650 and 2,100 psf, respectively, provided they bear on firm, naturally occurring soil or compacted fill. The minimum lateral dimensions for strip and spread footings should be 18 and 24 inches, respectively. Exterior footings and footings in unheated interior areas should be embedded 30 inches below the lowest adjacent exterior grade to provide protection from seasonal moisture variations and frost penetration.



The surface stratum is silty and easily disturbed. Footing excavations should be made with a smooth-edged backhoe bucket and foot traffic in the bottom of the foundation excavation should be minimized. Localized soft zones could be encountered at bearing elevations. Footing excavations should be extended through soft zones to stiffer soil. The overexcavation can be backfilled with lean concrete or flowable fill.

Settlement. Using the allowable bearing pressures listed above, spread footings at columns loaded from 100 to 250 kips are anticipated to settle in the range of 1 to 2 inches. Strip footings are anticipated to settle approximately 0.5 to 1 inch. Estimated settlement values contained in this report are based on our experience with projects of a similar nature. Consolidation tests were not performed.

Differential settlement between footings could be 1 to 1.5 inches, which is anticipated to be poorly tolerated by the proposed structure. Ground improvement can be used to reduce the settlement, as discussed in Section 5.7.

Lateral Resistance. Lateral loads can be resisted by considering available frictional resistance between the base of the footing and the soil subgrade. Resistance to sliding can be computed assuming an ultimate coefficient of friction of 0.3 for cohesive soils and 0.5 for granular materials; however, the maximum resistance should be limited to 600 psf. A factor of safety of at least 2.0 should be applied to determine the allowable sliding resistance.

5.7 Ground Improvement

Foundation settlement of 2 inches or more is likely to be poorly tolerated by the proposed building. Cracking of brick veneer, walls, and floor slabs would be anticipated, and door jambs could be misaligned. Therefore, ground improvement should be considered to reduce foundation settlement, particularly at the column footings.

Aggregate piers can generally be used to increase the allowable bearing pressure to approximately 4,000 psf while limiting settlement to one inch or less. Aggregate pier spacing and depth should be designed to reduce differential settlement between the column and wall footings to approximately ½-inch.

Aggregate piers are constructed by drilling a vertical borehole to remove a column of soil, typically about 24 to 30 inches in diameter, or by displacing a column of soil with a mandrel. The base of the excavated or displaced soil column is backfilled with clean, crushed aggregate and tamped with a mandrel/ram to create a compacted aggregate bulb. The ground improvement element is built on top of the bottom bulb by placing additional thin lifts of compacted clean aggregate. The result is a dense column of aggregate.

It should be noted that ground improvement elements are proprietary foundation systems designed and constructed by a ground improvement contractor. Consequently, a ground improvement contractor should be contacted to determine the suitability of their system for use at this location as well as to confirm the bearing capacity value for the final foundation design.



The following ground improvement contractors are available in the St. Louis area: Geopier Foundation Company, Inc.; Hayward Baker, Inc.; Subsurface Constructors, Inc.; and Helitech Civil Construction Division. The contractor should prepare its design based on a design allowable bearing pressure that limits total settlements of less than 1-inch. Geotechnology is available to review and advise on specific ground improvement methods.

5.8 Foundations Adjacent to the Existing Building

Foundations for the proposed addition should be configured to reduce the settlement risk to foundations for the existing building. During construction, the existing building footings must not be undermined.

The soil pressure distribution below a footing is configured similar to that of a bulb with forces acting both vertically and laterally. If adjacent foundations are placed at different elevations, pressure from the shallower footing can add load and increase settlement of the deeper footing. New footings, therefore, should be constructed at similar elevations to the existing foundations, or should be placed at least one width of the new foundation away from existing footings.

Notwithstanding these design precautions, settlement of the existing building could occur. The existing building foundations could experience settlement as the soil supporting the footings consolidates under the influence of loads applied by the abutting new footings. Total and differential settlement of existing footings could be similar to the magnitudes indicated herein for new footings.

5.9 Floor Slab

The building floor slab can be designed as slab-on-grade concrete. Fat clay fill must be remediated as discussed in Section 5.1. The floor slab should be underlain by a minimum 4-inch-thick layer of well-graded crushed rock to serve as a capillary break and a base of support. The crushed rock layer should be compacted per the requirements of Table 2. The top 8 inches of clayey floor slab subgrade should be compacted and moisture-conditioned per the requirements presented in Table 2 prior to placing the crushed rock layer.

Care should be taken during slab-on-grade construction to not allow the subgrade to become desiccated or saturated. Additionally, consideration should be given to the timing of construction relative to the time of year and weather. If slab construction is performed during relatively cold and wet weather, lime- or cement-treatment of the subgrade could be beneficial to maintain progress during construction. Otherwise, the subgrade could be weakened by softening from saturation by rain and/or snow, leading to delays in reworking the subgrade to prepare it back to its pre-softened condition.

It is recommended that control joints be provided within the concrete slab-on-grade floors. These joints should be sealed to mitigate surface water infiltration until the building is enclosed. We recommend that the floor slab be structurally separated from walls, columns, footings, and penetrations to allow independent movement of the floor. Also, construction joints should be



provided between the existing building and the proposed addition to accommodate potential differential movement.

A 15-mil plastic sheet should be placed below the floor to reduce the potential for moisture to permeate the slab and the potential for mold growth within the building. Some designers prefer not to place a vapor barrier directly beneath the concrete floor because it could affect the curing of the concrete, resulting in “curling” of the slab. This concern can be addressed by embedding the vapor barrier in or below the crushed rock layer below the slab.

5.10 Lateral Earth Pressures

Foundation and retaining walls are subject to unbalanced lateral earth pressures. We recommend that lateral earth pressures be computed using equivalent fluid weights of the backfill plus surcharges for foundation loads, pavement loads, sloping backfill, etc. Equivalent fluid weights for soil for both drained and undrained conditions, and earth pressure coefficients for surcharges, are provided in Table 4.

Table 4. Lateral earth pressures for level (horizontal) ground surfaces.

Parameter	Active	At-Rest
Lean Clay Backfill		
Lateral earth pressure coefficient, K	0.41	0.58
Drained equivalent fluid weight, EFW (pcf)	49.2	69.6
Undrained equivalent fluid weight, EFW _u (pcf)	86.0	95.8
Crushed Rock Backfill		
Lateral earth pressure coefficient, K	0.28	0.44
Drained equivalent fluid weight, EFW (pcf)	35.8	56.3
Undrained equivalent fluid weight, EFW _u (pcf)	80.8	91.3

Unless additional analysis is performed, we recommend that surcharges be modeled as a uniform horizontal pressure equal to the vertical surcharge pressure multiplied by the recommended lateral earth pressure coefficient. The values provided in Table 4 assume that the ground surface adjacent to the wall is level. Ground sloping towards the wall on its active or at-rest side should be accounted for as a surcharge on the wall, as discussed above, unless site-specific equivalent fluid weights are computed on the basis of the backfill slope.

The decision to use active or at-rest earth pressures should be based upon the ability of the wall or structure to deflect as a result of the lateral earth pressures. For cohesionless granular backfill, active earth pressures can be used if the top of the wall is able to deflect a minimum of 0.002 times the height of the wall. Similarly, for cohesive soil backfill, active earth pressures can be used if the top of the wall is able to deflect a minimum of 0.02 times the height of the wall. If these minimum horizontal deflections at the top of the wall are restrained from occurring or are unacceptable to the proposed structure, at-rest earth pressures should be used.



Undrained equivalent fluid weights should be used in computing the lateral loads on the wall wherever the backfill cannot be drained by a drainage system. For the drained equivalent fluid weights to be applicable, a drainage system should be incorporated along the backfilled face of the wall (i.e., the high side of the wall) as subsequently discussed.

5.11 Subsurface Drainage

Although the regional groundwater table is expected to be below proposed basement grade, water from surface runoff could become trapped behind basement walls. Consequently, we recommend constructing a subsurface drain system around the perimeter of below-grade structures and behind retaining walls, as shown on Figure 3 in Appendix B. The subsurface drain system should consist of 4-inch PVC or equivalent pipe with 1/4- or 3/8-inch perforations; the pipe should be laid with the perforations down and enveloped with drain filter having a gradation in the range shown on Figure 3. The drain filter should be surrounded with Mirafi 140 filter cloth or equivalent. The drainage system should be routed to a sump for collection and disposal, or the water discharged by a gravity system.

5.12 Utility Construction

Settlement of trench backfill can result in unsightly depressions and localized pavement failures. The magnitude of settlement can be reduced by mechanically compacting the trench backfill. Select granular backfill can be used for pipe bedding and minimum cover for utilities. The remainder of the utility trenches should be backfilled with flowable fill or compacted clayey soils up to design subgrade elevation to reduce the potential for water collecting in these trenches and being absorbed by the surrounding clays, causing heave of foundations, slabs, pavement, etc.

Granular bedding and backfill that exhibits a well-defined moisture-density relationship should be compacted and moisture-conditioned per the requirements presented in Table 2. Utility trench backfill should be placed in 6- to 8-inch thick lifts with each lift compacted to at least the specified degree of compaction. Thinner lifts should be used for lighter compaction equipment. The backfill should not be flushed with water in an attempt to obtain compaction.

Prior to placing the bedding and utilities within the utility trench, soft, saturated, and compressible material should be removed from the bottom of the trench to expose stiff soils or bedrock.

5.13 Pavement Design and Construction

Pavements for this project can be designed in accordance with expected traffic axle loads, frequency of loading, and the properties of the subgrade. The subgrade properties should be evaluated by field California Bearing Ratio (CBR) or plate load tests after final grading is completed, or by correlation of field density tests to laboratory CBR tests.

Pavement subgrades should be proofrolled with a heavily loaded piece of equipment under the review of the project geotechnical engineer or representative thereof. Soft or yielding soils



observed during the proofroll should be undercut to stiff soils; however, the depth of undercut below subgrade can be limited to 2 feet in light-duty traffic areas and 3 feet in heavy-duty traffic areas. The undercut should be backfilled with compacted fill satisfying the material and compaction requirements presented in Section 5.3.

If soft or yielding soils occur at the undercut depths suggested above, the subgrade can be stabilized at those depths using a biaxial or triaxial geogrid (e.g., Tensar BX-1100, TriAx TX140, or similar) and an 8- to 12-inch lift of compacted well-graded crushed rock. The remainder of the undercut can be backfilled with well-graded crushed rock or clayey soils satisfying the material and compaction requirements presented in Section 5.3. If clayey soils are used, a separation geotextile should be provided at the interface between the crushed rock and the clayey soils.

Immediately prior to installing pavement or aggregate base, the top 12 inches of subgrade should be scarified and recompacted per the requirements presented in Table 2.

Measures should be taken to hinder aggregate base from becoming saturated during or after construction. Water in aggregate base is capable of freezing, causing it to expand within the voids it occupies. As a result, ice lenses could form and potentially heave the pavement. Furthermore, the thawing process could soften underlying cohesive subgrades and reduce pavement support, resulting in "pumping" of the pavements under loads. Preferably, the aggregate base should be free-draining material that drains into a system of underdrains.

Surface drainage should be directed away from the edges of proposed or existing pavements so that water does not pond next to pavements or flow onto pavements from unpaved areas. Such ponding or flow can cause deterioration of pavement subgrades and premature failure of pavements. If drainage ditches are used to intercept surface water before it reaches the pavements, the ditches should have an invert at least 6 inches below the pavement subgrade, and have a longitudinal gradient that rapidly drains the ditches and reduces ponding of water. In areas where exterior grades do not slope away from pavement edges, perimeter edge drains should be installed.

Pavement in front of loading docks should be designed as a concrete slab to support the heavy prolonged loads of loaded and parked tractor-trailers. If dumpsters are utilized at the project site, we recommend that the dumpster be supported on a reinforced concrete slab designed to accommodate the loading wheels of the dumpster truck. The access lane to the dumpster should also be designed for heavier wheel loads associated with dumpster trucks.

6.0 RECOMMENDED ADDITIONAL SERVICES

The conclusions and recommendations given in this report are based on: Geotechnology's understanding of the proposed design and construction, as outlined in this report; site observations; interpretation of the exploration data; and our experience. Since the intent of the design recommendations is best understood by Geotechnology, we recommend that Geotechnology be included in the final design and construction process, and be retained to



review the project plans and specifications to confirm that the recommendations given in this report have been correctly implemented. We recommend that Geotechnology be retained to participate in prebid and preconstruction conferences to reduce the risk of misinterpretation of the conclusions and recommendations in this report relative to the proposed construction of the subject project.

Since actual subsurface conditions between boring locations could vary from those encountered in the borings, our design recommendations are subject to adjustment in the field based on the subsurface conditions encountered during construction. Therefore, we recommend that Geotechnology be retained to provide construction observation services as a continuation of the design process to confirm the recommendations in this report and to revise them accordingly to accommodate differing subsurface conditions. Construction observation is intended to enhance compliance with project plans and specifications. It is not insurance, nor does it constitute a warranty or guarantee of any type. Regardless of construction observation, contractors, suppliers, and others are solely responsible for the quality of their work and for adhering to plans and specifications.

7.0 LIMITATIONS

This report has been prepared on behalf of, and for the exclusive use of, the client for specific application to the named project as described herein. If this report is provided to other parties, it should be provided in its entirety with all supplementary information. In addition, the client should make it clear that the information is provided for factual data only, and not as a warranty of subsurface conditions presented in this report.

Geotechnology has attempted to conduct the services reported herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions. The recommendations and conclusions contained in this report are professional opinions. The report is not a bidding document and should not be used for that purpose.

Our scope for this phase of the project did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors noted or unusual or suspicious items or conditions observed are strictly for the information of our client.

Our scope did not include: any services to investigate or detect the presence of mold or any other biological contaminants (such as spores, fungus, bacteria, viruses, and the by-products of such organisms) on and around the site; or any services, designed or intended, to prevent or lower the risk of the occurrence of an infestation of mold or other biological contaminants.

The analyses, conclusions, and recommendations contained in this report are based on the data obtained from the geotechnical exploration. The field exploration methods used indicate



subsurface conditions only at the specific locations where samples were obtained, only at the time they were obtained, and only to the depths penetrated. Consequently, subsurface conditions could vary gradually, abruptly, and/or nonlinearly between sample locations and/or intervals.

The conclusions or recommendations presented in this report should not be used without Geotechnology's review and assessment if the nature, design, or location of the facilities is changed, if there is a lapse in time between the submittal of this report and the start of work at the site, or if there is a substantial interruption or delay during work at the site. If changes are contemplated or delays occur, Geotechnology must be allowed to review them to assess their impact on the findings, conclusions, and/or design recommendations given in this report. Geotechnology will not be responsible for any claims, damages, or liability associated with any other party's interpretations of the subsurface data or with reuse of the subsurface data or engineering analyses in this report.

The recommendations included in this report have been based in part on assumptions about variations in site stratigraphy that can be evaluated further during earthwork and foundation construction. Geotechnology should be retained to perform construction observation and continue its geotechnical engineering service using observational methods. Geotechnology cannot assume liability for the adequacy of its recommendations when they are used in the field without Geotechnology being retained to observe construction.



APPENDIX A – IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study.* Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBC-Member geotechnical engineer for more information.



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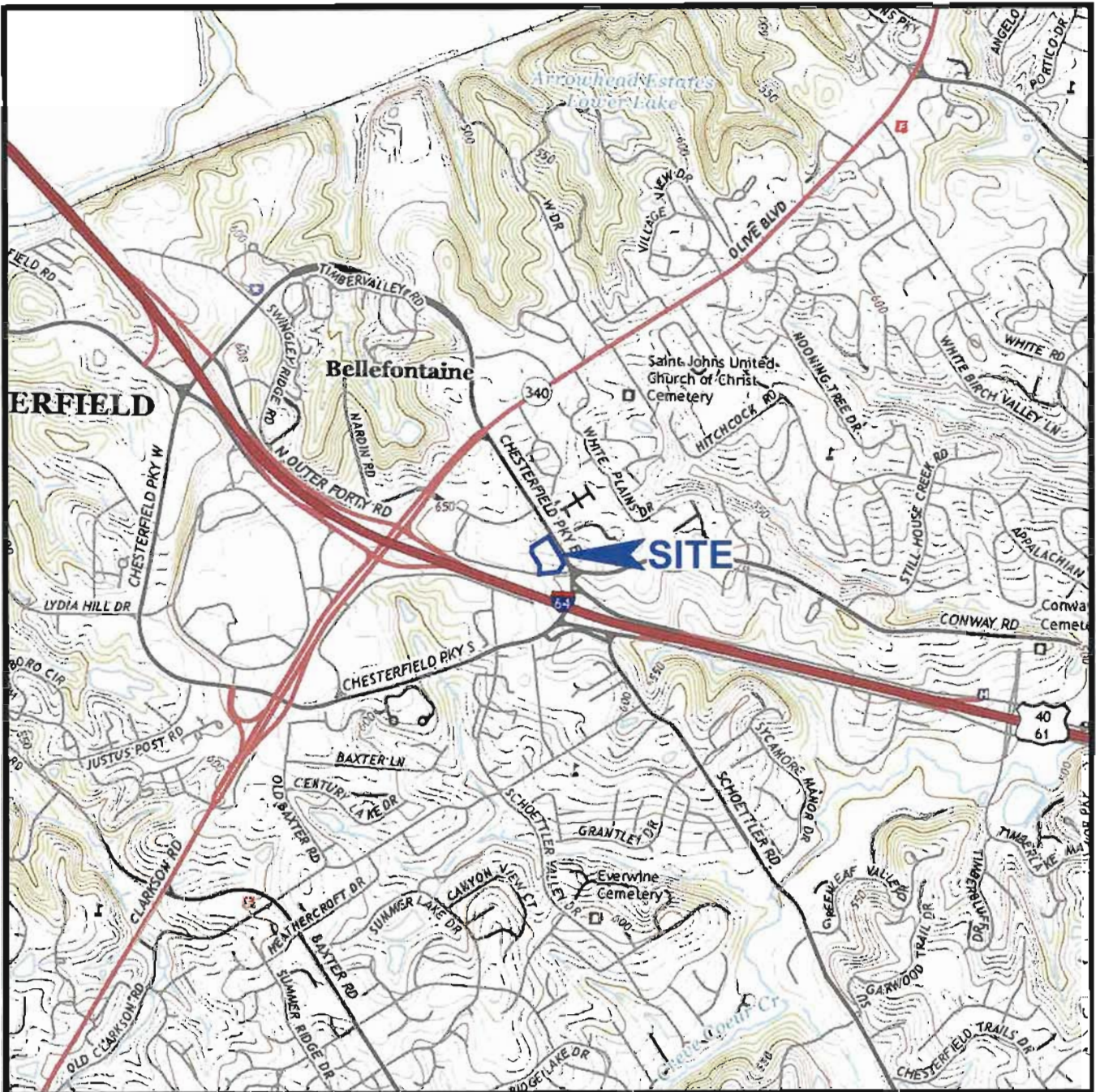


APPENDIX B – FIGURES

Figure 1 - Site Location and Topography

Figure 2 – Aerial Photograph of Site and Boring Locations

Figure 3 – Below-Grade Wall Schematic Drainage Detail

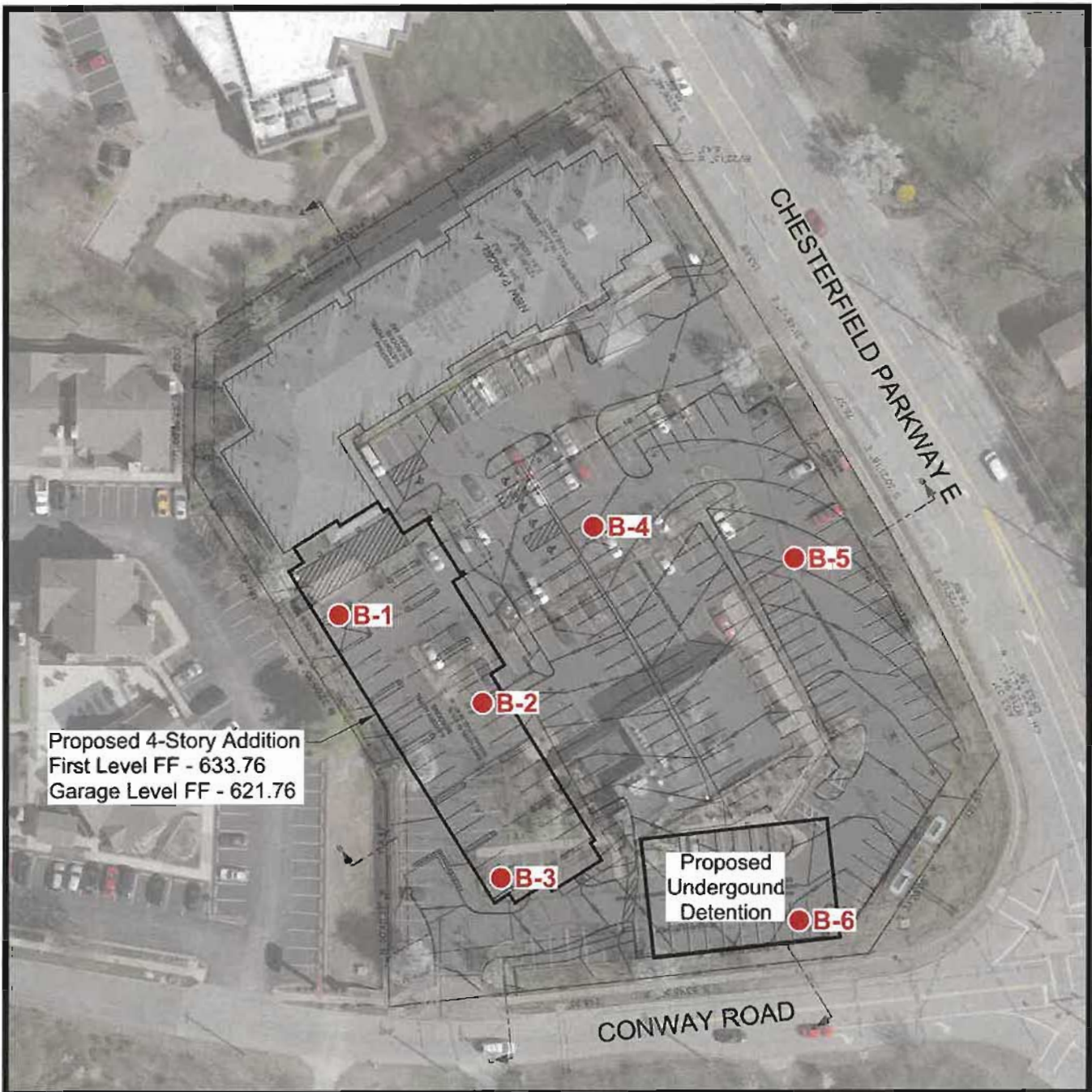


NOTES

1. Plan adapted from a 7.5 minute U.S.G.S. map for Chesterfield, Missouri quadrangle, last revised in 2015.



Drawn By: WAH	Ck'd By: DFB	App'vd By: BJS
Date: 10-10-19	Date: 10-17-19	Date: 10-17-19
<p>Geotechnical Exploration SpringHill Suites Expansion Chesterfield, Missouri</p>		
<p>SITE LOCATION AND TOPOGRAPHY</p>		
Project Number J035393.01		<p>FIGURE 1</p>



Proposed 4-Story Addition
 First Level FF - 633.76
 Garage Level FF - 621.76

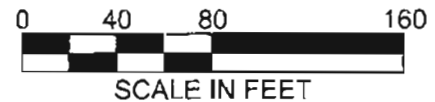
Proposed
 Underground
 Detention

NOTES

1. Plan adapted from "2015 Aerial Imagery for the St. Louis Region" supplied by East-West Gateway Council of Governments and a drawing dated April 5, 2019 titled "Preliminary Development Plan" prepared by G & W Engineering.
2. Borings were located in the field with reference to site features and are shown approximate only.

LEGEND

● Boring Location



Drawn By: WAH	Ck'd By: DFB	App'vd By: BJS
Date: 10-10-19	Date: 10-17-19	Date: 10-17-19

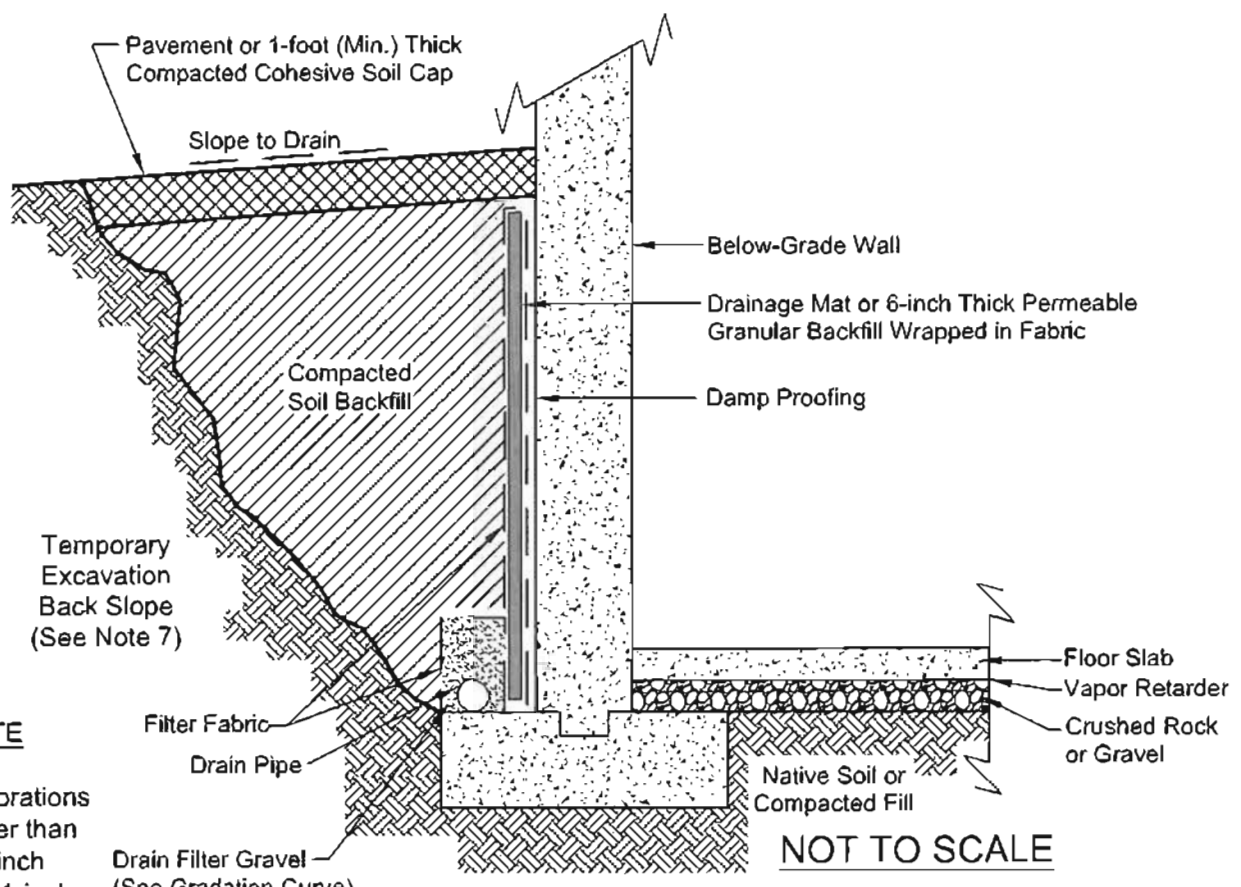


Geotechnical Exploration
 SpringHill Suites Expansion
 Chesterfield, Missouri

**AERIAL PHOTOGRAPH OF SITE
 AND BORING LOCATIONS**

Project Number
 J035393.01

FIGURE 2



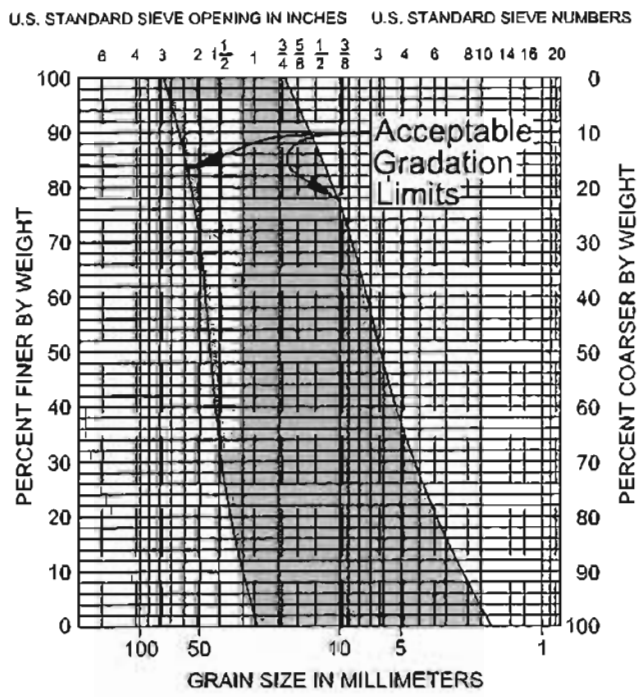
NOTE
For perforations larger than 3/8-inch use 1-inch clean rock.

Filter Fabric
Drain Pipe
Drain Filter Gravel (See Gradation Curve)

NOT TO SCALE

NOTES

1. 4-inch or larger, Sch. 40 PVC drain pipe or equivalent with 1/4-inch to 3/8-inch perforations.
2. Perforations positioned downward.
3. Location and invert of pipe as required for drainage.
4. Route drain pipe to daylight to outside slope.
5. Cleanouts advisable at changes of direction.
6. As an alternate, ASTM D2729 sewer pipe may be used in conjunction with 1-inch clean filter rock and filter fabric.
7. A minimum 45-degree back slope may be required if the structural engineer designs the wall using lateral pressures for a granular backfill.



COBBLES	GRAVEL		SAND	
	COARSE	FINE	COARSE	MEDIUM

DRAIN FILTER GRADATION

Drawn By: WAH	Ck'd By: DFB	App'vd By: BJS
Date: 10-16-19	Date: 10-17-19	Date: 10-17-19
<p>Geotechnical Exploration SpringHill Suites Expansion Chesterfield, Missouri</p>		
<p>BELOW-GRADE WALL SCHEMATIC DRAINAGE DETAIL</p>		
Project Number J035393.01		FIGURE 3



APPENDIX C – BORING INFORMATION

Boring Logs

Boring Log: Terms and Symbols

LOG OF BORING 2002 WL J035393 01 - SPRING HILL.GPJ_00 CLONE ME.GPJ 10/18/19 AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

Surface Elevation: <u>628</u>		Completion Date: <u>9/26/2019</u>		GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf		
Datum: <u>NAVD 88</u>		Δ - UU/2 \circ - QU/2 \square - SV 0.5 1.0 1.5 2.0 2.5							
DEPTH IN FEET		DESCRIPTION OF MATERIAL					STANDARD PENETRATION RESISTANCE		
				\blacktriangle N-VALUE (BLOWS PER FOOT) <small>(ASTM D 1586)</small>					
				WATER CONTENT, %					
				PL 10 20 30 40 50 LL					
		Asphalt - 5 inches							
		FILL: gray, brown, fat clay with gravel	4-6-3	SS1					
5			2-5-9	SS2					
							Garage Floor Level		
			3-6-9	SS3					
10		Medium stiff, gray to brown, LEAN CLAY - (CL)	96	ST4					
15			2-3-5	SS5					
		Stiff, reddish-brown, FAT CLAY, some limestone fragments - CH							
20		no sample recovery in SS6	3-4-6	SS6					
25		Sampler refusal at 24.7 feet.	6-2-50/2"	SS7					
30									
35									

GROUNDWATER DATA

FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

AUGER 3 3/4" HOLLOW STEM WASHBORING FROM FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
 HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: DFB	App'vd. by: BJS
Date: 10/4/2019	Date: 10/17/2019	Date: 10/17/2019



Geotechnical Exploration
 SpringHill Suites Expansion
 Chesterfield, Missouri

LOG OF BORING: B-1

Project No. J035393.01

Surface Elevation: 626

Completion Date: 9/26/2019

Datum: NAVD 88

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV
 0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

▲ N-VALUE (BLOWS PER FOOT)
 (ASTM D 1586)

WATER CONTENT, %

PL |-----| LL
 10 20 30 40 50

DEPTH
IN FEET

DESCRIPTION OF MATERIAL

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)
SPT BLOW COUNTS
CORE RECOVERY/ROD

SAMPLES

Asphalt - 5 inches
 FILL: brown, fat clay

5

Medium stiff, brown, LEAN CLAY - CL

10

15

Very stiff, tan, FAT CLAY, some limestone fragments - CH

20

25

Sampler refusal at 24.5 feet.

30

35



DEPTH (ft)	DESCRIPTION	GRAPHIC LOG	DRY UNIT WEIGHT (pcf)	SPT BLOW COUNTS	CORE RECOVERY/ROD	SAMPLES	UU/2 (tsf)	QU/2 (tsf)	SV (tsf)	N-VALUE (BPF)	WATER CONTENT (%)
0-5	Asphalt - 5 inches FILL: brown, fat clay	Cross-hatch				2-3-3 SS1				▲	●
5-10	Medium stiff, brown, LEAN CLAY - CL	Diagonal lines				1-2-3 SS2				▲	●
10-15						2-3-5 SS3				▲	●
15-20						2-2-5 SS4				▲	●
20-25	Very stiff, tan, FAT CLAY, some limestone fragments - CH	Vertical lines				1-3-4 SS5				▲	●
25-30						2-8-9 SS6				●	
30-35						10-18 -50/0" SS7					

Garage Floor Level

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.
 LOG OF BORING 2002 WL J035393.01 - SPRING HILL.GPJ 00 CLONEME.GPJ 10/18/19

GROUNDWATER DATA

FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

AUGER 3 3/4" HOLLOW STEM WASHBORING FROM FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
 HAMMER TYPE Auto

REMARKS:

Drawn by: AGB Checked by: DFB App'vd. by: BJS
 Date: 10/4/2019 Date: 10/17/2019 Date: 10/17/2019



Geotechnical Exploration
 SpringHill Suites Expansion
 Chesterfield, Missouri

LOG OF BORING: B-2

Project No. J035393.01

Surface Elevation: 623

Completion Date: 9/26/2019

Datum: NAVD 88

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV

0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE

▲ N-VALUE (BLOWS PER FOOT)
(ASTM D 1586)

WATER CONTENT, %

PL | 10 20 30 40 50 | LL

LOG OF BORING 2002 WL_J035393.01 - SPRING HILL.GPJ_00 CLONE M.E.GPJ_10/18/19 AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GRAPHIC LOG	DRY UNIT WEIGHT (pct) SPT BLOW COUNTS CORE RECOVERY/ROD	SAMPLES	SHEAR STRENGTH, tsf			STANDARD PENETRATION RESISTANCE	WATER CONTENT, %		
					Δ - UU/2	○ - QU/2	□ - SV	▲ N-VALUE (BLOWS PER FOOT) (ASTM D 1586)	PL	LL	
	Asphalt - 6 inches FILL: brown and gray, fat clay										
			3-4-6	SS1							
			2-3-3	SS2							
5	Stiff to very soft, gray, clayey SILT - (ML)										
			100	ST3							
			D-0-0	SS4							
10	Medium stiff, brown, LEAN CLAY - CL										
			2-2-3	SS5							
15	Stiff, reddish-brown, FAT CLAY, some limestone fragments - CH										
			14-16-5	SS6							
20											
			2-3-50/5"	SS7							
25	Sampler refusal at 25 feet.										
30											
35											

GROUNDWATER DATA

ENCOUNTERED AT 23.5 FEET ∇

DRILLING DATA

___ AUGER 3 3/4" HOLLOW STEM
WASHBORING FROM ___ FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: DFB	App'vd. by: BJS
Date: 10/4/2019	Date: 10/17/2019	Date: 10/17/2019



Geotechnical Exploration
SpringHill Suites Expansion
Chesterfield, Missouri

LOG OF BORING: B-3

Project No. J035393.01

LOG OF BORING 2002 WL J035393.01 - SPRING HILL, G.S.J. DD CLONE ME GP.J 10/18/19 - AND THE TRANSITION MAY BE GRADUAL GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY

Surface Elevation: <u>630</u>		Completion Date: <u>9/26/2019</u>		GRAPHIC LOG	DRY UNIT WEIGHT (pcf) SPT BLOW COUNTS CORE RECOVERY/RQD	SAMPLES	SHEAR STRENGTH, tsf				
Datum: <u>NAVD 88</u>							Δ - UU/2	○ - QU/2	□ - SV		
							0.5	1.0	1.5	2.0	2.5
DEPTH IN FEET	DESCRIPTION OF MATERIAL				STANDARD PENETRATION RESISTANCE						
					▲ N-VALUE (BLOWS PER FOOT) (ASTM D 1586)						
					WATER CONTENT, %						
					PL	10	20	30	40	50	LL
	Asphalt - 5 inches										
	FILL: gray and brown, fat clay				3-4-5	SS1	▲	●			
	Medium stiff, brown, LEAN CLAY - (CL)				2-2-3	SS2	▲	●			
5	Boring terminated at 5 feet.										
10											
15											
20											
25											
30											
35											

GROUNDWATER DATA

FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

4" AUGER HOLLOW STEM
WASHBORING FROM ___ FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB	Checked by: DFB	App'vd. by: BJS
Date: 10/4/2019	Date: 10/17/2019	Date: 10/17/2019



Geotechnical Exploration
SpringHill Suites Expansion
Chesterfield, Missouri

LOG OF BORING: B-4

Project No. J035393.01

Surface Elevation: 629

Completion Date: 9/26/2019

Datum: NAVD 88

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV
0,5 1,0 1,5 2,0 2,5

STANDARD PENETRATION RESISTANCE
▲ N-VALUE (BLOWS PER FOOT)
(ASTM D 1586)

WATER CONTENT, %

PL |-----| LL
10 20 30 40 50

DEPTH
IN FEET

DESCRIPTION OF MATERIAL

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)
SPT BLOW COUNTS
CORE RECOVERY/RQD

SAMPLES

Asphalt - 5 inches
Soft to medium stiff, brown, LEAN CLAY - CL

2-2-2 SS1

2-3-3 SS2

Boring terminated at 5 feet.

5
10
15
20
25
30
35

GROUNDWATER DATA

FREE WATER NOT
ENCOUNTERED DURING DRILLING

DRILLING DATA

4" AUGER HOLLOW STEM
WASHBORING FROM FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB Checked by: DFB App'vd. by: BJS
Date: 10/4/2019 Date: 10/17/2019 Date: 10/17/2019



Geotechnical Exploration
SpringHill Suites Expansion
Chesterfield, Missouri

LOG OF BORING: B-5

Project No. J035393.01

LOG OF BORING 2002 WL J035393.01 - SPRING HILL.GPJ 00.C.LONE.ME.GPJ 10/18/19 - AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

Surface Elevation: 624

Completion Date: 9/26/2019

Datum: NAVD 88

SHEAR STRENGTH, tsf

Δ - UU/2 ○ - QU/2 □ - SV
0.5 1.0 1.5 2.0 2.5

STANDARD PENETRATION RESISTANCE
▲ N-VALUE (BLOWS PER FOOT)
(ASTM D 1586)

WATER CONTENT, %
PL | 10 20 30 40 50 | LL

DEPTH
IN FEET

DESCRIPTION OF MATERIAL

GRAPHIC LOG

DRY UNIT WEIGHT (pcf)
SPT BLOW COUNTS
CORE RECOVERY/RQD

SAMPLES

Asphalt - 6 inches
FILL: brown and gray, fat clay

2-3-5 SS1

FILL: gravel and asphalt
Medium stiff, brown, LEAN CLAY - CL

4-20-22 SS2

2-3-5 SS3

2-3-4 SS4

Boring terminated at 10 feet.

DEPTH (ft)	TEST TYPE	RESULT
2-3-5	SS1	▲
4-20-22	SS2	●
2-3-5	SS3	▲
2-3-4	SS4	▲

Field Infiltration Test Depth

NOTE: STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL. GRAPHIC LOG FOR ILLUSTRATION PURPOSES ONLY.

GROUNDWATER DATA

FREE WATER NOT ENCOUNTERED DURING DRILLING

DRILLING DATA

AUGER 3 3/4" HOLLOW STEM WASHBORING FROM FEET
JF DRILLER ADP LOGGER
CME 85 DRILL RIG
HAMMER TYPE Auto

REMARKS:

Drawn by: AGB Checked by: DFB App'vd. by: BJS
Date: 10/4/2019 Date: 10/17/2019 Date: 10/17/2019



Geotechnical Exploration
SpringHill Suites Expansion
Chesterfield, Missouri

LOG OF BORING: **B-6**

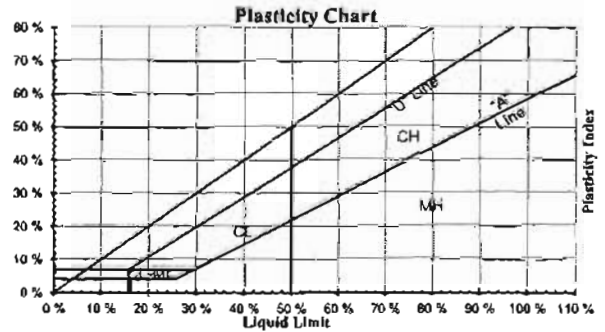
Project No. **J035393.01**

LOG OF BORING 2002 WL J035393.01 - SPRING HILL GPJ 00 CLONE ME GPJ 10/10/19

BORING LOG: TERMS AND SYMBOLS

LEGEND

CS	Continuous Sampler
GB	Grab Sample
NQ	NQ Rock Core
PST	Three-Inch Diameter Piston Tube Sample
SS	Split-Spoon Sample (Standard Penetration Test)
ST	Three-Inch Diameter Shelby Tube Sample
*	Sample Not Recovered
PL	Plastic Limit (ASTM D4318)
LL	Liquid Limit (ASTM D4318)
SV	Shear Strength from Field Vane (ASTM D2573)
UU	Shear Strength from Unconsolidated-Undrained Triaxial Compression Test (ASTM D2850)
QU	Shear Strength from Unconfined Compression Test (ASTM D2166)



SOIL GRAIN SIZE

US STANDARD SIEVE

	12"	3"	3/4"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE			
		300	76.2	19.1	4.76	2.00	0.42	0.074	0.005
SOIL GRAIN SIZE IN MILLIMETERS									

UNIFIED SOIL CLASSIFICATION SYSTEM

<i>Major Divisions</i>		<i>Symbol</i>	<i>Description</i>		
Coarse-Grained Soils (More than 50% Larger than No. 200 Sieve Size)	Gravel and Gravelly Soil	Clean Gravels Little or no Fines	GW Well-Graded Gravel, Gravel- Sand Mixture		
		Gravels with Appreciable Fines	GP Poorly-Graded Gravel, Gravel-Sand Mixture		
		Sand and Sandy Soils	Clean Sands Little or no Fines	GM Silty Gravel, Gravel-Sand-Silt Mixture	
			Sands with Appreciable Fines	GC Clayey-Gravel, Gravel-Sand-Clay Mixture	
	Fine-Grained Soils (More than 50% Smaller than No. 200 Sieve Size)	Silt and Clays	Liquid Limit Less Than 50	SW Well-Graded Sand, Gravelly Sand	
			Silt and Clays	Liquid Limit Greater Than 50	SP Poorly-Graded Sand, Gravelly Sand
				Highly Organic Soils	SM Silty Sand, Sand-Silt Mixture
		Silt and Clays	Liquid Limit Less Than 50	SC Clayey-Sand, Sand-Clay Mixture	
Silt and Clays			Liquid Limit Greater Than 50	ML Silt, Sandy Silt, Clayey Silt, Slight Plasticity	
			Highly Organic Soils	CL Lean Clay, Sandy Clay, Silty Clay, Low to Medium Plasticity	
			OL Organic Silts or Lean Clays, Low Plasticity		
			MH Silt, High Plasticity		
			CH Fat Clay, High Plasticity		
			OH Organic Clay, Medium to High Plasticity		
			PT Peat, Humus, Swamp Soil		

STRENGTH OF COHESIVE SOILS

DENSITY OF GRANULAR SOILS

<i>Consistency</i>	<i>Undrained Shear Strength (tsf)</i>	<i>Unconfined Comp. Strength (tsf)</i>	<i>Descriptive Term</i>	<i>Approximate N₆₀-Value Range</i>
Very Soft	less than 0.125	less than 0.25	Very Loose	0 to 4
Soft	0.125 to 0.25	0.25 to 0.5	Loose	5 to 10
Medium Stiff	0.25 to 0.5	0.5 to 1.0	Medium Dense	11 to 30
Stiff	0.5 to 1.0	1.0 to 2.0	Dense	31 to 50
Very Stiff	1.0 to 2.0	2.0 to 3.0	Very Dense	>50
Hard	greater than 2.0	greater than 4.0		

N-Value (Blow Count) is the last two, 6-inch drive increments (i.e. 4/7/9, N = 7 + 9 = 16). Values are shown as a summation on the grid plot and shown in the Unit Dry Weight/SPT column.

RELATIVE COMPOSITION

OTHER TERMS

Trace	0 to 10%	Layer - Inclusion greater than 3 inches thick.
Little	10 to 20%	Seam - Inclusion 1/8-inch to 3 inches thick
Some	20 to 35%	Parting - Inclusion less than 1/8-inch thick
And	35 to 50%	Pocket - Inclusion of material that is smaller than sample diameter



Relative composition and Unified Soil Classification System (USCS) designations are based on visual descriptions and are approximate only. If laboratory tests were performed to classify the soil, the USCS designation is shown in parenthesis.

