OAKMONT COMMONS – COMMONS DRIVE FLOODING AND DRAINAGE EVALUATION

FOR

Oakmont Commons HOA

August 1, 2019

Prepared By:

GATEWAY

On Call. On Time. On Target.

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INTRODUCTION

This Report is to detail the findings and propose recommendations to mitigate the flooding issues at Oakmont Commons. The report was prepared as a follow up to the meeting held on Wednesday, June 19, 2019 with Oakmont Commons and the Borough of Oakmont to review the various storm water issues which have been experienced more frequently at the Oakmont Commons. Previous evaluations and discussions had been performed with Borough over the past 3 years in an attempt to address the increasing stormwater issues encountered.

On July 11, 2019, two representatives from Gateway Engineers visited the site at Oakmont Commons to gain further understanding of the source of the water and flooding issues in the areas of concern. Gateway was directed to specifically evaluate the outfall and drainage from the Crystal Drive neighborhood and its effects on the 200 numbered houses along Commons Dive. The date of the visit was the same day as a large rain event which occurred in the area. Observing the rainfall and flow patterns along the hillside provided a better visual of how the water sheet flows and channelizes from the top to the bottom.

EVALUATION

The two main focal points of what was discovered include the two defined channels which originate at a point source along the top of the hill, and the assumed ground water and sheet flowing which has no determined discharge point. The discharge of the public system along Crystal Drive provided the two separate locations of defined channel flow. The discharge point behind 28 Crystal Drive (Erickson property) was a known point source. The water from this location has overtime formed a defined channel which conveys water approximately ¾ of the way down the hill and then disperses into a sheet flow. This eroded channel has altered the natural course of flow for runoff in this area of the hillside. The other unmapped point source behind 26 Crystal Drive also forms a defined swale, however this channel stays formed the entire length until it reaches the downstream inlet. The exact source of this water is undetermined at this time. These two points are a significant source of concentrated water which needs to be addressed along with the excessive groundwater, both of which contribute to the flooding.

Along the rear of Commons drive at the 200 numbered houses, an existing drainage system, which includes a few inlets and larger pipe, was installed to help relieve the flooding issues. The pipes don't appear to have sufficient capacity to handle the volume of flow for large rain events. The pipe sizes were not able to be measured due to the amount of flow on the date of the site visit. This system was assumedly installed to convey water that collects in the rear side of the property. The water is then piped downstream through the public system, ultimately to Plum Creek.

During the rain event, water was observed ponding behind the 200 houses and eventually making its way to existing Inlets 2 and 3 shown on the Exhibit by way of surcharging to a level above the existing embankments. The channelized flow from the western channel meandered down the hill and discharged to existing Inlet 1 shown on the Exhibit and not the existing "marsh" area as believed to be originally intended. Over time, the erosion created from the channel appears to have built up in the "marsh" area which can no longer accept water as it appears it was originally intended. Flow from the eastern channel dispersed and began sheet flowing approximately ¾ of the way down the hill. The

groundwater sources emerged from the hillside at multiple locations and appeared to accumulate volume as it flowed down the hillside. Large volumes of water were observed at the toe of the slope.

There are other know flooding issues along the 100 numbered houses at Commons drive which are being addressed and will require additional evaluation.

RECOMMENDATION

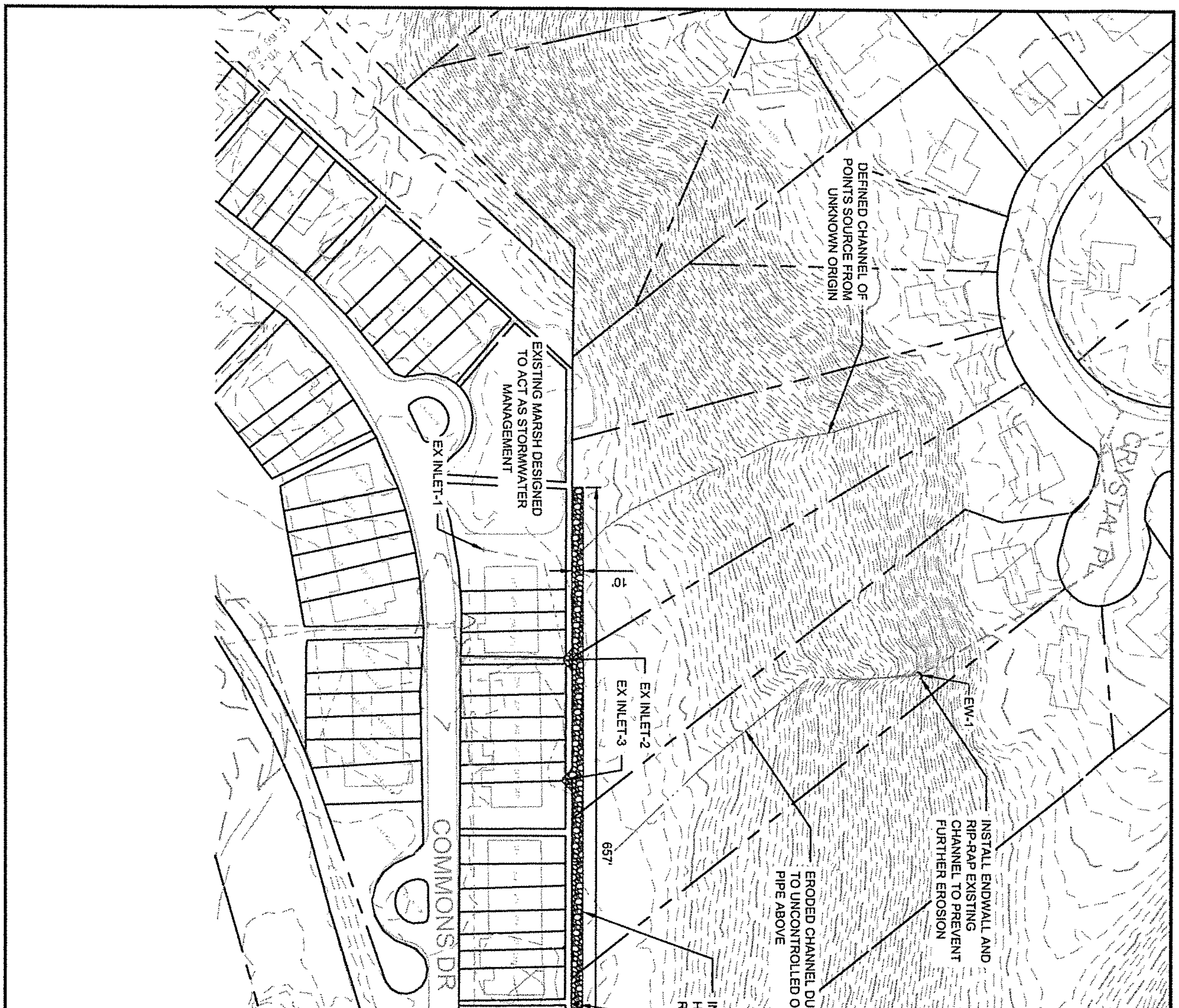
After reviewing the site and the drainage patterns, Gateway is proposing the installation of a rip rap drainage swale along the length of the 200 numbered properties (approximately 660 LF) in order to mitigate both sources of water. Located along the swale will be two additional inlets that will convey water collected by the swale though a pipe system and discharge the water to the creek along the eastern side of the project. Minor grading and modifications to the existing inlets will also create a location for the water collected by the swale to discharge. Gateway also recommends installing a concrete endwall at the discharge points with rip rap in the existing channel to lessen erosion and reduce the velocity of the flow from the point sources. We determined this recommendation to be the most feasible due to the lack of any one single source of water. From the site visit, the two point sources appear to be the main contributor to the flow volume; however all flow must be captured to mitigate the damage.

All pipe sizes for the proposed swale drainage system were designed to a 25-year storm event. The existing system will need to be evaluated to determine if it is adequate to handle the flows. This existing system would include anything downstream that could be impacted by the flows and owned by the Borough. This evaluation would determine capacity of the existing system. Gateway has general information on the existing system behind the 200 number houses, however a site survey is recommended to verify the locations, depths, and sizes of the drainage system in this area to ensure data accuracy. Gateway recommends the HOA work with the Borough to obtain easements through the properties behind Crystal Drive. A full site survey is also recommended to ensure proper slopes and location of the proposed swale for design purposes.

Attached is an exhibit depicting the approximate locations of the proposed drainage swale and pipe system. Also attached is the pipe sizing calculations used to determine the proposed system pipe sizes.

Another recommendation would involve the dredging of the "marsh" area so that it could be utilized as a stormwater BMP again. Once the erosion and sediment buildup in the "marsh" is removed, the area would be expected to allow water to infiltrate instead of runoff. Infiltration testing would be recommended to determine the expected drainage abilities of the "marsh" area.

After a thorough review of the site, the evaluation that was completed was only to review the water issues stemming from Crystal Drive. Future recommendations would include a full review of downstream capacity issues, the potential for onsite storage, or possibly other stormwater BMPs. Currently there are known backups that cause issues in other parts of the community. Based on the information provided in this report, it can be assumed that, if actions are not taken to control the runoff from the above properties as well as natural runoff, flooding of the Oakmont properties will continue during significant rain events. Constructing a swale would be a beginning step to mitigate flooding issues along Commons Drive.


DEFINED CHANNEL OF
POINTS SOURCE FROM
UNKNOWN ORIGIN
EXISTING MARSH DESIGNED
TO ACT AS STORMWATER
MANAGEMENT
EX INLET-1
10'
EX INLET-2
EX INLET-3
657'
EW-1
INSTALL ENDWALL AND
RIP-RAP EXISTING
CHANNEL TO PREVENT
FURTHER EROSION
ERODED CHANNEL DUE
TO UNCONTROLLED OUTFLOW
PIPE ABOVE
INSTALL 2.0' DEEP SWALE AT TOE OF
HILLSIDE TO CATCH GROUNDWATER AND
REDIRECT IT AWAY FROM THE HOUSES
INLET-A
INLET-B
INSTALL PIPE SYSTEM TO
REROUTE STORMWATER
TO NEARBY STREAM
EW-2
COMMONS DR
CRYSTAL PL
COLORADO ST
NORTH
GRAPHIC SCALE
0
50
100
200
(IN FEET)
1 inch = 100 ft.

OAKMONT COMMONS DRAINAGE ISSUES

COMMONS DRIVE, OAKMONT, PA 15139
ALLEGHENY COUNTY, PA

PREPARED FOR:

OAKMONT COMMONS

OAKMONT, PA 15139
ALLEGHENY COUNT, PA

DRAINAGE EXHIBIT

EX-1

REVISION RECORD

GATEWAY®

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