

PUBLIC WORKS ENGINEERING DIVISION

Date: Thursday, May 24, 2018

To:

GEORGE BUTLER ASSOCIATES INC
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From: Gene Williams, P.E.
Senior Staff Engineer

Application Number: PL2018074

Application Type: Engineering Plan Review

Application Name: The Grove - Mass Grading and Stormwater Plans

The Development Services Department received plans for this project on May 04, 2018. We have completed our review and offer the following comments listed below.

- Resubmit three (3) full size sets of plans (no larger than 24"x36") folded to 8-½"x11", one (1) comment response letter, and one (1) digital copy following the electronic plan submittal guides as stated below.
- Revised plans will be reviewed within five (5) business days of the date received.

Engineering Review

1. The "Final Stormwater Management Study for the Grove at Lee's Summit", dated May 3, 2018 (hereinafter referred to as "the stormwater study") appears to be missing the following items: 1) discussion of wetland and USACE issues, 2) an existing condition drainage area map, with points of interest defined for each subarea, including any off-site contributors to the drainage areas with contours, 3) a proposed condition drainage area map, with the same information listed for the existing condition map, 4) elevation-area-volume curves for the storage facility including notation of the storage volumes allocated to runoff, sediment, and permanent residual water storage for other uses (wet basins only), 5) inflow hydrographs for all (1, 10, and 50-percent) design storms, 6) stage-discharge rating curves for each emergency spillway, primary outlet works and combined outlets and overflows, 7) routing curves for all (1, 10 and 50-percent) design storms with time plotted as the abscissa and the following plotted as ordinates:
following plotted as ordinates:
 - Cumulative inflow volume
 - Cumulative discharge
 - Stage elevation
 - Cumulative storage
2. The stormwater study did not appear to discuss details concerning the emergency spillway. Will the emergency spillway be incorporated into the riser structure, or will a separate emergency spillway be constructed (e.g., earthen spillway)?

3. The stormwater study discusses blockage of the low flow orifice (i.e., the 8" orifice). Section 5600 of the Design and Construction Manual requires that the 100 year water surface elevation be calculated assuming 100% clogging of the primary outlet works, and assuming zero available storage. In other words, it does not appear this was taken into account during design of the detention basin or the emergency spillway.
4. Section 5600 of the Design and Construction Manual has specific requirements for an effective emergency spillway system. It must have a crest elevation of no less than 0.5 feet above the 100 year water surface elevation (unclogged primary outlet works condition), and there must be a minimum of 1.0 feet of freeboard between the 100% clogged-condition 100 year water surface elevation and the top of the dam. It does not appear these conditions have been met, since there appear to be no calculations showing the 100% clogged/zero available storage water surface elevations for the 100 year event.
5. The stormwater study did not appear to discuss sedimentation allowance within the basin in accordance with Section 5600 of the Design and Construction Manual. This would include calculations of sedimentation of not less than 5 years accumulation.
6. Will the pond include fish? If so, please be aware of the depth requirements contained in Section 5600.
7. A sediment forebay appears to be missing from the pond. Please see Section 5600 of the Design and Construction for specific requirements.
8. Drawdown provisions within the retention pond appear to be missing (i.e., siphon or drain). If these are not being utilized, discuss in the report and provide justification for their exclusion. This provision is needed in case the water level in the pond needs to be lowered during an emergency situation, such as a dam breach or other issue.
9. The outlet structure appears to be missing anti-clogging measures. In accordance with Section 5600 of the Design and Construction Manual, a reverse slope pipe which draws from below the permanent pool, or other method must be utilized. As proposed, the outlet structure will likely clog on a frequent basis.
10. The stormwater study contradicts the detention basin outlet structure shown on Sheet C7.8. There are too many discrepancies to list in this comment letter, so we are asking that a thorough review be conducted. Orifices are called-out in the stormwater study, while the plans appear to show weirs. This must be reconciled.
11. The shoo-fly appears to propose MoDOT Type 5 for the surface course. This design, including the simple subgrade design (i.e., compacted native subgrade) does not appear to be capable of supporting the weight of emergency vehicles. As design must be presented showing how this will be capable of supporting the weight of a fully-loaded fire apparatus truck.

12. Sheet 7.2: The PPP pipe appears to be laid on native subgrade, according to the detail. The City requires an aggregate bedding be placed.
13. Sheet 7.2: A mud mat is not desired when using pre-cast box culvert structures. If pre-cast, then do not specify its use. If cast-in-place, then a mud mat is required. It must be 6 inches thickness rather than the 4 inch thickness shown in the plans.
14. Where are the calculations for energy dissipation at the end of the triple PPP? Will the flow be supercritical? If so, additional energy dissipation structures are required. Rip-rap is not sufficient in this instance. Keep in mind that the calculations of velocity on the storm calculation tables would appear to represent steady sub-critical flow rather than supercritical flow.
15. The triple PPP culvert appears to be too shallow beneath the roadway. It would appear these culverts will tend to float, and also are not capable of withstanding loading requirements for the roadway. It is likely that a RCB structure is warranted at this location.
16. The current storm drainage beneath 16th Street daylights into what appears to be a natural stilling basin. The proposed replacement does not appear to incorporate this design element into the design, and there is a significant concern about downstream erosion issues.
17. An enlarged grading plan for the retention basin is warranted. Sheet C4.0 shows the grading for the retention basin, but contours are shown very close to each other, with no clear definition between successive contours.
18. Please be aware that an as-graded and as-built plan for the detention basin shall be required prior to issuance of a Certificate of Substantial Completion. This includes both the grading, and the outlet structure construction details.
19. The hydraulic grade line for the 100 year storm event was not shown on the profile views for any of the storm lines. This is required.
20. If the hydraulic grade line for the 100 year event is above the crown of the pipe, then justification must be given for this design. Section 5603.1 of the Design and Construction Manual specifies that "...pressure flow may be justified in certain instances." If the hydraulic grade line for the 100 year event is above the crown of the pipe, then justification must be given for this design.
21. Sheet C5.5: The outlet for storm line for the Summit Street RCB is shown in what appears to be supercritical flow at the outlet. Although this is partially submerged at the end of pipe, there may be significant issues with this design. For example, it is likely that submerged erosion will occur within the retention basin, and will eventually lead to undermining of the end section and eventual failure.

22. Sheet C5.6: Are these calculations assuming steady uniform, subcritical flow? If so, then it would appear many of the calculations of velocity at the end of pipe are in error?
23. Voided. Please disregard this deleted comment.
24. Have all the necessary drainage easements, water line easements, and utility easements been obtained?
25. Sheet C7.7: A 4' by 5' Reinforced Concrete Box is shown. What does this detail refer to? Where is the plan view? Are there pipes connected to the box?
26. Sheet C7.8: Significant issues remain unresolved concerning the details shown on this sheet. Please see previous comments related to the detention basin outlet structure. If elevations are shown, they must be clearly identified with a specific orifice or weir or other opening. As shown, it is impossible to say with any certainty what these elevations represent. In addition, they do not agree with the stormwater report.
27. Plan and Profile Sheets for Triple Culvert: Please see previous comment related to the proximity of the PPP to the pavement. In addition, it appears the wall thickness was not accounted when drawing the pipe. In other words, the pipe will be even closer to the surface than shown.
28. It is our understanding that the "cut-off channel" to the east of the 102 SE 16th St. will be piped, and eventually connected to a box within the triple culvert system. It is our understanding these plans will be provided as part of the 16th Street project. As such, no approval for the Mass Grading and Stormwater shall be granted until the 16th Street plans have been approved. Simultaneous construction shall be required, since this is integral to the entire system.
29. Concerning the Downstream Hydraulics: Was the 100 year 100% clogged condition for the primary outlet works (i.e., all orifices and weirs excluding the emergency spillway) considered when calculating the capacity of the downstream triple culvert? Was the assumption of "zero available storage" (i.e., essentially, was the 100 year event upstream of the retention basin) taken into account for this condition? In accordance with the Design and Construction Manual, if this triple culvert is being utilized as the emergency overflow system, then it must be sized to handle the 100 year storm event upstream of the retention basin. In other words, the upstream hydrograph must pass through the triple culvert without surcharging.
30. Please submit a hardcopy version of the stormwater study. The electronic version contained a font type that was not recognized, and the resulting printout contained printing errors.
31. Please define "BHC Watershed" mentioned in the stormwater study.

Traffic Review

1. Shoo-Fly requires more detail in the plans. The alignment should be established in the plans, rather than

referencing another planset. The width should be dimensioned, temporary traffic control plan detailed (not TBD in coordination with inspections), and surface (and typical section) shall comply with Fire Department requirements capable of accommodating emergency vehicle apparatus weight.

In order to calculate the Engineering Plan Review and Inspection Fee, a sealed Engineer's Opinion of Probable Construction Costs shall accompany your final submittal copies. The itemized estimate (material and installation) shall be sufficiently broken down and shall include the following items, as applicable.

- Public infrastructure, both onsite and offsite.
- Private street construction, including parking lots and driveways.
- Sidewalks located within the right-of-way.
- ADA accessible ramps.
- Sanitary sewer manholes and piping between manholes, including private mains.
- Connection of the building sanitary sewer stub to the public main.
- Waterlines larger than 2 inches in diameter, valves, hydrants, and backflow preventer with vault, if outside the building.
- Stormwater piping greater than 6 inches in diameter, structures, and detention / retention facilities - public or private.
- Water quality features installed to meet the 40-hour extended duration detention requirements.
- Grading for detention / retention ponds.
- Grading to establish proper site drainage.
- Utility infrastructure adjustments to finished grade (i.e. manhole lids, water valves, etc.).
- Erosion and sediment control devices required for construction.
- Re-vegetation and other post-construction erosion and sediment control activities.

Electronic Plans for Resubmittal

Development engineering plan resubmittals shall include an electronic copy of the documents as well as the required number of paper copies.

Electronic copies shall be provided on CD in the following formats

- Plats – All plats shall be provided in Tagged Image Format File (TIFF) Group 4 compression.
- Engineered Civil Plans – All engineered civil plans shall be provided in Tagged Image Format File (TIFF) Group 4 compression. All sheets shall be individually saved and titled with the sheet title.
- Architectural and other plan drawings – Architectural and other plan drawings, such as site electrical and landscaping, shall be provided in Portable Document Format (PDF).
- Studies – Studies, such as stormwater and traffic, shall be provided in Portable Document Format (PDF).
- It is requested that each plan sheet be a maximum of 2MB.

Please contact me if you have any questions or comments.

Sincerely,

Original Signed

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cc: Development Engineering Project File