REVIEW OF TREATMENT ALTERNATIVES

MULTIPLE IN-LINE STORM WATER TREATMENT UNITS

THIS OPTION INCLUDES THE INSTALLATION OF PRECAST IN-LINE STORM WATER TREATMENT UNITS ON THE EXISTING STORM SEWER SYSTEMS ON THE KINGSWAY AND BANCROFT DRIVE. UNITS WOULD BE TYPICALLY INSTALLED AT LOCATIONS WHERE STORM WATER ENTERS THE MUNICIPAL STORM SEWER SYSTEM FROM PRIVATE SITES, AND AT SUITABLE INTERVALS BELOW THE EXISTING ROADWAYS.

PROS

- NO DISRUPTION OF PARKING AND ACCESS AT THE MINNOW LAKE CENTRE.
- SMALLER UNITS DO NOT REQUIRE CONFINED SPACE ENTRY TO BE MAINTAINED AND CLEANED.
- DOWNSTREAM STORM SEWERS DO NOT RECEIVE SAND/SILTS, AND MAY REQUIRE LESS MAINTENANCE.

CONS

- CONSIDERABLE TRAFFIC INTERRUPTION ON THE KINGSWAY AND BANCROFT DRIVE DURING INSTALLATION.
- EXCAVATION IS REQUIRED OF NEWLY RECONSTRUCTED SECTIONS OF THE KINGSWAY.
- PHYSICAL LIMITATIONS AND POTENTIAL CONFLICTS WITH EXISTING BURIED INFRASTRUCTURE BELOW THE LONG ESTABLISHED ROADWAYS.
- HIGH MAINTENANCE COSTS FOR BOTH MONITORING AND MAINTENANCE OF MULTIPLE UNITS AT VARIOUS LOCATIONS.
- AT LEAST ONE LANE CLOSURE ON THE KINGSWAY WOULD BE REQUIRED TO MONITOR AND/OR CLEAN EACH OF THE UNITS. MONITORING AND CLEANING WILL LIKELY BE REQUIRED ANNUALLY AT EACH UNIT.
- CAPITAL COST FOR THE INSTALLATIONS WILL BE SIGNIFICANT.

STORM WATER MANAGEMENT (SWM) WET POND

WET PONDS ALLOW SUSPENDED PARTICLES TO SETTLE TO THE BOTTOM OF THE SEDIMENT FOREBAY PRIOR TO DISCHARGING INTO THE PERMANENT POOL, AND ULTIMATELY THE DOWNSTREAM WATER COURSE. THEY ARE TYPICALLY LOCATED AT THE LOWEST POINT IN A DRAINAGE BASIN, AND, IN THIS CASE, THE POND SHOULD BE LOCATED NEAR THE STORM OUTLET INTO MINNOW LAKE.

PROS

- PONDS CAN BE AN AESTHETICALLY PLEASING FEATURE WHEN APPROPRIATELY CONSTRUCTED.
- FEWER GEOTECHNICAL CHALLENGES WOULD BE ENCOUNTERED AT THE SITE (MINNOW LAKE PLACE), SINCE A POND WOULD REQUIRE A SHALLOWER EXCAVATION.
- LESS EXPENSIVE TO CONSTRUCT THAN IN-GROUND TREATMENT UNITS PROVIDED THAT REAL ESTATE IS AVAILABLE.

CONS

- CONVENTIONAL SWM PONDS DO NOT CAPTURE PETROLEUM PRODUCTS AND FLOATABLES VERY WELL. GIVEN THE NATURE OF THE USES AND HIGH TRAFFIC VOLUMES IN THE TREATMENT AREA, THERE IS LIKELY A CONSIDERABLE QUANTITY OF PETROLEUM PRODUCTS ENTERING THE STORM SEWER SYSTEMS.
- A CONSERVATIVE ESTIMATE FOR THE AREA REQUIRED TO CONSTRUCT A SWM POND WOULD BE ABOUT 3% OF THE CATCHMENT AREA. BASED ON THE 153 HECTARE KINGSWAY/BANCROFT CATCHMENT BASIN, A POND WOULD HAVE TO BE ABOUT 4.6 HECTARES IN AREA (153 HECTARES X 3% = 4.6 HECTARES). ASSUMING PLACEMENT AT THE MINNOW LAKE PLACE PARKING LOT, AND THE PARK AREA SOUTH OF MINNOW LAKE PLACE, A 0.5 HECTARE POND COULD BE CONSTRUCTED. AN AREA LARGE ENOUGH TO CONSTRUCT AN APPROPRIATE POND IS NOT AVAILABLE.
- LOSS OF PARKLAND/CURRENT USE.
- FENCING IS REQUIRED SURROUNDING THE POND FOR SAFETY (ESPECIALLY IN CLOSE PROXIMITY TO A PARK).
- REGULAR MAINTENANCE.

RECOMMENDED OPTION

END-OF-PIPE STORM WATER TREATMENT UNITS

END-OF-PIPE STORM WATER TREATMENT UNITS ARE TYPICALLY PRECAST OR CAST-IN-PLACE STRUCTURES THAT ARE INSTALLED BELOW GRADE AT LOCATIONS WHERE STORM SEWER PIPES DISCHARGE INTO OPEN DITCHES, STREAMS, RIVERS OR LAKES. THE UNITS ARE INSTALLED IMMEDIATELY UPSTREAM OF THE DISCHARGE POINT, AND SEPARATE SANDS AND SILTS USING VARIOUS TECHNOLOGIES THAT SLOW THE VELOCITY OF THE STORM WATER TO ALLOW THE SETTLEMENT OF CONTAMINANTS. THE DECANTED STORM WATER FLOWS THROUGH A SERIES OF CHAMBERS, WHERE BAFFLES ALLOW FOR THE CONTAINMENT OF PETROLEUM PRODUCTS AND OTHER FLOATABLES, FOR FUTURE REMOVAL AND DISPOSAL.

PROS

- THERE ARE MANY OF THESE UNITS INSTALLED IN THE GREATER SUDBURY AREA ON MUNICIPAL, INSTITUTIONAL AND PRIVATE SITES, AND ARE PROVEN TO BE EFFECTIVE.
- SUPPORTED BY MUNICIPAL AND PROVINCIAL APPROVING AGENCIES AS END-OF-PIPE DISCHARGE.
- MAINTENANCE IS ISOLATED TO A SINGLE LOCATION, AND WILL HAVE MINIMUM IMPACT ON THE PUBLIC.
- THE EXISTING USE OF THE SITE WILL BE MAINTAINED.
- AREA REQUIRED TO IMPLEMENT IS SMALLER WHEN COMPARED TO OTHER OPTIONS.

CONS

- CONFINED SPACE ENTRY MAY BE REQUIRED FOR MAINTENANCE ON LARGER UNITS.
- TEMPORARY INTERRUPTION TO PARKING FACILITIES IS REQUIRED DURING CONSTRUCTION.
- CONSTRUCTION CHALLENGES GIVEN THE HIGH GROUNDWATER TABLE AND NATURE OF THE SOILS AT THE SITE.
- REGULAR MAINTENANCE.

THE “IN LAKE” SOLUTION

THIS OPTION WOULD PROVIDE A SWM TREATMENT FACILITY WITH THE INSTALLATION OF COFFER DAMS AND FEATURES THAT WOULD CREATE A SWM POND WITHIN THE EXISTING LAKE/SHORELINE.

PROS

- PERMANENT POOL PROVIDES EXTENDED SETTLING, SIMILAR TO A WET POND.
- BIOLOGICAL REMOVAL OF POLLUTANTS (ENHANCED NUTRIENT REMOVAL) OCCURS.

CONS

- WORKING WITHIN A WATERBODY WOULD INCLUDE A COMPREHENSIVE AND COSTLY APPROVAL PROCESS WITH PROVINCIAL AND FEDERAL AGENCIES.
- THE PROOF OF EFFICACY WOULD HAVE TO BE PROVIDED BY THE CITY OF GREATER SUDBURY TO RECEIVE PROVINCIAL AND FEDERAL APPROVAL TO CONSTRUCT THIS OPTION. “IN-LAKE” SOLUTIONS ARE NOT TYPICALLY SUPPORTED BY THE PROVINCE.
- DISRUPTION OF FISH AND WILDLIFE HABITAT.
- IMPACTS TO THE AESTHETICS OF THE WATERFRONT.
- THE CONSTRUCTION OF COFFER DAMS AND OTHER FEATURES WITHIN THE LAKE ARE LIKELY TO BE VERY DIFFICULT AND COSTLY.
- IT WOULD LIKELY BE DIFFICULT AND COSTLY TO MAINTAIN A SWM FACILITY WITHIN A LAKE. TYPICAL SWM PONDS ARE DRAINED FROM TIME TO TIME, IN ORDER TO EXCAVATE AND REMOVE ACCUMULATED SILT AND SAND WITH HEAVY EQUIPMENT. DRAINING A POND WITHIN A LAKE WOULD BE CHALLENGING, AND THE REMOVAL OF SILTS AND SAND WOULD LIKELY REQUIRE A SPECIALIZED FLOATING BARGE THAT WOULD VACUUM AND PUMP THE CONTAMINANTS TO THE SHORELINE FOR SEPARATION AND DISPOSAL.

LOW IMPACT DEVELOPMENT (LID) OPTIONS

LID SOLUTIONS TYPICALLY INCLUDE MULTIPLE LOT LEVEL AND CONVEYANCE CONTROLS (I.E. TREATMENT TRAIN), INCLUDING GREEN ROOFS, SOAKAWAYS AND INFILTRATION TRENCHES, REDUCED LOT GRADING, GRASSED SWALES, VEGETATED FILTER STRIPS, PERMEABLE PAVEMENT, ETC. LID IS THE CAPTURING OF CONTAMINANTS ON A SITE SPECIFIC BASIS, WHICH ADDRESSES STORM WATER QUALITY BEFORE IT ENTERS THE MUNICIPAL STORM SEWER SYSTEMS.

PROS

- LID TECHNIQUES ARE CURRENTLY IN THE PROCESS OF BEING ADOPTED BY THE PROVINCE.
- INTRODUCES LESS WATER INTO THE STORM SEWER SYSTEM, AND FACILITATES THE RECHARGING OF GROUNDWATER.
- ENHANCED AESTHETICS.
- TREATS POLLUTANTS AT SOURCE PRIOR TO STORM WATER ENTERING THE SEWER SYSTEMS.
- LOW COST INSTALLATION WHEN COMPARED TO OTHER TECHNOLOGIES.

CONS

- RETROFITTING OR IMPLEMENTING LID MEASURES ON PRIVATELY OWNED SITES WOULD BE CHALLENGING, SINCE THE SITES THAT ARE GENERATING THE POLLUTANTS HAVE BEEN FULLY DEVELOPED LEAVING NO AREAS TO CONSTRUCT LID MEASURES.
- THE IMPLEMENTATION OF LID STRATEGIES WOULD ALSO REQUIRE SIGNIFICANT COOPERATION FROM THE PRIVATE LAND OWNERS, SINCE PORTIONS OF THEIR SITES WOULD HAVE TO BE REALLOCATED FOR POLLUTION ABATEMENT.
- POLLUTANTS GENERATED ON THE MUNICIPAL ROADWAYS COULD NOT BE PRACTICALLY ADDRESSED WITH LID MEASURES WITHOUT A REDUCTION TO THE CAPACITY OF THE ROADWAY.
- LID INSTALLATIONS DO NOT COLLECT PETROLEUM PRODUCTS FOR SAFE DISPOSAL.
- A MULTI-YEAR SOLUTION WITH GRADUAL IMPLEMENTATION AS DEVELOPMENT OR REDEVELOPMENT OCCURS.
- SIGNIFICANT MAINTENANCE REQUIREMENTS TO MAINTAIN EFFECTIVENESS.
- MAY BE DIFFICULT TO EFFECTIVELY IMPLEMENT IN THE AREA GEOGRAPHY.