



**LAKE COLUMBIA
STS OUTFALLS**
JACKSON COUNTY, MICHIGAN

1 inch equals 2,000 feet

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Figure 10: Storm Drain Outfalls

Storm Drain Outfall Survey

A survey of storm drain outfalls around Lake Columbia was conducted by staff from Progressive AE on August 1, 2007. The initial field survey identified 26 storm drain (SD) outfalls (Figure 9 and Appendix D).

The following is a description of each of the SD outfalls observed, the current condition and functional status of each, and recommendations for improvements, if necessary:

- SD 1 - A 15-inch diameter smooth interior corrugated high density poly ethylene (HDPE) pipe located immediately north of the cul-de-sac for Beechmont Drive (Photo 1, Appendix D). The catchment area drains approximately three acres of residential development and roads through a catch basin (Photo 2, Appendix D). No excess sedimentation was observed at the pipe outfall and the structures appeared to be in good working condition. No immediate improvements are necessary other than routine inspection and maintenance.
- SD 2 – A 12-inch diameter reinforced concrete pipe located due west of Ivanhoe Drive (Photo 3, Appendix D). The catchment area drains approximately two acres of residential development and roads through a series of catch basins. No excess sedimentation was observed at the pipe outfall. However, some sediment was observed near one of the catch basins. This could be an indication of settling in the vicinity of the catch basin. The settling near the catch basin could be rectified by re-establishing the proper grades on properly compacted soils.
- SD 3 – A 15-inch diameter corrugated metal pipe located immediately east of Waverly Court (Photo 4, Appendix D). The catchment area drains approximately 3.5 acres of residential development and roads through a series of catch basins and culverts. No excess sedimentation was observed at the pipe outfall. The outfall pipe appeared to be angled in an upward direction (possible from ice movement on the lake). In addition, the upstream end of the culvert was partially crushed. In order to improve the drainage characteristics of the pipe outfall, a portion of the pipe may need to be replaced at both the upstream and downstream terminal ends (or the entire pipe should be replaced).
- SD 4 – A 10-inch corrugated plastic pipe located immediately southwest of the Paula Drive cul-de-sac (Photo 5, Appendix D). The catchment area drains approximately 2.5 acres of residential development and roads through a series of catch basins. No excess sedimentation was observed at the pipe outfall and the structures appeared to be in good working condition. No immediate improvements are necessary other than routine inspection and maintenance.
- SD 5 – A 12-inch diameter reinforced concrete pipe located immediately west of the intersection of Boyce Drive and Hewitt Road (Photo 6, Appendix D). The catchment area for this outfall occupies approximately 2.5 acres of residential development and roads. The functionality of this outfall is questionable due to its location (approximately 20 feet upstream of the lake) and the fact that the pipe was approximately 2/3 filled with sediment. A more detailed assessment of this stormwater outfall may be necessary (under storm conditions) to determine the necessity or effectiveness of the current pipe configuration.
- SD 6 – A 10-inch diameter corrugated plastic pipe located just west of the dam and south of the Imperial Court cul-de-sac (Photo 7, Appendix D). This pipe drains an approximate 1.5 acre area of residential development, roads, and forested land cover through tree separate catch basins. No excess sedimentation was observed at the pipe outfall and the structures appeared to be in good working condition. No immediate improvements are necessary other than routine inspection and maintenance.

- SD 7 – A 12-inch diameter corrugated plastic pipe located immediately east of Wesch Road (Photo 8, Appendix D). The catchment area for this outfall occupies approximately 3 acres of residential development and road drainage from Wesch Road. The outfall pipe was approximately $\frac{1}{4}$ full of sediment and a small delta was present immediately downstream of the outfall pipe. It may be necessary to install a catch basin upstream of the outlet pipe to intercept the flow of sediment to the lake. Periodic monitoring of the catch basin would be required and a clean-out schedule established.
- SD 8 – A 10-inch diameter corrugated metal pipe located immediately south of the intersection of Fletcher Drive and Wesch Road (Photo 9, Appendix D). This catchment area occupies about 2.5 acres of residential development and both paved and unpaved roadways. The unpaved portion (Fletcher Drive) is apparently contributing sand to the outfall pipe (Photo 10, Appendix D). It is recommended that this road either be paved or a catch basin installed upstream of the outlet pipe to intercept this sediment before it reaches the lake. Periodic monitoring of the catch basin would be required and a clean-out schedule established.
- SD 9 – A 12-inch diameter reinforced concrete pipe located immediately south of the intersection of Wesch Road and Castlewood Drive (Photo 11, Appendix D). The catchment area encompasses approximately 3.5 acres of residential development and the road drainage from Wesch Road and a small portion of Castlewood Drive. Sedimentation is actively occurring at this outfall and a fairly significant delta of sand and silt has formed below the outfall. Again, it is likely that the source of the sediment may be the unpaved Fletcher Drive. It is recommended that this road either be paved or a catch basin installed upstream of the SD 9 outlet pipe to intercept this sediment before it reaches the lake. Periodic monitoring of the catch basin would be required and a clean-out schedule established.
- SD 10 – A 15-inch diameter corrugated metal pipe located immediately southeast of the intersection of Golf View Drive and Beal Drive (Photo 12, Appendix D). The catchment area encompasses approximately 10 acres of residential development, roads, woods, and a golf course. No excess sedimentation was observed at the pipe outfall and the structures appeared to be in good working condition. No immediate improvements are necessary other than routine.
- SD 11 – A 12-inch concrete pipe located immediately northeast of North Grand Pointe Drive (Photo 13, Appendix D). This outfall drains an approximate one acre area of residential development and roads. The pipe is $\frac{1}{2}$ buried in sand and the last three foot section has apparently been completely removed by ice-shearing and is currently not functioning. No apparent sedimentation is occurring at this site. However, the functional capability of the pipe is questionable due to its decreased capacity and damage. This site may need to be monitored during storm events to determine if repairs/improvements are necessary.
- SD 12 – A 12-inch concrete pipe located located immediately southwest of Kingsbury Drive (Photo 14, Appendix D). This outfall drains an approximate 3 acres of residential development and roads through a catch basin. The pipe is $\frac{1}{2}$ submerged and some silt was observed near the catch basin which indicates some settling or erosion may have occurred. The settling near the catch basin could be rectified by re-establishing the proper grades on properly compacted soils.

- SD 13 – A 12-inch pipe located immediately southeast of the intersection of Holiday Drive and Alconac Drive (Photo 15, Appendix D). The outfall was partially-plugged with rocks and ready-mix concrete bags. No apparent sedimentation was observed, however, the restriction caused by the rocks and ready-mix concrete bags could cause the pipe to back-up during intense storm events which may result in localized flooding. The catch basin and outfall should be observed during storm events to gauge the extent of this potential.
- SD 14 - A 72-inch corrugated metal pipe located under Hayes road which connects Lake Columbia to an approximate 3 acre pond (Photo 16, Appendix D). The catchment area for this pipe is by far the largest of those surveyed (approximately 15 acres of residential and agricultural development) and thus, the expected discharge from this pipe during storm events would be significant. The pipe was flowing during the survey and a sand and silt delta was evident immediately downgradient of the pipe. The potential impact of the large drainage area is buffered somewhat by the stormwater detention currently being provided by the 3-acre pond which is most likely settling out the majority of suspended sediments prior to discharging into Lake Columbia. Given this factor, it is unlikely that significant sedimentation is occurring from this outfall. However, the extent of the current delta should be periodically monitored to determine if it is actively growing in size. The pipe itself is in good working condition and does not currently need repairs.
- SD 15 – A 12-inch smooth interior corrugated plastic pipe located immediately northeast of the intersection of North Grand Pointe Drive and Littlefield Lane (Photo 17, Appendix D). The catchment area occupies approximately two acres of residential development and roads. Approximately ½ inch of sediment was observed in the pipe. This minimal amount of sediment does not appear to warrant any immediate concern. Routine maintenance should suffice for this outfall.
- SD 16 – A 12-inch corrugated metal pipe located immediately southeast of the intersection of South Grand Pointe Drive and Aberdeen (Photo 18, Appendix D). This pipe was almost completely buried in sediment. This outfall drains an area of approximately 4 acres of roads and residential development. The current condition could have been caused by excessive sedimentation coming from the catchment area or settling of the pipe subsequent to its installation. This outfall should be observed during a storm event to determine if excessive sediment is being transported to the lake (which would indicate the need for a catch basin) or localized flooding is occurring (which would indicate that the pipe has settled and needs to be replaced over adequately compacted soils).
- SD 17 – A 12-inch concrete pipe located immediately northeast of Somerset Drive and drains an area of approximately 1.5 acres of residential development and roads (Photo 19, Appendix D). This pipe outfall is approximately 2/3 submerged but no apparent indications of excessive sedimentation were observed. The relatively small drainage area should limit the likelihood of localized flooding which may be caused by the outfalls submerged status. However, the catch basin should be observed during a storm event to verify that no localized flooding is occurring.
- SD 18 – A 12-inch ductile iron pipe located immediately east of Princess Drive East, drains an area of approximately 2 acres of residential development and roads (Photo 20, Appendix D). No apparent sedimentation or settling was observed at this pipe outfall. Routine maintenance and inspection procedures should be followed for this outfall.

- SD 19 – A 12-inch concrete pipe located immediately east of Kathy Lane, drains an area of approximately two acres of residential development and roads (Photo 21, Appendix D). No apparent sedimentation or settling was observed at this pipe outfall. Routine maintenance and inspection procedures should be followed for this outfall.
- SD 20 – A 12-inch concrete pipe located immediately northwest of the terminal end of Riviera Drive cul-de-sac, drains an approximate area of 4 acres of residential development and roads through a series of catch basins (Photo 22, Appendix D). No apparent sedimentation was observed at the outfall or at the catch basin located in the cul-de-sac. Inspection and maintenance of the catch basins and outfall pipe should be implemented on a periodic basis.
- SD 21 – An 8-inch vitreous clay pipe located north of Riviera Drive (Photo 23, Appendix D), drains an area of approximately one acre of residential development (the road drainage apparently was being collected by a pond on the south side of Riviera Drive). No apparent sedimentation was observed at the pipe outfall which was partially submerged. Routine inspection and maintenance should suffice for this small outfall.
- SD 22 – A 12-inch concrete pipe located at the terminal end of a small peninsula that just out north of Riviera Drive (Photo 24, Appendix D). This outfall drains an approximate area of 1.5 acres of residential development and roads. The pipe outfall was mostly submerged but no apparent sedimentation was observed. A local resident indicated that some of the drainage to this outfall had been re-routed to a storm drain outfall into the pond on the south side of Riviera Drive. This would need to be verified with the Jackson County Road Commission. Routine inspection and maintenance should suffice for this outfall.
- SD 23 – A 12-inch corrugated metal pipe located at the confluence of a small intermittent stream which drains a wetland southeast of Cement City Road (Photo 25, Appendix D). This outfall likely drains a large area (greater than ten acres). However, given the storage and detention capacity offered by the upstream wetland, the outfall does not apparently receive significant discharge amounts. Some sedimentation was observed as a delta near the pipe outfall which may indicate that sedimentation does occur during significant storm events. The seasonal timing of these storm events could also play a factor as the wetland vegetation may lose some of its filtering capacity during the non-growing season (i.e., November through March).
- SD 24 – A 30-inch corrugated metal pipe located south of Nottingham Drive, drains an approximate 12 acre area of residential development, forested, and wetland land cover (Photo 26, Appendix D). Primarily, this pipe outfall drains a wetland north of Nottingham Drive. Some sedimentation was observed in the pipe outfall and could be from either excess sediment load from the drainage area or settling of the pipe. This pipe outfall should be observed during storm events to determine the source of the sediment. Based upon the results of this observance, either a catch basin would need be installed downstream of the wetland (in the case of excess sediment load), or replacement of the pipe on properly compacted soils (in the case of pipe settling).
- SD 25 – A 10-inch vitreous clay pipe located immediately southwest of the intersection of Nottingham Drive and Ambler Drive (Photo 27, Appendix D). This outfall drains an approximate 2 acre area of roads and residential development. No apparent sedimentation or settling of the pipe was observed. Routine maintenance and inspection protocols should be implemented for this outfall.

DREDGING EVALUATION

- SD 26 – A 12-inch concrete pipe located immediately west of the intersection of Hewett Road and Boyce Drive, drains an area of approximately 2.5 acres of steeply sloping residential development and roads through a catch basin (Photo 28, Appendix D). No sedimentation was observed at the outfall. Routine maintenance and inspection protocols should be implemented for the catch basin and pipe outfall. Periodic cleaning out of the catch basin may be necessary.

A summary of storm drain survey results are provided in Table 3.

Table 3
Lake Columbia
Storm Drain Survey Summary

SD ID	Location	Size	Maintenance/Improvements	Estimated Cost
SD 1	Beechmont Dr.	15-inch	Routine maintenance	N/A
SD 2	Ivanhoe Dr.	12-inch	Re-set catch basin	\$1,500
SD 3	Waverly Ct.	15-inch	Replace pipe	\$2,500
SD 4	Paula Dr.	10-inch	Routine maintenance	N/A
SD 5	Boyce Dr./Hewett Rd.	12-inch	Observe during storm event	N/A
SD 6	Imperial Ct.	10-inch	Routine maintenance	N/A
SD 7	Wesch Rd.	12-inch	Install catch basin	\$10,000
SD 8	Fletcher Dr./Wesch Rd.	10-inch	Pave road or install catch basin	\$10,000-\$20,000
SD 9	Wesch Rd./Castlewood	12-inch	Pave road or install catch basin	\$10,000-\$20,000
SD 10	Golf View/Beal Dr.	15-inch	Routine maintenance	N/A
SD 11	North Grand Pointe Dr.	12-inch	Observe during storm event	N/A
SD 12	Kingsbury Dr.	12-inch	Re-set catch basin	\$1,500
SD 13	Holiday/Alconac Dr.	12-inch	Observe during storm event	N/A
SD 14	Hayes Rd.	72-inch	Monitor delta expansion	N/A
SD 15	N. Grand Pointe/Littlefield	12-Inch	Routine maintenance	N/A
SD 16	S. Grand Pointe/Aberdeen	12-inch	Observe during storm event	N/A
SD 17	Somerset Dr.	12-inch	Observe during storm event	N/A
SD 18	Princess Dr. East	12-inch	Routine maintenance	N/A
SD 19	Kathy Ln.	12-inch	Routine maintenance	N/A
SD 20	Riviera Dr. cul-de-sac	12-inch	Routine maintenance	N/A
SD 21	Riviera Dr.	8-inch	Routine maintenance	N/A
SD 22	Riviera Dr.	12-inch	Routine maintenance	N/A
SD 23	Cement City Rd.	12-inch	Install catch basin	\$10,000
SD 24	Nottingham Dr.	30-inch	Observe during storm event	N/A
SD 25	Nottingham/Ambler Dr.	10-inch	Routine maintenance	N/A
SD 26	Hewett/Boyce Dr.	12-inch	Routine maintenance	N/A

References

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