

* PIPE LENGTHS NOT IN () ARE MEASURED CL TO CL OF STRUCTURES. THE PIPE SLOPE IS MEASURED USING THE PIPE LENGTH IN ().

NOTE: CONCRETE PIPE JOINTS SHALL BE MSD TYPE "A" APPROVED COMPRESSION-TYPE JOINTS AND SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE, USING FLEXIBLE, WATER-TIGHT, RUBBER-TYPE GASKETS ASTM C443. BAND-TYPE GASKETS DEPENDING ENTIRELY ON CEMENT FOR ADHESION AND RESISTANCE TO DISPLACEMENT DURING JOINTING SHALL NOT BE USED.

ALL STORM SEWER PIPES SHALL BE REINFORCED CONCRETE PIPE, CLASS II MINIMUM, ANY CONCRETE PIPE, CONDUIT, OR CULVERT BENEATH A STREET RIGHT-OF-WAY OR WITH REASONABLE PROBABILITY OF BEING SO LOCATED SHALL BE A MINIMUM OF CLASS III, BUT ALSO SHALL ACCOUNT FOR ALL VERTICAL LOADS. IN NO CASE SHALL THE DESIGN PROVIDE FOR LESS THAN HS-20 LOADING PER AASHTO. FOR OTHER LOCATIONS, THE MINIMUM DESIGN LIVE LOAD SHALL BE THE HS-10 LOADING.

STORM SEWER PIPES WHICH CROSS OVER EXISTING OR PROPOSED SANITARY SEWER TRENCHES SHALL BE CRADLED IN CONCRETE THROUGH THE FULL WIDTH OF THE SANITARY SEWER TRENCH. THE TRENCH SHALL BE BACKFILLED AND COMPACTED WITH GRANULAR FILL TO THE BOTTOM OF THE CONCRETE CRADLE.

IF THE STORM AND SANITARY SEWERS ARE PARALLEL AND IN THE SAME TRENCH OR OVER-DIG, THE UPPER PIPE SHALL BE PLACED ON A SHELF AND THE LOWER PIPE SHALL BE BEDDED IN COMPACTED GRANULAR FILL TO THE FLOWLINE OF THE UPPER PIPE.

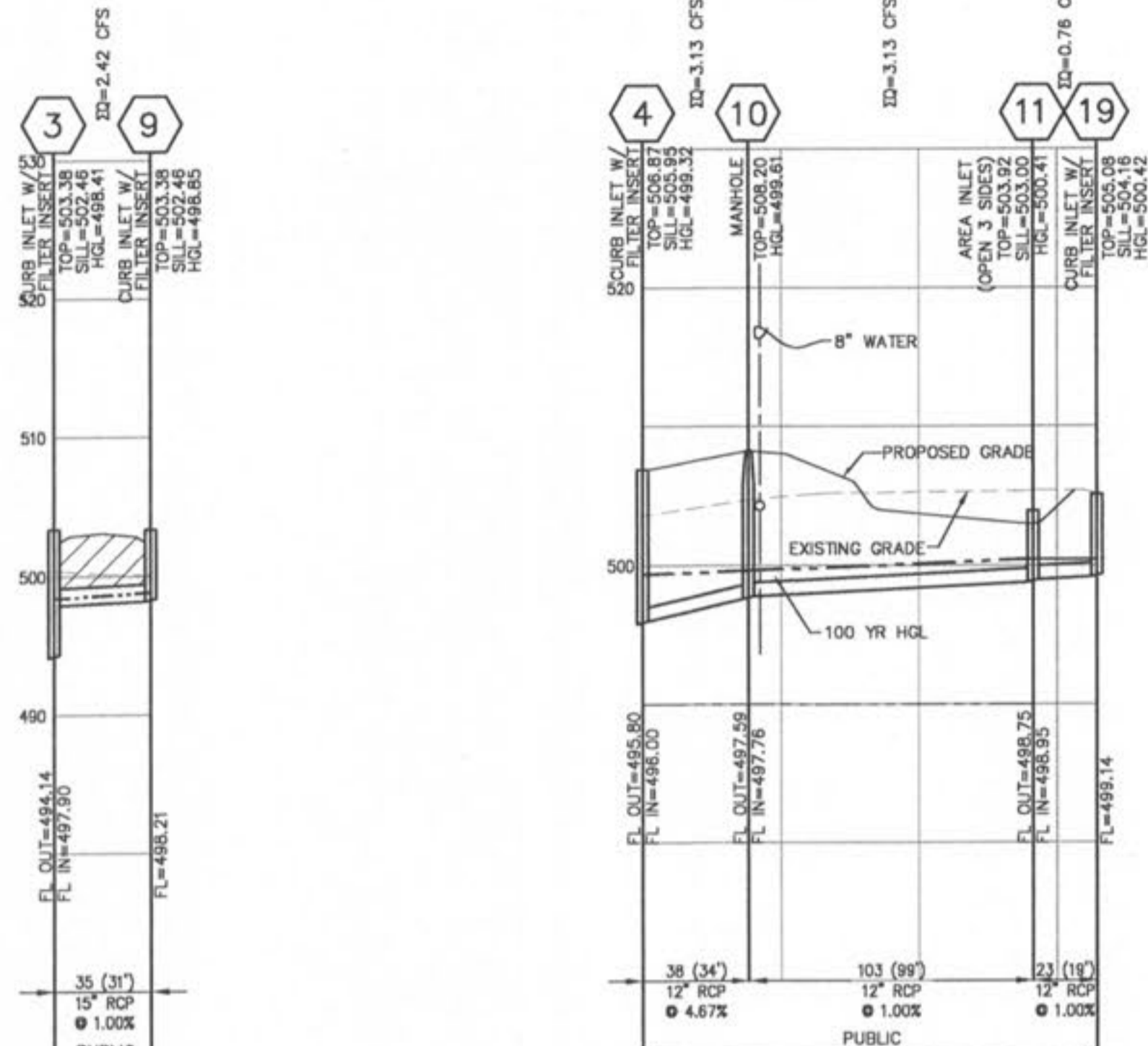
BRICK SHALL NOT BE USED IN THE CONSTRUCTION OF STORM SEWER STRUCTURES

ALL CONCRETE PIPES WILL BE INSTALLED WITH O-RING RUBBER TYPE GASKETS

CONNECTIONS AT ALL STORM SEWER STRUCTURES TO BE MADE WITH A-LOK JOINT OR EQUAL.

REFER TO SHEET C10.6 FOR WATER-QUALITY INSERT "ULTRA-URBAN FILTER WITH SMART SPONGE INSIDE" TO BE INSTALLED IN ALL CURB INLETS.

- NOTES:**
- STORM REACH 1-8 PREVIOUSLY CONSTRUCTED AS PART OF THE MASS GRADING PLANS.
 - REFER TO SHEET C10.6 FOR WATER QUALITY INSERT "ULTRA-URBAN FILTER WITH SMART SPONGE INSIDE" TO BE INSTALLED IN ALL CURB INLETS.



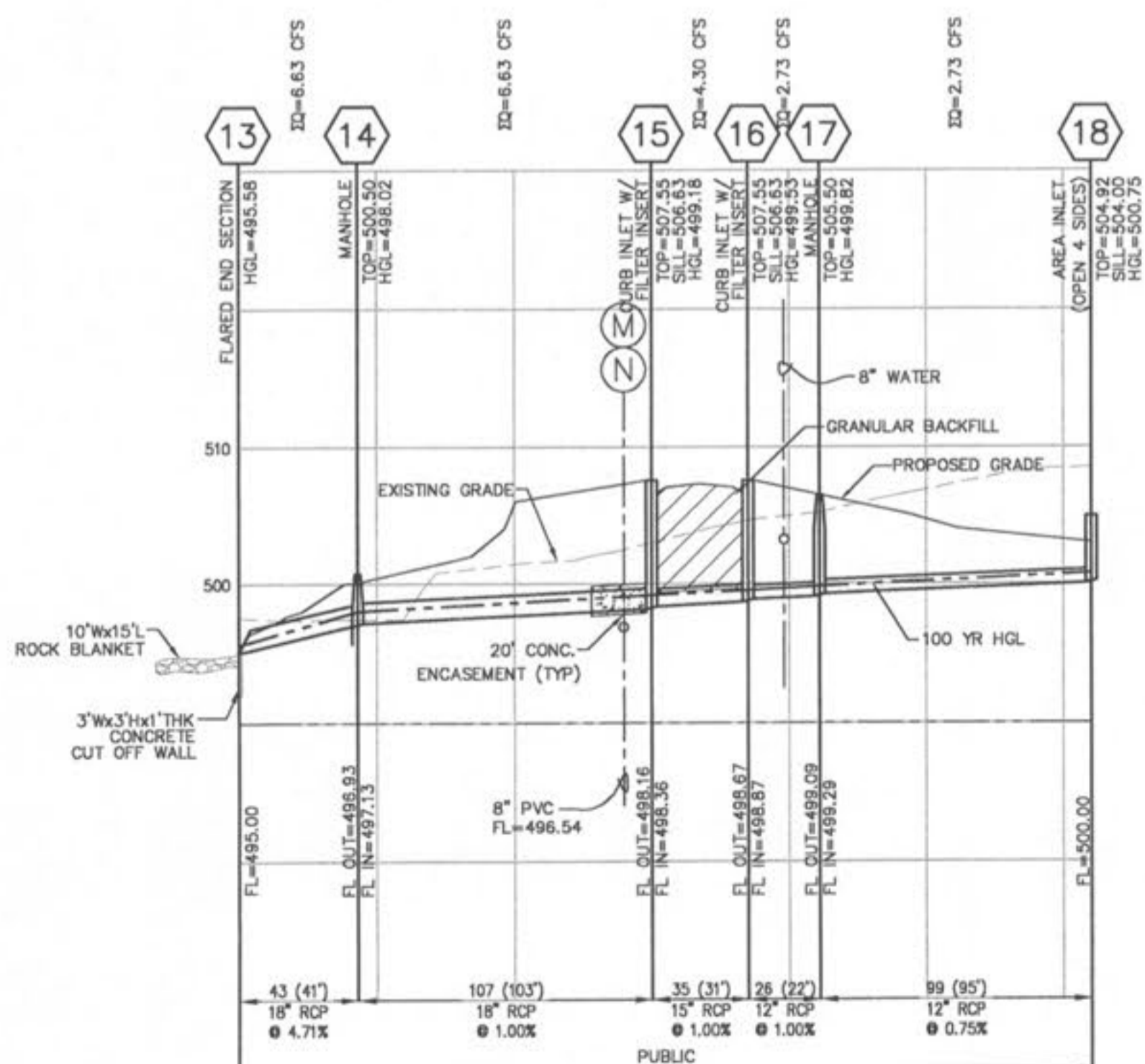
WATER JETTING NOTES

- WATER JETTING.** GRANULAR MATERIALS AND EARTH MATERIAL ASSOCIATED WITH NEW CONSTRUCTION OUTSIDE OF PAVEMENTS MAY BE JETTED, TAKING CARE TO AVOID DAMAGE TO NEWLY LAID SEWERS. THE JETTING SHALL BE PERFORMED WITH A PROBE ROUTE ON NOT GREATER THAN 7.5 FOOT CENTERS WITH THE JETTING PROBE CENTERED OVER AND PARALLEL WITH THE DIRECTION OF THE PIPE. TRENCH WIDTHS GREATER THAN 10-FEET WILL REQUIRE MULTIPLE PROBES EVERY 7.5 FOOT CENTERS.
- DEPTH. TRENCH BACKFILL LESS THAN 8-FEET IN DEPTH SHALL BE PROBED TO A DEPTH EXTENDING TO HALF THE DEPTH OF THE TRENCH BACKFILL, BUT NOT LESS THAN 3- FEET. TRENCH BACKFILL GREATER THAN 8- FEET IN DEPTH SHALL BE PROBED TO HALF THE DEPTH OF THE TRENCH BACKFILL BUT NOT GREATER THAN 8- FEET.
 - EQUIPMENT. THE JETTING PROBE SHALL BE A METAL PIPE WITH AN EXTERIOR DIAMETER OF 1.5 TO 2- INCHES.
 - METHOD. JETTING SHALL BE PERFORMED FROM THE LOW SURFACE TOPOGRAPHIC POINT AND PROCEED TOWARDS THE HIGH POINT, AND FROM THE BOTTOM OF THE TRENCH TOWARDS THE SURFACE. THE FLOODING OF EACH JETTING PROBE SHALL BE STARTED SLOWLY ALLOWING SLOW SATURATION OF THE SOIL. WATER IS NOT ALLOWED TO FLOW AWAY FROM THE DITCH WITHOUT FIRST SATURATING THE TRENCH.
 - SURFACE BRIDGING. THE CONTRACTOR SHALL IDENTIFY THE LOCATIONS OF THE SURFACE BRIDGING (THE TENDENCY FOR THE UPPER BACKFILL CRUST TO ARCH OVER THE TRENCH RATHER THAN COLLAPSE) AND CONSOLIDATE DURING THE JETTING PROCESS. THE CONTRACTOR SHALL BREAKDOWN THE BRIDGE AREAS USING AN APPROPRIATE METHOD SUCH AS WHEELS OR BUCKET OF A BACKHOE. WHEN THE SURFACE CRUST IS COLLAPSED, THE VOID SHALL BE BACKFILLED WITH THE SAME MATERIAL USED AS TRENCH BACKFILL AND RE- JETTED. COMPACTION OF THE MATERIALS WITHIN THE SUNKEN/JETTED AREA SHALL BE COMPACTED SUCH THAT NO FURTHER SUBSURFACE SUBSIDENCE OCCURS.

Title: Conduit FlexTable: Hydraulic Calculations (stormcad.stc)

Current Time: 0.000 min

Label	Diameter (in)	Length (ft)	Manning's n	Bend Angle (degrees)	Slope (Calculated) (ft/ft)	Flow (ft ³ /s)	Excess Capacity (ft ³ /s)	Capacity (Full Flow) (ft ³ /s)	Velocity (In) (ft/s)	Velocity (Out) (ft/s)	Downstream Structure	Ground Elevation (Downstream) (ft)	Hydraulic Grade Line (In) (ft)	Invert (Downstream) (ft)	Upstream Structure	Hydraulic Grade Line (ft)	Ground Elevation (Upstream) (ft)	Invert (Upstream) (ft)	Upstream Freeboard (ft)
1-2	24	62	0.013	0	0.01	14.2	8.42	22.62	4.52	4.52	1	494	497.1	491.9	2	497.34	503.3	492.52	5.96
2-3	24	148	0.013	37.13	0.01	14.2	8.42	22.62	4.52	4.52	2	503.3	497.34	492.68	3	497.93	502.46	494.16	4.53
3-4	18	150	0.013	0	0.01	10.12	0.38	10.5	5.73	5.73	3	502.46	497.93	494.32	4	499.32	505.95	495.82	6.63
4-5	15	35	0.013	89.62	0.01	2.42	4.04	6.46	3.96	4.89	3	502.46	498.41	497.88	9	498.85	502.46	498.23	3.61
5-6	15	35	0.013	12.73	0.0147	3.13	4.56	7.69	3.99	3.99	4	505.95	499.32	495.91	10	499.61	508.2	497.68	8.59
6-7	15	71	0.013	90	0.01	5.2	1.26	6.46	4.24	4.24	4	505.95	499.32	495.98	5	499.55	505.95	496.33	6.40
7-8	15	35	0.013	48.58	0.01	3.63	2.83	6.46	2.96	2.96	6	505.95	499.32	496.49	6	499.7	505.5	496.99	5.80
8-9	12	35	0.013	81.35	0.01	0.99	5.47	6.46	3.02	3.81	7	506.2	501.95	501.62	12	499.93	506.2	501.97	3.84
9-10	12	74	0.013	81.35	0.01	2.01	1.55	3.56	2.56	2.56	7	506.2	500.14	498.02	8	500.38	503	498.76	2.62
10-11	12	103	0.013	72.87	0.01	3.13	0.43	3.56	3.99	3.99	10	506.2	499.61	497.74	11	500.41	503	498.77	2.59
11-12	12	23	0.013	1.49	0.01	0.76	2.8	3.56	0.97	0.97	11	503	500.41	498.93	19	500.42	504.16	499.16	3.74
12-13	14	18	0.013	0	0.047	6.63	16.14	22.77	5.32	10.47	13	497	495.58	495	14	498.02	505.5	497.02	7.48
13-14	18	107	0.013	64.64	0.01	6.63	3.87	10.5	5.32	6.29	14	505.5	497.97	497.11	15	499.18	506.63	498.18	7.45
14-15	15	35	0.013	4.57	0.01	4.3	2.16	6.46	4.9	5.63	15	506.63	499.09	498.34	16	499.53	506.63	498.69	7.10
15-16	12	26	0.013	43.12	0.01	2.73	0.83	3.56	4.59	5	16	506.63	499.51	498.85	17	499.82	505.5	499.11	5.68
16-17	12	99	0.013	52.07	0.007	2.73	0.35	3.08	4.43	4.59	17	505.5	499.99	499.28	18	500.75	504	500.02	3.25



SCALE:
1" = 50' HORIZ.
1" = 10' VERT.

PLANNING AND DEVELOPMENT DEPARTMENT FILE #9831.57 (AREA PLAN-APPROVED MAY 24TH, ORDINANCE #H78) - 9831.57.01 (FINAL PLAN)

DESIGNED BY: CJB
DRAWN BY: KDK
CHECKED BY: JFH
DATE: 11/6/07
Job Number: 07-075
Sheet Number: C9.0

REVISIONS

DATE	DESCRIPTION
02/13/2008	CITY OF OTTAWA/PHS #/DSD COMMENTS
03/14/2008	CITY OF OTTAWA/PHS #/DSD COMMENTS
04/17/2008	CITY OF OTTAWA/PHS #/DSD COMMENTS
05/17/2008	CITY OF OTTAWA/PHS #/DSD COMMENTS

DEVELOPER/OWNER:
THE VILLAGE AT PARK PLACE, LLC.
1001 BOARDWALK SPRINGS PL
OFALLON, MO 63366
PHONE: (636) 567-9323

SEAL: M. MATTHEW B. WASTEBERG, PE, PROFESSIONAL ENGINEER, STATE OF MISSOURI, LICENSE NO. 000004889

STORM SEWER PROFILES

planning + engineering + surveying + landscape architecture
GOLE and ASSOCIATES INCORPORATED
10777 sunset office drive
saint louis, missouri 63127
p: 314 984 9887 f: 314 984 0587

LAYOUT: C9.0
DATE: Apr 25, 2008 - 11:05am
DRAWING: S:\0815\0815007\07-0075\07-0075.dwg IMPROVEMENT PLANS\07-0075.dwg STORM SEWER PROFILES.dwg