155 EAST BROAD STREET PLAZA

155 E. BROAD STREET
COLUMBUS, OHIO

STORMWATER DRAINAGE MANUAL
TYPE I VARIANCE APPLICATION

Prepared By:

ADVANCED
CIVIL DESIGN

ENGINEERS & SURVEYORS
781 SCIENCE BOULEVARD, SUITE 100
GAHANNA, OHIO 43230
Ph: 614-428-7750
Fax: 614-4287755

Date:
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INTRODUCTION:
The following report provides information pertaining to a requested variance from the City of Columbus Stormwater Drainage Manual for the proposed redevelopment project for the 155 East Broad Street building located at the Southwest intersection of East Broad Street and South 4th Street.

The project redevelopment of an existing 24 Story commercial/office building that resides on 0.81 acres, into residential apartments with retail space and restaurants. The project will remove the two story atrium on the North side of the building along East Broad Street. The Western third of the atrium contains an underground mechanical room which is to remain undisturbed. The remaining area to the east will be a sunken garden feature at one story below East Broad Street. The total amount of on-site area being redeveloped is 0.268 acres.

The street frontage along East Broad Street and South Fourth Street will be brought up to the downtown streetscape standards.

In conjunction with the proposed redevelopment, 155 East Broad Street is seeking a Type I Downtown Variance since full compliance with the Stormwater Drainage Manual is impracticable.

SITE CONDITIONS

The total on-site development area equals a total of 11,681 square feet (0.268 acres). Of that, 3,947 square feet (0.091 acres) will not be disturbed as it is the roof of the existing building's mechanical room. In total, 7,734 square feet (0.178 acres) of on-site area will be disturbed by this project.

The total off-site development area equals a total of 12,063 square feet (0.277 acres) with 3,077 square feet (0.071) being left undisturbed (asphalt milling section). In total, the off-site work will disturb a total of 8,986 square feet (0.206 acres).

Individually, neither the on-site nor the off-site work exceeds the City's 10,000 square foot rule that would require the project to meet the requirements of the manual. Taken together, the total disturbed area of 16,720 square feet does exceed the limit set forth in the manual.

WATER QUALITY/QUANTITY IMPACTS

The total on-site impervious area is 11,681 square feet (0.268 acres) in the existing condition. With the improvements completed, the impervious area would reduce to 7,589 square feet (0.174 acres). The proposed on-site impervious area is 65 percent as compared to the existing 100 percent.

The total off-site impervious area is 11,958 square feet (0.275 acres) in the existing condition. With the improvements completed, the impervious area would reduce to 10,756 square feet (0.247 acres). The proposed off-site impervious area is 89 percent as compared to the existing 99 percent.

With the reduction in impervious areas the amount of runoff is reduced by 36%. This corresponds to a critical storm of 1 year. The project is still required to limit the release of the post-construction 100 year storm to the pre-construction 10 year storm and match the pre-development for the 1 year, 2 year and 5 year storm events in the post-developed condition.

With the project area being less than 1 acre, water quality is not required to be considered.

STORM WATER MANAGEMENT MANUAL VARIANCE SECTIONS:
Below is a listing of each of the four Stormwater Quality Control Groups per the City of Columbus SWDM Table 3-6 and the related hardship for this project to meet the intended requirements.

<u>Group 1: Stormwater Basins</u>

The total area of the project site is 0.81 acres with approximately 0.268 acres being disturbed/developed on-site with another 0.275 being disturbed in the right-of-way. With the entirety of the 0.268 acres of on-site being developed, there is simply not the room to install a storm water basin.

Group 2: Media Filters

The only available land for a media filter would be the eastern two thirds of the 0.268 acre piece located where the two-story atrium is being removed. However, this portion of the site will be developed into a sunken garden, which will not work in this case. The existing storm sewer outlet for this area is a 60" combined sewer whose invert is 13-feet below street level. The proposed sunken garden will be set approximately 15-feet below street level.

Group 3: Vegetated Swales and Filter Strips

The project site is located in the downtown area with very little greenspace. There is no available land to provide this option.

Group 4: Controls for Commercial Activity Areas

This project does not meet the criteria applicable to this control group.

Given that none of the four groups listed above is practical or even possible, the last possibility would be an underground system such as Storm Tech, oversized pipes, or a concrete vault. Both the pipes and the Storm Tech system would require too large of a footprint, so the concrete vault was chosen as a possible option to meet full compliance of the City's storm water manual.

PLAN OPTION "A" (FULL COMPLIANCE TO THE CITY'S SWDM):

In order to fully meet the City's storm water manual, the project site will need to provide an underground storage vault to detain the runoff from the site. The vault size required would be 65 feet long by 12.5 feet wide by 4 feet deep. Refer to the appendix for the plan of this option.

The depth of the vault puts the invert well below the invert of the combined sewer in Broad Street. Due to this, the vault will be connected to a 60" diameter, 9' deep sump pump. Within the sump pump are three pumps, two of which would be used to direct the runoff to the existing building drain while the third would pump water to the street level as an emergency overflow.

In order to collect all of the on-site storm water runoff, the drain inlets located throughout the development will need to be directed down into the tank by running vertically and then connecting to the drain pipes set for the sunken garden inlets.

The storm water vault will have two access lids for maintenance purposes. The sump pump will also have an access lid.

The storm water vault outlet pipe to the sump pump would be reduced via an orifice plate to reduce the flows out of the tank to the appropriate rates demanded by the storm water manual.

PLAN OPTION "B" (PREFERRED OPTION-NO DETENTION):

Option "B" would not provide detention per the requirements of the stormwater manual. In this case, the area drains located within the street level plaza would be collected and gravity-drained to the existing building 12" storm drain. The existing storm drain exits to the north and connects to the existing 60" combined sewer under East Broad Street.

The sunken garden portion of the development would be drained via inlets connected to a 60" diameter, 9' deep sump pump. Within the sump pump are three pumps, two of which would be used to direct the runoff to the existing building drain while the third would pump water to the street level as an emergency overflow.

Refer to the appendix for the general layout of items used with this option.

ANALYSIS

In order to provide detention as required by the storm water manual, the storage vault would need to hold at least 3000 cubic feet of water. The size of this vault as described earlier would require a lot of space in the sunken garden area. The floor of the garden is currently the basement floor of the existing atrium section of 155 East Broad Street. Below that are the existing foundations. The design of this storage vault would have to take into account the existing foundation and any other unseen obstacles.

The vault would likely need to be a cast-in-place structure with potential field adjustments occurring throughout its construction. With the tank being located 15 feet below grade, the cost to install would be elevated. Another concern for this vault would be maintenance. Over time the vault could leak and possibly begin to deteriorate. In order to repair any problems associated with the vault, the sunken garden area would need to be closed and possibly even have a large portion demolished in order to perform the needed work.

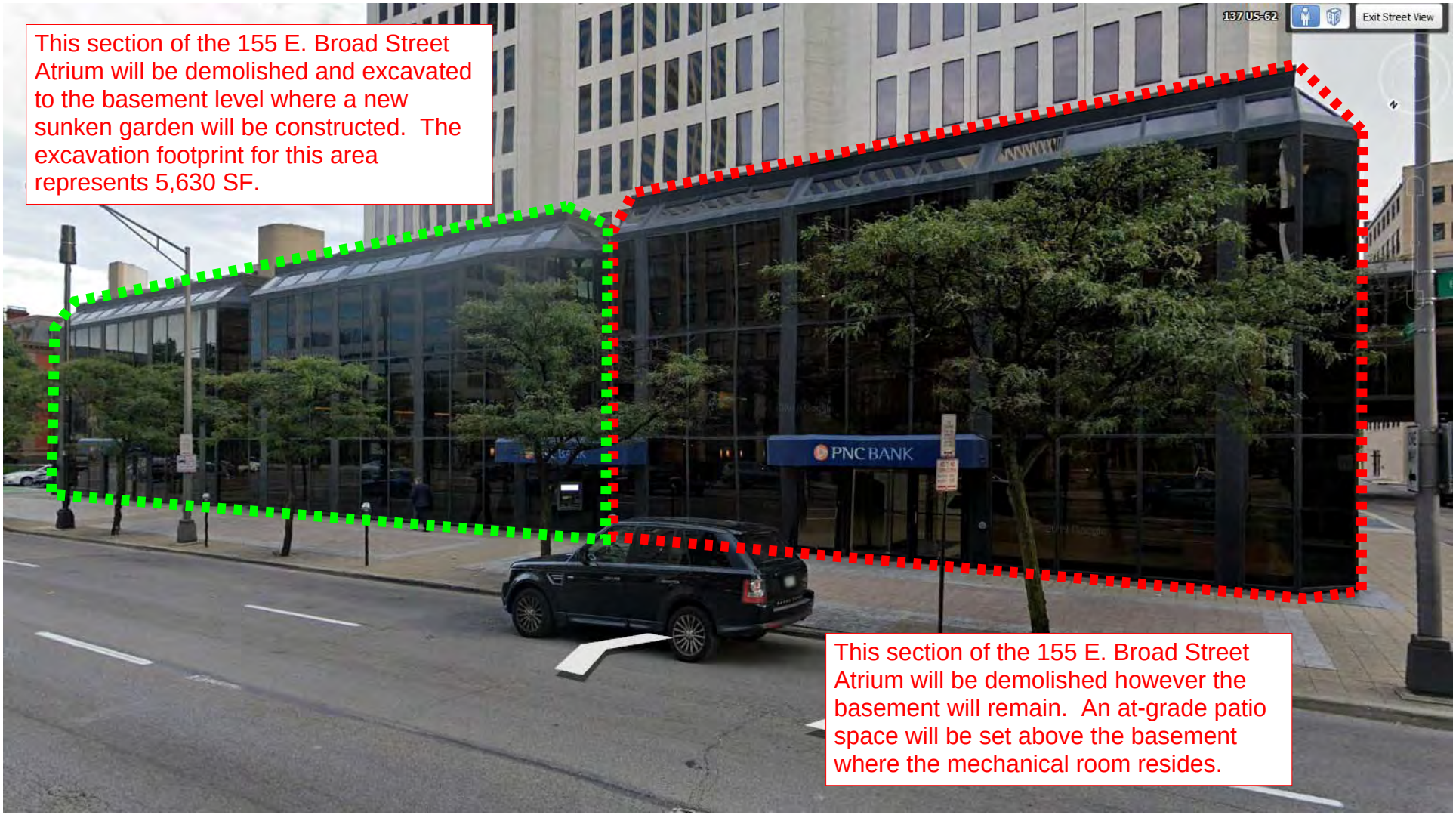
Both options will include the sump pumps, so maintenance of those is a concern either way. The sump pumps are not triggered to run with just a little bit of water in the sump. The pumps are designed to come on once there is approximately 2 feet of water. This provides some detention in the preferred option even if not the full detention that the manual would demand.

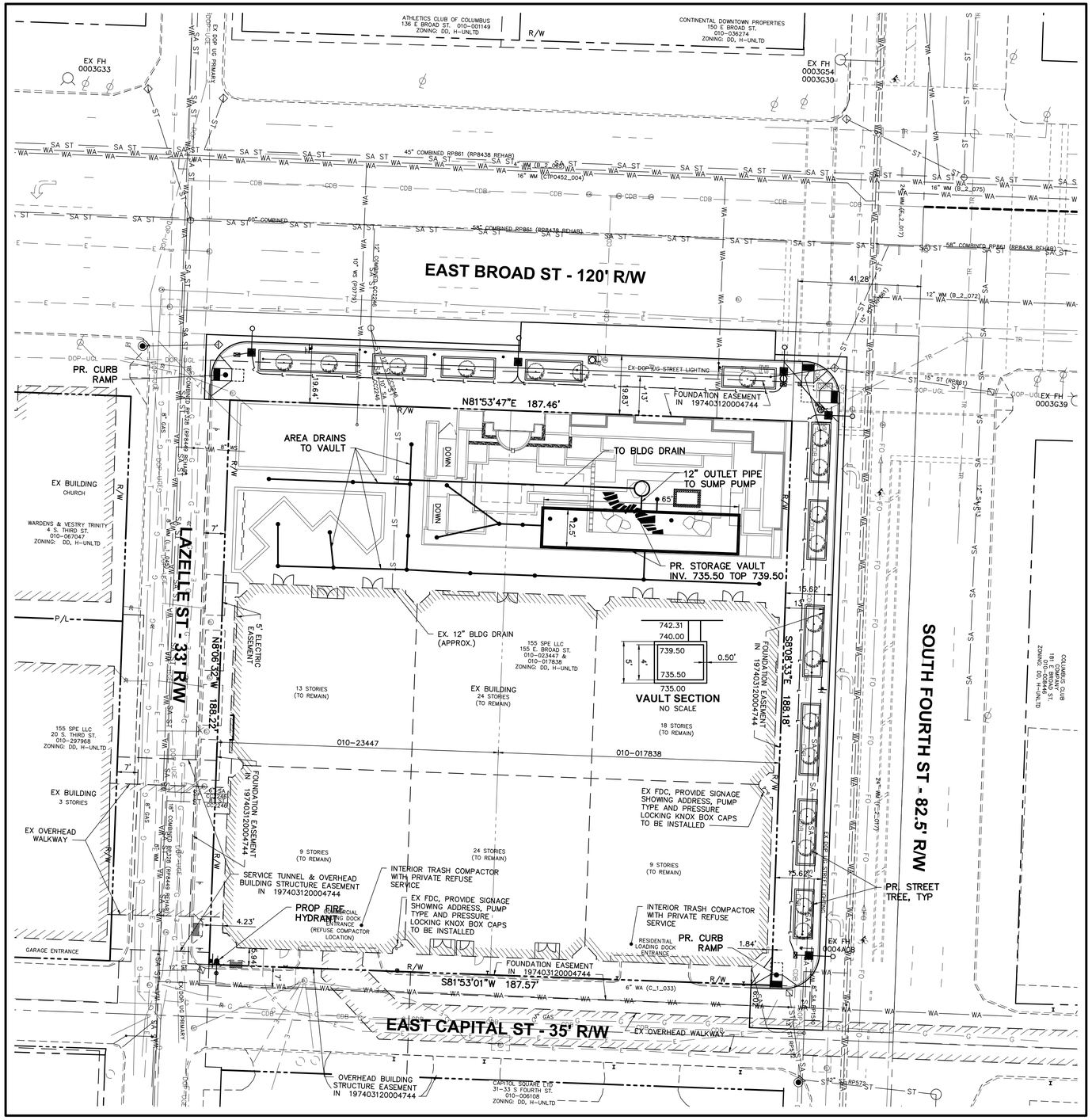
The project at 155 East Broad Street, as described earlier, does qualify to meet the requirements of the storm water manual. However, when taken in parts, it becomes less clear. The amount of on-site disturbed area is 7,734 square feet, which is less than the 10,000 square foot limit set in the storm water manual. The length of this improvement is 123 feet along Broad Street and 46 feet along Fourth Street. The developer will be providing a total of 246 feet of streetscape improvements along Broad Street and 233 feet along Fourth Street. The total disturbed linear footage is 169 feet versus the total improvements being provided to the City of 479 feet.

The project is providing a great improvement to the existing conditions along East Broad Street and South Fourth Street by decreasing the amount of impervious areas by adding planter boxes both on-site and within the right-of-way. The total runoff will decrease as it will be collected by the surface inlets and inlets in the sunken garden.

The project will be a net positive for the downtown community and therefore requests the granting of the Type I Variance from the storm water manual.

APPENDIX


This section of the 155 E. Broad Street Atrium will be demolished and excavated to the basement level where a new sunken garden will be constructed. The excavation footprint for this area represents 5,630 SF.
137 US-62
Exit Street View
PNC BANK
This section of the 155 E. Broad Street Atrium will be demolished however the basement will remain. An at-grade patio space will be set above the basement where the mechanical room resides.



STORM WATER SUMMARY

IN ORDER TO FULLY MEET THE REQUIREMENTS OF THE STORM WATER MANUAL, AN UNDERGROUND STORAGE VAULT WILL BE INSTALLED BENEATH THE LEVEL OF THE SUNKEN GARDEN. THE VAULT WILL MEASURE 12.5 FEET BY 65 FEET BY 4 FEET FOR A TOTAL OF 3,250 CUBIC YARDS OF STORAGE VOLUME.

INLETS LOCATED AT THE STREET LEVEL PLAZA AND AT THE SUNKEN GARDEN LEVEL ARE INTERCONNECTED AND DRAIN INTO THE STORAGE VAULT. THE VAULT IS CONNECTED TO A 60" DIAMETER, 9 FOOT DEEP SUMP VIA AN 8" PIPE WITH AN ORIFICE PLATE TO CONTROL THE RELEASE RATE.

WITHIN THE SUMP ARE THREE PUMPS THAT WILL TRANSFER WATER AWAY TO THE EXISTING 12" BUILDING DRAIN. A THIRD PUMP WILL ACT AS AN EMERGENCY RELIEF AND PUMP WATER TO THE SURFACE.

GRAPHIC SCALE

0 10 20 40

1 inch = 20 feet

CITY OF COLUMBUS, OHIO
STORM WATER VARIANCE EXHIBIT
FOR
155 E. BROAD STREET
OPTION "A"-NO IMPACT

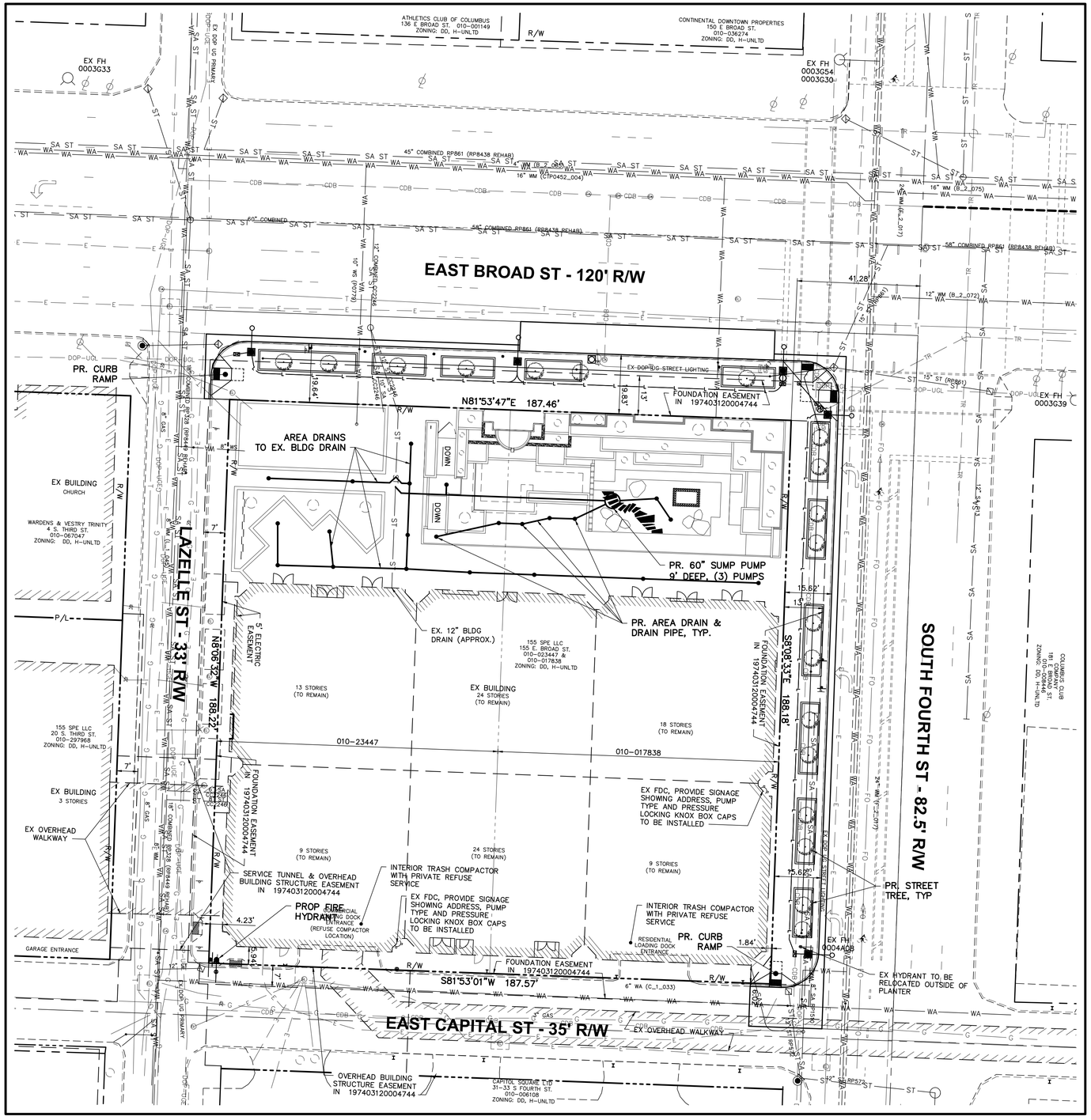
PLAN PREPARED BY:

ADVANCED CIVIL DESIGN ENGINEERS SURVEYORS

422 BEECHER ROAD
Gahanna, Ohio 43230
ph 614.428.7750
fax 614.428.7755

SCALE: 1" = 20'
DATE: 07/31/2020

SHEET 1 / 1



STORM WATER SUMMARY

THIS OPTION INVOLVES THE INSTALLATION OF A 60" DIAMETER, 9' DEEP SUMP THAT INCLUDES THREE PUMPS. THE DRAINS LOCATED WITHIN THE SUNKEN GARDEN AREA WILL BE CONNECTED TO THE SUMP. TWO PUMPS WILL BE USED TO TRANSFER WATER TO THE EXISTING BUILDING DRAIN WHILE THE THIRD PUMP WILL BE USED AS AN EMERGENCY RELIEF TO GET WATER TO THE SURFACE LEVEL.

THE AREA DRAINS LOCATED AT THE SURFACE LEVEL PLAZA WILL BE INTERCONNECTED AND TIED INTO THE EXISTING BUILDING DRAIN.

GRAPHIC SCALE

0 10 20 40

1 inch = 20 feet

CITY OF COLUMBUS, OHIO
STORM WATER VARIANCE EXHIBIT
FOR
155 E. BROAD STREET
OPTION "B"-PREFERRED

PLAN PREPARED BY:
ADVANCED CIVIL DESIGN ENGINEERS SURVEYORS
781 Science Boulevard, Suite 100
Gahanna, Ohio 43230
ph 614.428.7750
fax 614.428.7755

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