



March 25, 2022

Mr. Robert Pawlak
Portsmouth Charter Township
1711 W. Cass Avenue Road
Bay City, MI 48708

RE: Stoney Acres Subdivision – Review of Drainage System
Bay County, MI

Mr. Pawlak,

Per your request, Spicer Group has performed a cursory review of the drainage system in the Stoney Acres Subdivision. The review consisted of an office review of the available plans from the subdivision construction and a field review.

DRAINAGE SYSTEM BACKGROUND BASED ON PLAN REVIEW

Based on the review of the original construction plans on file, the current drainage system is composed of three basic components:

1. The storm sewer drainage system that drains storm water to the detention pond
2. The detention pond that stores/detains excess storm water during rain events
3. The storm sewer outlet pipe that conveys water released from the detention pond to the county drain

According to the construction plans, it appears that this drainage system was designed around having a detention pond that holds water continuously (commonly referred to as a “wet detention pond”). The pond is designed to maintain water at an elevation of 593 feet during normal weather conditions and store water up to an elevation of 595 feet during rain events. The main line storm sewer drainage pipe outlets into the pond at an invert elevation of 589 feet. As you can see by comparison of the elevations above, the water in the pond is designed to be at a depth that is approximately four (4) feet above the invert of the storm sewer drainage pipe.

The water in the pond is drained by a separate storm sewer once the water in the pond exceeds 593 feet in elevation. The outlet storm sewer conveys the storm water to the county drain on the east side of Trumble Road. At the end of the outlet storm sewer, there is a flap gate that is designed to act as a check valve that prevents water from the county drain backing up into the pond when water levels in the county drain are elevated.

CURRENT CONDITIONS BASED ON FIELD REVIEW

On February 24th, 2022, and March 22nd, 2022, we visited the Stoney Acres Subdivision to perform the cursory engineering field review of the detention basin and associated drainage infrastructure. The intention of this review was to note any deficiencies in the system that could be visually observed and to verify that the detention basin was operating as designed. Below is a summary of the conditions observed on each component of the system.

Drainage System Storm Sewer

As described above, the detention basin and storm sewer holds approximately four (4) feet of water at all times. Due to this fact, the drainage structures and the storm sewer pipes were submerged at the time of inspection as expected. Because of the submerged nature of the storm sewer, it is not possible to visually see the condition of the existing storm sewer from the surface. In addition to inhibiting visual inspection

of these pipes, this type of design leads to sedimentation within the storm sewer as well as the detention basin.

Because we could not visually assess the condition of existing storm sewer, we are recommending having the sewer cleaned and video inspected (also referred to as televising) to ensure proper function and identify any deficiencies. To perform these tasks, the storm sewer will need to be dewatered by pumping the water out of the system.

Detention Basin

The Detention Basin appeared to be functioning properly, in regard to storing stormwater and releasing water to the storm sewer outlet, however there are several condition issues that were observed. Trees have fallen from the adjacent property into the basin. These fallen trees have also damaged the fence surrounding the basin at multiple locations. We recommend removing these trees and repairing the damaged portions of fence.

Due to the nature of being a wet detention basin, the slopes of the basin are saturated and unvegetated. These conditions appear to have led to slope stability concerns. The banks appear to be settling around the basin and sloughing into the detention basin forming steep slopes. We also observed what appeared to be several small pump houses near the detention pond indicating that some residents may be using the pond water for irrigation purposes. Rapidly and repeatedly drawing down the pond with pumps can encourage/accelerate the sloughing previously mentioned. We recommend against frequently having rapid drawdowns on the pond. Any drawdowns being performed should be gradual and solely for the purposes of maintenance. We are unclear as to what slope was used when constructing the basin as the 6 horizontal to 1 vertical slopes indicated on the plans will not physically fit in the footprint shown on the plans or occupied in the field.

We recommend performing maintenance to prevent further erosion of the pond banks by placing riprap or other reinforcing measures and removing any accumulated sediment that may be obstructing the storm sewer outlet for the drainage system.

Based on the design plans, the minimum top of bank elevation around the detention basin was to be 596 feet with the proposed top of storage for the 100-year storm to be 595 feet. Based on review of 2016 elevation contour data available from the Bay County GIS, it appears that there are elevations on the north and east side of the detention basin that are between 1 foot to 1.5 feet below the proposed elevation of 596 feet. It is unclear if this is related to the original construction not following the plan or due to settling. Additionally, it was observed that many of the drainage patterns of the surrounding parcels outside of the subdivision are encouraging water to drain into the detention basin. Based on the design plans, it does not appear as if any non-subdivision drainage was accounted for in the basin design.

We recommend the ground elevations surrounding the pond be surveyed to verify the maximum allowable storm water storage elevation. The calculations performed for the design of the detention basin should also be reviewed to verify that proper volume in the detention basin exists for the additional storm water being contributed by the neighboring parcels.

Outlet Storm Sewer

The last item reviewed was the outlet storm sewer of the detention basin that conveys storm water into the county drain. Storm sewer pipe for the outlet appeared to be in fair condition. It appeared as if there may have been some movement of the plastic storm sewer inlet at the pond. Based on the design plan this pipe was intended to be a reinforced concrete pipe sewer, which would have been more resistant to buoyancy forces and movement. Upward movement of this storm sewer inlet can affect the elevation at which the

water level in the pond is maintained and the amount of stormwater storage available. We recommend surveying the elevation of the pipe and correcting any elevation issues that exist.

On the downstream end of the outlet storm sewer, the flap gate in the county drain is in very poor condition and is not functioning. The flap gate appeared to be a poorly fabricated flap gate by the contractor as opposed to an engineered, commercially available flap gate. The flap gate is very light weight and as a result has sustained severe damage. The bottom of the flap gate was also stuck open due to sediment in the drain bottom. If the sediment were removed, it is unclear if the flap gate would be able to operate correctly due to severe damage and low-quality construction. We recommend replacing the existing flap gate with a heavy duty commercially available flap gate mounted to a pre-cast concrete headwall.

PLANNING LEVEL
MAINTENANCE ACTIVITIES

Drainage Storm Sewer Dewatering, Cleaning, and Televising
Tree Clearing Around Detention Basin
Fence Repairs Around Detention Basin
~~Riprap Bank Stabilization Around Detention Basin~~
Corrections to Storm Water Inlet Elevation (if needed)
Flap Gate Replacement

Please note that prior to engaging with a contractor to perform the recommended maintenance activities, further engineering and surveying should be completed as part of the development of a comprehensive maintenance plan. We also anticipate that permits will be required for certain activities.

Please let me know if you have any questions. Thank you.

Sincerely,



Nicholas D. Czerwinski, P.E.
Senior Project Manager

SPICER GROUP, INC.
230 S. Washington Avenue
Saginaw, MI 48607
Cell: (989) 529-0256
nickc@spicergroup.com

Enclosure:

Field Review Photos

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STONE ACRES SUBDIVISION - REVIEW OF DRAINAGE SYSTEM



Standing water and submerged pipe in catch basin



Damaged fence gate



Fallen trees and damaged fence on north side of pond



North bank of pond



Erosion on south bank of detention pond



Eroded bank on east side of detention pond



Pump house on south side of detention pond



Storm water inlet to adjacent non-subdivision parcel



Detention pond outlet



Flap gate unable to close or open due to sediment and damage



Damaged flap gate