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William R. Snodgrass Tennessee Tower
3rd and 4th Floor Plaza Level Waterproofing
SBC no. 529/000-02-2019
Nashville, Davidson County, Tennessee

# Programming for Tennessee Tower Waterproofing

October 24th, 2023

**Goodwyn Mills Cawood, LLC.**
GMC Project No. ANAS 230036
**NASHVILLE, TENNESSEE**

# INTRODUCTION

## A. OVERVIEW

The State of Tennessee retained Goodwyn, Mills & Cawood, LLC (GMC) and NRC consultants to evaluate and provide a recommendation for the remediation of water infiltration issues at the 3rd and 4th floor plaza at the Tennessee Tower.

## B. PROCESS

The team met with the Owner on site to review the existing conditions of 3rd and 4th floor Terrace Plaza on August 22, 2023. In addition, the team reviewed the existing drawings provided by the Owner and the report developed by RAM-USA dated November 7, 2017. Based on the observations, we developed a report documenting existing conditions and providing recommendations.

## C. EXISTING CONDITIONS – 3rd Floor Plaza

As stated in the attached NRC report there is persistent leakages occurring at 3rd floor entrance, stair plaza above the 3rd floor entrance. The floor finish of the stair plaza and stairs was expected to be placed over a waterproofing system. Leakages were reported occurring below the planters. The NRC report notes that drainage areas are covered with stone materials, and the terrace plaza drains in these areas appeared to be eliminated at the surface and covered due to reported leakages. Mortar bed calcium and deposits are found at the drains. Leakages we reported to be persistent and requested to be considered for correction to reduce moisture intrusion into the facility.

## D. EXISTING CONDITIONS – 4th Floor Plaza

During the site visit the 4th floor terrace plaza was reported to have interior leakages and the State of Tennessee 's intention is to correct these conditions resulting in leakages at the interior of the space. The existing two-part plaza drain system was observed to have significant blockages and these blockages hinder the relief of moisture at waterproofing level and probably reducing the moisture relief from the waterproofing level and thereby forcing moisture to create pressure at various locations. We discussed methods of proper moisture relief as per existing site conditions. In addition to these areas the existing single pane, non-insulated glazing appeared to be thermally void allowing moisture to build up at the curtain wall system. The glazing systems were observed to be condensing at glass components. The moisture was observed travelling down the glass to the extrusion location. It appeared that the drainage plane was buried within the Terrazzo finish area and blockages to the internal drainage system may be present if appropriate pathways are not present. However, NRC could not

observe in detail at any location and replacement of Curtain wall system is not in the scope.

## E. RECOMENDATIONS – 3rd Floor Plaza

We recommend drainage areas be exposed and observed for blockages at second level drainage plane. If blockages are present, they may be hindering proper relief of moisture and backing up waterproofing levels and if they are not draining, moisture could be forced to the perimeter for overflow purposes. We recommend an area of destructive surveying to analyze and investigate existing conditions and accordingly provide repairs wherever necessary as required. We recommend to remove areas around the drain (overburden), and attempt to clean from positive side. If this is not successful and replacement of the plumbing lines are required, the scope will need to be reevaluated. However, it is our opinion these drains and plumbing lines can be salvaged. At worst, it might just be the upper part of the plaza drain that needs to be replaced. *See NRC report attached also.*

## F. RECOMENDATIONS – 4th Floor Plaza

We recommended onsite to the team regarding cleaning of drainage systems. The debris blockage appeared to clog the pathway. We recommend destructive surveying to be performed at an area where waterproofing transitions into the structure for further understanding of the drainage pathways for surface moisture at curtain wall and waterproofing levels. Upon these investigations corrections could be made to the waterproofing systems. Also, it was observed that the drainage mat was installed inverted at a small location which could hinder proper drainage pathways below the concrete topping. *See NRC report attached also.*
Even though the condensation from the storefront is not the cause of the issue, we recommend replacing the storefront system on the 4$^{th}$ Floor Plaza. We have provided a second OPC including the cost to replace the storefront system.

## G. DELIVERY METHOD RECOMMENDATIONS

Due to the sensitivity of the materials and area and the expertise required to perform the work included in these recommendations a CM/GC delivery method is recommended to ensure qualified and experienced contractors are used to complete the work.

## H. ANTICIPATED PROJECT DURATIONS BY PHASE

| | |
|---|---|
| Destructive Surveying (Demo and Investigation) | 120 calendar days |
| Anticipated Design Duration | 120 calendar days |

**Pending STREAM review and approval of Design Phase*

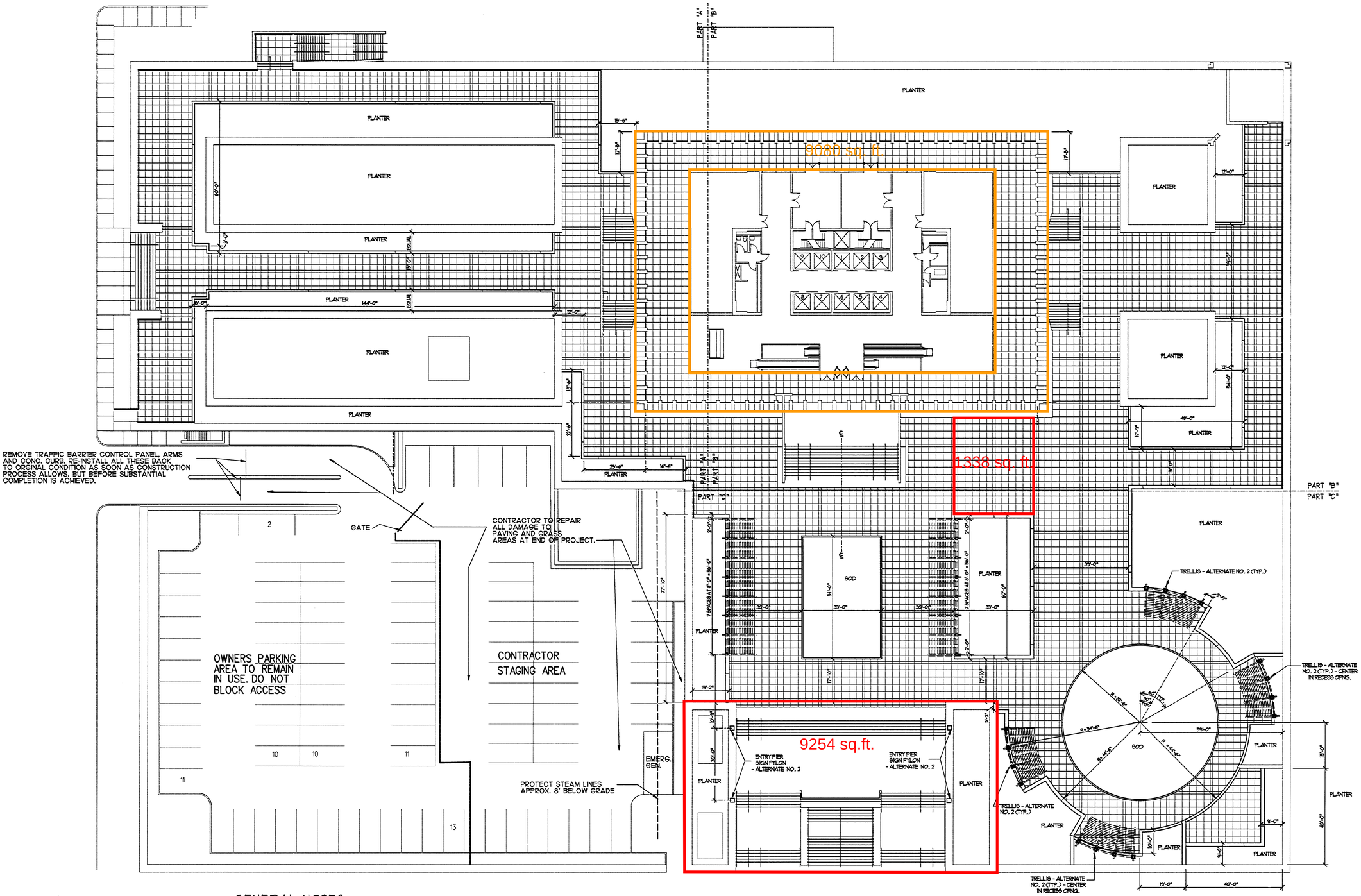
| | |
|---|---|
| Anticipated Construction Duration | 500 calendar days |

**Allow for potential supply chain realignment and material availability*

## I. ESTIMATE OF PROBABLE COSTS

Costs recommended in this report have been estimated based on the above proposed solutions. The costs include all the work associated with the construction procedure outlined. The probable costs are for construction only and do not include design fees or other associated soft costs. See below for estimates of these probable costs.

| | | | Divisional Breakdown | | |
|---|---|---|---|---|---|
| | | | 3rd Floor Plaza Waterproofing | 4th Floor Plaza Waterproofing | 4th Floor Storefront Replacement |
| | | **Cost per GSF** | **Estimate Amount** | **Estimate Amount** | **Estimate Amount** |
| Division 1 | General Requirements | Include in General Conditions Below | | | |
| Division 2 | Existing Conditions | $95.00 | $1,006,240.00 | $862,600.00 | |
| Division 3 | Concrete | $0.00 | | | |
| Division 4 | Masonry | $0.00 | | | |
| Division 5 | Metals | $0.00 | | | |
| Division 6 | Wood, Plastics, Composites | $0.00 | | | |
| Division 7 | Thermal and Moisture Protection | $40.00 | $423,680.00 | $363,200.00 | |
| Division 8 | Openings | $552.29 | | | $2,919,426.00 |
| Division 9 | Finishes | $0.00 | | | |
| Division 10 | Building Specialties | $0.00 | | | |
| Division 11 | Equipment | $0.00 | | | |
| Division 12 | Furnishings | $0.00 | | | |
| Division 13 | Special Construction | $0.00 | | | |
| Division 14 | Conveying Equipment | $0.00 | | | |
| Division 21 | Fire Supression | $0.00 | | | |
| Division 22 | Plumbing | $0.00 | | | |
| Division 23 | HVAC | $0.00 | | | |
| Division 26 | Electrical and Communications | $0.00 | | | |
| Division 27 | Communications | $0.00 | | | |
| Division 28 | Electrical Safety | $0.00 | | | |
| Division 31 | Earthwork | $0.00 | | | |
| Division 32 | Exterior Improvements | $0.00 | | | |
| Division 33 | Utilities | $0.00 | | | |
| | **Subtotal Direct Cost of Work** | | $1,429,920.00 | $1,225,800.00 | $2,919,426.00 |
| General Conditions | | | $944,692.80 | $926,322.00 | $1,078,748.34 |
| Permitting | | | $5,249.23 | $4,804.24 | $8,496.35 |
| Add Other Items as Applicable | | | | | |
| | **Subtotal w/ Direct Overhead** | | $2,379,862.03 | $2,156,926.24 | $4,006,670.69 |
| General Contractor Overhead - 10% of Subtotal w/ Direct Overhead | | | $237,986.20 | $215,692.62 | $400,667.07 |
| General Contractor Profit - 6% of Subtotal w/ Direct Overhead + GC Overhead | | | $157,070.89 | $142,357.13 | $264,440.27 |
| | **Subtotal w/ General Contractor's Markup** | | $2,774,919.12 | $2,514,976.00 | $4,671,778.02 |
| Construction Contingency - 15% | | | $416,237.87 | $377,246.40 | $700,766.70 |
| | **Subtotal w/ Construction Contingency** | | $3,191,156.99 | $2,892,222.40 | $5,372,544.73 |
| Builder's Risk Insurance - 0.65% of Subtotal w/ Construction Contingency | | | $20,742.52 | $18,799.45 | $34,921.54 |
| Performance & Payment Bond - 2% of Subtotal w/ Construction Contingency | | | $63,823.14 | $57,844.45 | $107,450.89 |
| | **Total Construction Cost** | | $3,275,722.65 | $2,968,866.29 | $5,514,917.16 |
| Escalation - 8% of Total Construction Cost per Year | | | $262,057.81 | $237,509.30 | $441,193.37 |
| | **Total Escalated Construction Cost to the Year 2024** | | $3,537,780.46 | $3,206,375.60 | $5,956,110.53 |
| Duration (Months) | | | 16 | 16 | 16 |




## GENERAL NOTES

1. THE CONTRACTOR IS TO PROVIDE AND INSTALL 25 COPING PANELS AND 25 VERTICAL PANELS TO MATCH THE EXIST. PANELS OF THE PERIMETER WALL AROUND THE PLAZA. THESE PANELS WILL BE USED AT THE DISCRETION OF THE DESIGNER TO REPLACE EXISTING PANELS. THIS COUNT DOES NOT INCLUDE ANY NEW PANELS REQUIRED BY THE DOCUMENTS
2. CLEAN ALL TRAVERTINE PANELS BEFORE RE-INSTALLLATION WITH A RESTORATION CLEANER BY PROSOCO..
3. UNUSED CUT PIECES OF TRAVERETINE CAN BE USED FOR DUTCHMAN PATCHES.
4. CUT AND PATCH PAVEMENT WHERE IRRIGATION LINES ARE TO BE INSTALLED. SEE IRRIGATION PLANS

SEE PLAZA PLANS A, B AND C FOR DETAILS

GRAPHIC LEGEND
EXISTING CONSTRUCTION TO REMAIN
NEW CONSTRUCTION

# OVERALL PLAZA PLAN

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

NORTH

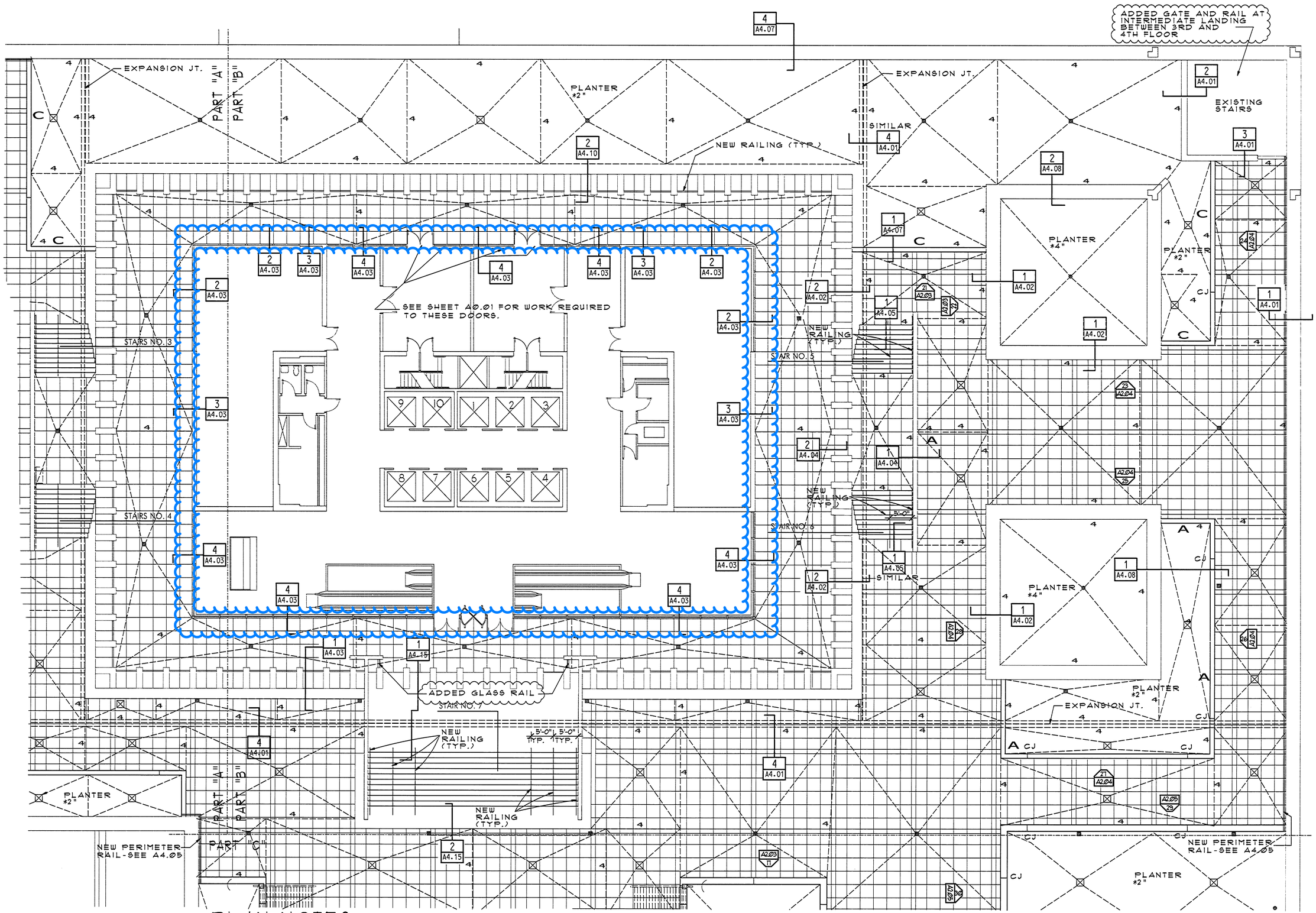
revision:
1 AS-BUILTS
2
3
4

JACK FREEMAN AND ASSOCIATES, P.C.
TLC Engineering for Architecture, Inc. A JOINT VENTURE
311 22nd AVENUE NORTH
NASHVILLE, TN. 37203
615-329-2424

EXTERIOR RENOVATIONS
WILLIAM R. SNODGRASS TENNESSEE TOWER
Nashville, Davidson County, Tennessee SBC No. 529/079-02-2007

date JUNE 18, 2008
project no. 27-134
sheet no.

A1.01
OVERALL PLAZA PLAN




## PLAN NOTES

1. A INDICATES PLANTER TYPE - SEE DETAILS ON SHEET A4.07
2. 4 INDICATES THICKNESS OF SLOPED STRUCTURAL CONCRETE
3. ☒ INDICATES NEW PLAZA DRAIN - SLOPED LIGHTWEIGHT CONCRETE THICKNESS IS 1½" TYPICAL AT DRAIN.
4. ■ ● INDICATES EXISTING PLAZA DRAIN LOCATION - SLOPED LIGHTWEIGHT CONCRETE THICKNESS IS 1½" TYPICAL AT DRAIN. SEE PLUMBING DRAWINGS FOR DRAIN WORK REQUIRED.
5. CJ INDICATES LOCATION OF CONTROL JOINT - SEE DETAIL SHEET A4.11.
6. *4" INDICATES THICKNESS OF POLYSTYRENE INSULATION IN PLANTER.

GRAPHIC LEGEND

EXISTING CONSTRUCTION TO REMAIN

NEW CONSTRUCTION

# PLAZA PLAN - PART "B"

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

N NORTH

revision:
1 AS-BUILTS
2
3
4

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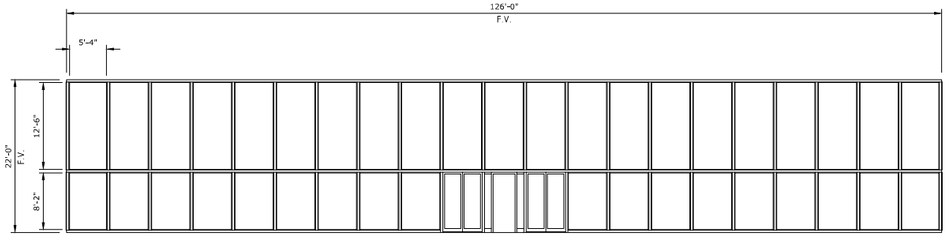
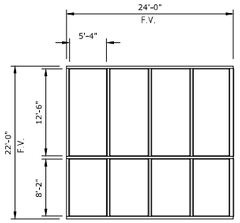
EXTERIOR RENOVATIONS
WILLIAM R. SNODGRASS
TENNESSEE TOWER
Nashville, Davidson County, Tennessee
SBC No. 529/079-02-2007

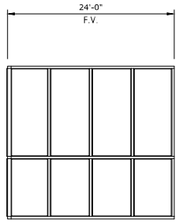
date JUNE 18, 2008
project no. 27-134
sheet no.
A1.03
PART B



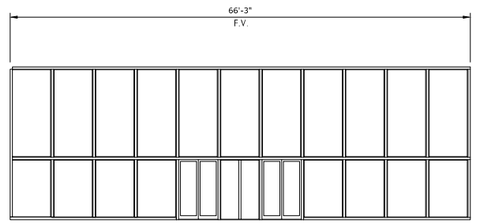

EAST CURTAIN WALL




NORTH CURTAIN WALL




SOUTH CURTAIN WALL




WEST CURTAIN WALL

1 / A402 ELAVATIONS- 4TH FLOOR ENTRANCE CURTAIN WALL - ALTERNATE #1

1/8" = 1'-0"

Johnson + Associates Architects, Inc.
328 Martin Lane
Cottontown, TN 37048
P. 615.497.0846

11.25.2020

# TN TOWER PLAZA WATERPROOFING

William R. Snodgrass TN Tower
Nashville, Davidson County, TN
SBC Project No.: 529/079-01-2019

**DRAWN BY:** WJ
**CHECKED BY:** WJ
**DOCUMENT DATE:** 11.25.2020 CD Submittal

**OWNER:**
STATE OF TENNESSEE
GENERAL SERVICES

# A402

Exterior Elevations

NASHVILLE ROOF CONSULTANTS

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Nashville, TN 37216
615-238-5737
james@nashvilleroofconsultants.com

August 30, 2023

Mr. Tim DeBuse, AIA, NCARB, LEED GA
Sr. Project Manager, Architecture
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615-604-7516
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Mr. DeBuse:

Pursuant to request, Nashville Roof Consultants performed an initial observation of the Tennessee Towers "Snodgrass" Building for the program management related to the Terrace Plaza leakage concerns the State of Tennessee requested. This letter is to follow the program requirements for the initial observations of the conditions that currently exist, recommendations for potential solutions, and deliverable information related to the program's repairs to be performed. The following deliverable is intended to provide information for this project per GMC Networks request.

**Initial observation of existing conditions:**

Nashville Roof Consultants met the GMC Network Team and the State of Tennessee's Team onsite on August 22nd, 2023. Upon meeting, the Team observed the current conditions at the 3rd floor entrance and 4th floor Terrace Plaza. The reported concerns were related to persistent leakages occurring at the 3rd floor entrance, stair plaza above the 3rd floor entrance, planters, and Terrace surrounding the 4th floor entrance area. NRC was informed of leakages occurring at the exterior and interior of spaces below the above listed locations. Upon observing the exterior components, the Team discussed the components in place. NRC was informed of the waterproofing systems anticipated below the finishes exposed on the surface. The 3rd floor terrace stairway plaza contained a terrazzo style stone finish anticipated to be placed over a waterproofing system. The stone finished were installed with sealants between the joints and extended upward over a parapet style fall protection above the entrance. The stairs contained the same style stone, in which is anticipated to be covering the same typical waterproofing system as the plaza above. The planters in the areas were observed to be covered with a stone terrazzo finish at the vertical walls and filled with vegetation within the interior. Leakages were reported to be occurring below these components.
NRC observed the drainage areas covered with the stone materials. The terrace plaza drains in these areas appeared to be eliminated at the surface and covered due to reported leakages. NRC could not observe the waterproofing systems below. It is unclear if the waterproofing encapsulated all vertical transitions behind any finishes. The information provided appeared to be designed around a hot applied system with drainage mat and insulation coverboard. The stone finishes were reported to be placed in a mortar bed with potential concrete substrate for

support. Leakages were reported to be persistent and requested to be considered for correction to reduce moisture intrusion into the facility.
The 4th floor Terrace Plaza was observed. The finishes were removed in one small area at the building connection. NRC observed the area to be filled with concrete from repairs. The travertine style paver was not installed and the waterproofing at the vertical transition appeared to be asphaltic in nature. The concrete covered the waterproofing below, in which NRC could not observe the installation methods. The concerns at these locations around the Terrace Plaza were reported to be interior leakages. The State of Tennessee's intentions are to correct the conditions resulting in leakages at the interior of the space. With this being understood, NRC observed the drainage systems in place for appropriate moisture relief. The drainage systems "drain bowl" was observed to be a two-part plaza drain system. These systems are designed to promote moisture relief in two locations. The initial location is along the surface of the travertine finish surface. The second location is concealed below the overburden finishes and anticipated to drain the waterproofing levels. When the drain screen was removed from the top of the drain component, NRC observed significant blockages within the drainage system internal second location moisture relief area. The blockages appeared to hinder the relief of moisture at the waterproofing level. These blockages are most probable to reduce moisture relief from the waterproofing level. The reduced relief is most probable to result in backing up of moisture at the waterproofing levels, forcing moisture to create pressure at detail locations. Promoting proper moisture relief was discussed while onsite.
In other areas at the building connection, the glazing systems were observed condensing at the glass components. The single pane not insulated glazing appeared to be thermally voided promoting moisture build up at the Curtain Wall System. The moisture was observed traveling down the glass to the extrusion location. NRC could not observe the Curtain Wall Systems make-up or drainage plane. It appeared the drainage plane was buried within the Terrazzo finish area. Blockages to the internal drainage system may be present if the appropriate pathways are not present. These areas could not be observed in detail at any location. The interior of the Curtain Wall was not observed and the focus of the meeting was at the exterior Terrace Plaza waterproofing system location.

**Program Recommendations:**

3rd Floor Terrace and Entrance –

NRC recommends further destructive observations be performed at the 3rd floor Terrace and transitions. In review of the area, the drainage components are covered and could not be observed functioning. The drainage areas are recommended to be exposed and observed for blockages at the second level drainage plane. If blockages are present, the blockages may be hindering proper relief of moisture and backing up waterproofing levels. If the waterproofing levels are not draining, moisture could be forced to the perimeters for overflow purposes. NRC recommends an area of destructive surveying be considered to promote more understanding of the drainage components, waterproofing components, and possible waterproofing protections anticipated to be in place. Once these items are understood, small selective areas of

overburden could potentially be removed to correct defects within the waterproofing system. Repairs to the waterproofing may be necessary to assist in leakages occurring.

4th Floor Terrace Plaza:

NRC made recommendations onsite to the Team regarding the drainage systems cleaning. The drain relief points were recommended to be cleaned at the second levels drainage plane. The debris blockages appeared to clog the pathway for moisture, in which immediate recommendations were made to promote relief of the waterproofing surface moisture. As a larger scale for the project, the areas at the interior perimeter of the building should be observed more closely. NRC recommends destructive surveying be performed at a localized area where the waterproofing transitions into the structure. This destructive surveying would promote further understanding of the drainage pathways for surface moisture at the Curtain Wall and waterproofing levels. Throughout limited observations, it appeared the pathways for moisture were hindered by concrete and overburden installations. The pathways at the building connection may need to be created to promote relief of moisture from the building connection and direction of this moisture to the cleaned drainage system. Once the destructive surveying is performed, more information may be provided regarding the waterproofing system transitions. At this time, NRC can only speculate what is currently installed. The system appeared to be a hot applied asphalt but this is unknown. The drainage mat was observed inverted in one small location, in which the proper drainage pathways may be hindered below the concrete topping pour. Correction of the drainage plane and systems components may be needed to promote reduced moisture intrusion potentials. Details with the waterproofing and Curtain Wall system may need to be corrected once further knowledge is obtained.

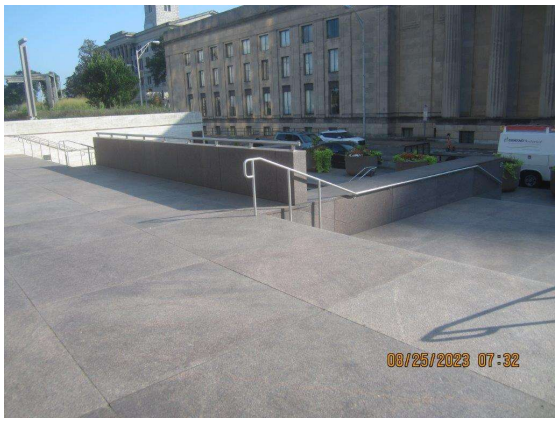
**Photographical Documentation:**



Overview of the 3rd Floor Plaza area and entrance where leakages were reported. This area would be anticipated for further destructive surveying to gain further knowledge of the conditions concealed by the exposed finishes in place.


Overview of the stair where transitions are anticipated to occur in the below waterproofing system.


Overview of the area where a drain system has been covered. NRC recommends removing the finish components above the drainage system to promote observation of the drainage relief point.


Overview of the 3rd Floor Plaza above the entrance area. NRC anticipates a waterproofing to be installed below the finish surface. Drainage locations are recommended to be observed closely.


Overview of a planter structure where leakages were reported. NRC recommends locating the drainage system for destructive surveying observations. Ensuring moisture relief is occurring is critical to the performance of the waterproofing systems below.


One leak was reported in the area shown above. The Team did not thoroughly observe this location. As per the other areas, ensure drainage components are functioning as designed.



Overview of the 4th Floor Terrace Plaza where leakages were more concerning. The State's initial program was anticipated to revolve around these waterproofing and glazing locations.



NRC observed significant condensation occurring on the glazing system. The drainage pathways within the Curtain Wall could not be observed. Further destructive surveying is recommended.



Transitions along the base of the structure are recommended to be destructed to promote further knowledge of the waterproofing installations and drainage pathways.



A Plumbing Contractor was present onsite upon NRC’s return. The technicians were working to clean the drain line of debris. The moisture in the drain piping was observed backing while cleaning was being performed.



Overview of the two-part plaza style drainage component. The technicians were cleaning the plumbing lines while NRC was present. NRC recommended the technicians clean the drain bowl and second level drain strainer screen while working to clean the drainage systems.


The drainage system was observed clogged with debris at the waterproofing level. NRC recommended cleaning the strainer of debris to promote relief of moisture at the waterproofing level. Once cleaned, the moisture from the waterproofing system should relieve as designed to reduce pressure on the surrounding components. Further destructive surveying is recommended to be performed to understand the construction make-up of all waterproofing components.


The debris blockages observed in the drainage system component was recommended for cleaning. Significant blockage was observed at multiple drain locations. The technicians were made aware of the recommendations as they were not intending to clean these areas.

Cleaning was reported to have occurred but the strainers remained to be clogged in areas surrounding the drain bowl.

**Cost Associations (Construction Budgets):**

The anticipated cost associations have tremendous variables involved. The overburden removal and reinstallation pricing could not be understood completely during the time of providing cost evaluation estimates. Once the overburden is removed, the Hot Applied Waterproofing cost associations could be considered for $35.00-$40.00 per square foot. This value would promote removal of the current waterproofing, installation of the new waterproofing, installation of the new drainage mat component, and installation of the new insulation protection system.

The overburden may be within the cost association range of $85.00-$95.00 per square foot due to the underlying concrete pour, access, logistics, storage of materials, and other project restrictions. These finishes may be capable of alteration but is currently unknown at this time. Once further design is understood, more detail cost considerations may be further provided.

We appreciate the opportunity to provide this information and assist with this project. Upon review of the above, please feel free to discuss any project information as necessary. Should there be any questions or concerns, NRC invites the open discussions to promote knowledge and further assistance.

Respectfully,

James Oldham

*BECxP, CxA+BE, RRO*
Professional IIBEC Consultant Member
Owner, Nashville Roof Consultants

This report is for the exclusive use of our client and is not intended for any other purpose. This report is based upon the information made available to Nashville Roof Consultants at the time as described above in this report. Should additional information become available in the future, Nashville Roof Consultants reserves the right to determine the impact the new information may have on our deliverables, recommendations, and may revise our opinions, or conclusions, if necessary and warranted. Our Standard Terms and Conditions apply to this work and all service deliveries. NRC welcomes discussing any questions or concerns you may have concerning this report.