

OWNER:
NIVO DEVELOPMENTS INC.
255 MICHAEL COWPLAND DRIVE
OTTAWA, ONTARIO, K2M 0M5
613-224-6200

APPROVED
By Adam Brown at 9:24 am, Aug 25, 2021

ADAM BROWN
MANAGER, DEVELOPMENT REVIEW - RURAL
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

CATCH-BASIN & MANHOLE SCHEDULE

STORM SEWER

REF	TOP	SIZE	TYPE	INVERT AT INLET	INVERT AT OUTLET	NOTES
MH-1	±95.96	1200mm	PRE-CAST CONCRETE MANHOLE	91.66(W) 93.39(S)	92.00(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
MH-2	±93.65	1200mm	PRE-CAST CONCRETE MANHOLE	90.82(W)	89.54(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
CB-3	92.20	600 x 600mm	PRE-CAST CONCRETE CATCH-BASIN	-	89.24	TO OPSD 705.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S19
CB/MH-4	90.53	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	87.54(W) 87.84(E)	86.83(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010 INSTALL ICD IN OUTLET PIPE
MH-5	90.73	1200mm	PRE-CAST CONCRETE MANHOLE	86.76(S)	86.73(NE)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
CB-6	87.67	600 x 600mm	PRE-CAST CONCRETE CATCH-BASIN	-	86.36	TO OPSD 705.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S19
CB/MH-7	88.01	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	86.27(S)	86.27(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010
CB/MH-8	90.36	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	86.25(S) 86.68(W)	86.25(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010
CB-9	90.51	600 x 600mm	PRE-CAST CONCRETE CATCH-BASIN	-	88.26	TO OPSD 705.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S19
CB/MH-10	90.53	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	88.22(W) 86.22(S)	86.22(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010 INSTALL ICD IN OUTLET PIPE
MH-11	90.61	1200mm	PRE-CAST CONCRETE MANHOLE	86.21(S) 86.65(SW)	86.20(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
MH-12 (OGS)	90.84	STORMCEPTOR MODEL EFO4	OIL & GRIT SEPARATOR (OGS) MANHOLE	86.16(S)	86.135(N)	-
MH-13	±90.47	1200mm	PRE-CAST CONCRETE MANHOLE	88.17(W) 86.10(S)	86.03(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
MH-14	±87.79	1200mm	PRE-CAST CONCRETE MANHOLE	85.90(W) ±85.85(N)	±85.84(S)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24.1 OR OPSD 401.010
CB/MH-15	96.30	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	±95.25(W)	93.84(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010
CB-16	94.67	600 x 600mm	PRE-CAST CONCRETE CATCH-BASIN	-	91.58	TO OPSD 705.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S19
CB-17	91.68	600 x 600mm	PRE-CAST CONCRETE CATCH-BASIN	-	89.86	TO OPSD 705.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S19
CB/MH-18	89.51	1200mm	PRE-CAST CONCRETE CATCH-BASIN/MANHOLE	-	88.42	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S28.1 OR OPSD 401.010

SANITARY SEWER

MH-SA-1	±95.28	1200mm	PRE-CAST CONCRETE MANHOLE	91.15(W)	91.14(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-2	90.60	1200mm	PRE-CAST CONCRETE MANHOLE	-	87.21	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-3	90.67	1200mm	PRE-CAST CONCRETE MANHOLE	87.07(S)	87.04(NE)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-4	90.64	1200mm	PRE-CAST CONCRETE MANHOLE	86.96(SW)	86.93(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-5	90.80	1200mm	PRE-CAST CONCRETE MANHOLE	86.88(S)	86.85(N)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-6	±90.58	1200mm	PRE-CAST CONCRETE MANHOLE	87.48(W) 86.80(S)	86.74(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010
MH-SA-7	±87.96	1200mm	PRE-CAST CONCRETE MANHOLE	84.69(W)	84.68(E)	TO OPSD 701.010 & CITY OF OTTAWA STANDARDS - FRAME & COVER TO CITY OF OTTAWA DRAWING No. S25 & S24 OR OPSD 401.010

1. GENERAL

- 1.1 USE BAR SCALE TO CONFIRM ACTUAL PLOT SCALE. EXISTING AND NEW ELEVATIONS AND INVERTS SHOWN ARE GEODETIC AND ARE IN METERS. ALL PIPE DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
- 1.2 UNLESS OTHERWISE STATED "ENGINEER" REFERS TO D. B. GRAY ENGINEERING INC.
- 1.3 EXISTING ELEVATIONS AND LOCATIONS, INVERTS AND SIZES OF EXISTING SERVICES & UTILITIES ARE NOT NECESSARILY SHOWN ON PLAN AND THOSE SHOWN ARE DERIVED FROM AVAILABLE INFORMATION AND MUST BE CONFIRMED ON SITE BEFORE COMMENCING CONSTRUCTION. REPORT ANY DIFFERENCES TO ENGINEER. UNDERGROUND LOCATIONS (INCLUDING ONTARIO ONE CALL: 1-800-400-2255) SHALL BE DETERMINED PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION.
- 1.4 SITE BOUNDARIES AND EXISTING GRADES AND OTHER FEATURES DERIVED FROM TOPOGRAPHIC SURVEY PREPARED BY ANNIS O'SULLIVAN, VOLLEBEKK LTD JOB NO. 18873-18. EXISTING AND NEW GRADE ELEVATIONS AND INVERT ELEVATIONS ON THE SURVEY PLAN AND THESE DRAWINGS ARE IN METRES AND ARE GEODETIC AND ARE DERIVED FROM CGS BENCHMARK 0011948UB53G HAVING AN ELEVATION OF 96.329 m AND AT THE MANOTICK UNITED CHURCH ON THE SE CORNER OF MANOTICK MAIN ST AND CURRIER ST. IT IS THE RESPONSIBILITY OF THE USER OF THE SURVEY PLAN AND THESE DRAWINGS TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON SURVEY PLAN AND THESE DRAWINGS.
- 1.5 REFER TO ARCHITECTURAL AND LANDSCAPE SITE PLANS FOR EXACT LOCATIONS OF BUILDINGS, PAVED AREAS, SIDEWALKS, PLANTERS ETC.
- 1.6 REFERENCE THE LATEST REVISION AND ALL ADDENDUMS OF THE GEOTECHNICAL INVESTIGATION BY LRL ASSOCIATES LTD. FILE: 180783. SITE PREPARATION INCLUDING BUILDING SUB-GRADE PREPARATION AND PAVEMENT SUB-GRADE PREPARATION AND CONSTRUCTION OF THE PAVEMENT STRUCTURE AND EXCAVATION AND BACKFILL, INCLUDING COMPACTION OF MATERIALS, SHALL CONFORM TO THE GEOTECHNICAL INVESTIGATION TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER.
- 1.7 DRAWINGS ARE TO BE READ IN CONJUNCTION WITH SERVING BRIEF & STORM WATER MANAGEMENT REPORT No. 18035 PREPARED BY D. B. GRAY ENGINEERING INC.
- 1.8 REINSTATE ADJACENT PROPERTIES TO PRE-CONSTRUCTION CONDITIONS.
- 1.9 REINSTATE CITY PROPERTIES TO CITY STANDARDS AND TO CITY OF OTTAWA'S SATISFACTION.
- 1.10 ALL RELEVANT WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT CITY STANDARDS AND SPECIFICATIONS.
- 1.11 ONTARIO PROVINCIAL STANDARDS & SPECIFICATIONS WILL APPLY WHERE NO CITY STANDARDS ARE AVAILABLE.
- 1.12 ALL PROPOSED RETAINING WALLS SHALL BE SETBACK A MINIMUM 0.15m FROM PROPERTY LINE. ALL PROPOSED RETAINING WALLS GREATER THAN 1.0m IN HEIGHT SHALL BE DESIGN BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO.

2. EROSION AND SEDIMENT CONTROL PLAN

- 2.1 THE EROSION AND SEDIMENT CONTROL PLAN IS A "LIVING DOCUMENT" AND SHALL BE REVISED IN THE EVENT THE SPECIFIED CONTROL MEASURES ARE NOT SUFFICIENT. THE CONTRACTOR SHALL IMPLEMENT MANAGEMENT PRACTICES TO PROVIDE PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING SEDIMENT CAPTURE FILTER SOCKS IN CATCH BASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCIES. THE CONTRACTOR SHALL INSTALL THE FOLLOWING CONTROL MEASURES AND INSPECT, MAINTAIN AND REMOVE THE CONTROL MEASURES.
- 2.2 AT ANY MANHOLES OR CATCH BASINS THAT WILL RECEIVE DISCHARGE FROM DE-WATERING OPERATIONS AND ALL NEW CATCH BASINS AS THEY ARE INSTALLED, INSTALL SEDIMENT CAPTURE FILTER SOCK INSERTS (TERRAFIX GEOSYNTHETICS INC SILTSAK OR APPROVED EQUAL). INSPECT AT THE END OF EACH DAY AND AFTER EACH RAINFALL. REMOVE SEDIMENT AS RECOMMENDED BY THE MANUFACTURER. IMMEDIATELY REPAIR OR REPLACE ANY DAMAGED FILTER SOCK INSERTS. DO NOT REMOVE UNTIL CONSTRUCTION IS COMPLETE.
- 2.3 INSTALL A SILT FENCE BARRIER AROUND STOCKPILED SEDIMENT OR SOIL. PRIOR TO COMMENCEMENT OF CONSTRUCTION INSTALL A SILT FENCE BARRIER AS SHOWN ON PLANS. INSPECT ALL SILT FENCE BARRIERS AT THE END OF EACH DAY AND AFTER EACH RAINFALL. REMOVE SEDIMENT DEPOSITS WHEN THE LEVEL OF DEPOSITS REACHES ONE THIRD THE HEIGHT OF THE FENCE. IMMEDIATELY REPAIR OR REPLACE ANY DAMAGED SECTIONS OF FENCE. DO NOT REMOVE ANY SILT FENCES IN ANY PHASE UNTIL CONSTRUCTION IS COMPLETE.
- 2.4 CONTROL AND LIMIT VEHICLE ACCESS TO AND AROUND THE CONSTRUCTION SITE TO MINIMIZE THE DISTURBANCE OF SOIL AND VEGETATION. PRIOR TO COMMENCEMENT OF CONSTRUCTION INSTALL AT ALL POINTS OF ENTRY AND EXIT TO THE CONSTRUCTION SITE (TERRAFIX GEOSYNTHETICS INC. OR APPROVED EQUAL). MUD MATS SHALL BE THE FULL WIDTH OF THE EGRESS POINT AND AT LEAST 20m IN LENGTH. MUD MATS SHALL BE WASHED AS REQUIRED TO PREVENT MATERIAL FROM BEING TRACKED ONTO THE PUBLIC ROAD. DO NOT REMOVE MUD MATS UNTIL CONSTRUCTION IS COMPLETE. IN ADDITION, IF REQUIRED TO PREVENT MATERIAL FROM BEING TRACKED ONTO THE PUBLIC ROAD, WASH VEHICLE TIRES AT THE EGRESS POINT.
- 2.5 ANY MATERIAL DEPOSITED ON PUBLIC ROAD SHALL BE REMOVED BY SWEEPING AND SHOVELING OR VACUUMING AND DISPOSING SEDIMENT IN A CONTROLLED AREA. DO NOT SWEEP OR HOSE MATERIAL INTO ANY STORMWATER CONVEYANCE SYSTEM.
- 2.6 CONSTRUCTION IS CONSIDERED COMPLETE WHEN THE FOLLOWING CONDITIONS HAVE BEEN MET:
 - a. ALL STRUCTURES HAVE BEEN BUILT.
 - a. ALL HARD SURFACES HAVE BEEN CONSTRUCTED.
 - a. ALL PROPOSED GRASSED AREAS ARE EITHER SOODED OR HAVE A FULL COVERAGE OF WELL ESTABLISHED TURF AND HAVE HAD A MINIMUM OF ONE FULL GROWING SEASON (MAY 15TH TO SEPTEMBER 15TH).
 - a. THERE ARE NO AREAS OF EXPOSED EARTH.
 - a. ALL STOCKPILED MATERIALS HAVE BEEN REMOVED.
- 2.7 REMOVE EROSION AND SEDIMENT CONTROL MEASURES WHEN CONSTRUCTION IS COMPLETE.

3. GRADING & DRAINAGE

- 3.1 NEW GRADES TO MATCH EXISTING AT PROPERTY LINE. NO EXCESS DRAINAGE WILL BE DIRECTED TOWARDS THE ADJACENT PROPERTIES DURING AND AFTER CONSTRUCTION. THERE WILL BE NO ALTERATION TO EXISTING GRADIENT PATTERNS ON PROPERTY LINE.
- 3.2 ALL AREAS SHALL BE GRADED TO ENSURE ADEQUATE DRAINAGE AWAY FROM BUILDINGS TO CATCH BASINS, SWALES, DITCHES AND OTHER APPROVED DISPOSAL AREAS. GRADING SHALL BE GRADUAL BETWEEN FINISHED SPOT ELEVATIONS SHOWN ON DRAWINGS TO PREVENT PONDING (OTHER THAN PONDING REQUIRED FOR STORMWATER MANAGEMENT).
- 3.3 CULVERTS SHALL BE HOPE OR CORRUGATED STEEL PIPE (CSP). HOPE CULVERTS SHALL BE TO CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND TO OPSD 1840 AND CSA B182.8 OR 182.6 MINIMUM 320 x 400mm AND PINNED TOGETHER. JOINTS SHALL BE SOIL-TIGHT OR BETTER. BOSS 2000 OR APPROVED EQUAL. CSP CULVERTS SHALL BE 500mm ROUND CORRUGATED STEEL 2.0 mm THICK ALUMINUM DIE CAST TO CITY OF OTTAWA STANDARDS AND SPECIFICATIONS AND TO OPSD 1801 AND OPSD 805.010 AND CSA G401.
- 3.4 GEOTEXTILE FABRIC: TO OPSD 1860. WOVEN SYNTHETIC FIBRE FABRIC SHALL BE USED IN SILT FENCE BARRIER. NON-WOVEN SYNTHETIC FIBRE FABRIC SHALL BE USED FOR EARTH RETENTION. GEOTEXTILE (FILTER) FABRIC SHALL BE FREE OF TEARS AND RESISTANT TO DETERIORATION BY ULTRA VIOLET AND HEAT EXPOSURE. PLACE GEOTEXTILE MATERIAL BY UNROLLING UNTO GRADED SURFACE, SMOOTH AND FREE OF TENSION STRESS, FOLDS, WRINKLES AND CREASES. PLACE GEOTEXTILE MATERIAL ON SLOPE WITH 100% OVERLAP AND CONTINUOUS LENGTH FROM TOE OF SLOPE TO UPPER EXTENT OF GEOTEXTILE. OVERLAP EACH SUCCESSIVE STRIP OF GEOTEXTILE 600mm OVER PREVIOUSLY LAID STRIP IN DIRECTION OF FLOW. ALTERNATIVELY THE FABRIC MAY BE LAPPED MINIMUM 300mm AND PINNED TOGETHER. PROTECT INSTALLED GEOTEXTILE MATERIAL FROM DISPLACEMENT, DAMAGE OR DETERIORATION BEFORE, DURING AND AFTER PLACEMENT OF MATERIAL LAYERS AFTER INSTALLATION, COVER WITH OVERLAPPING LAYER WITHIN 1 HOURS OF PLACEMENT DURING DELIVERY AND STORAGE. PROTECT GEOTEXTILES FROM DIRECT SUNLIGHT, ULTRAVIOLET RAYS, EXCESSIVE HEAT, MUD, DIRT, DUST, DEBRIS AND RODENTS. VEHICULAR TRAFFIC NOT PERMITTED DIRECTLY ON GEOTEXTILE. AVOID PUNCTURING GEOTEXTILE OR DAMAGING OR DETERIORATING GEOTEXTILE.
- 3.5 WHETHER RESULT OF POOR WORKMANSHIP OR DAMAGE, DEFECTIVE GRADING SHALL BE CORRECTED. PROMPTLY MAKE GOOD OTHER CONTRACTOR'S WORK DAMAGED BY SUCH CORRECTIONS.

4. SITE SERVICES

- 4.1 CONNECTION TO WATERMAIN BY CITY OF OTTAWA FORCES, CONTRACTOR SHALL PROVIDE EXCAVATION, BACKFILL AND REINSTATEMENT.
- 4.2 WATER METERS SHALL BE INSTALLED AS PER CITY OF OTTAWA DWG. NO. W30. WATER SERVICES SHALL BE INSTALLED AS PER CITY OF OTTAWA DWG. NO. 26.
- 4.3 THE WATER PRESSURE MAY BE ABOVE 80 PSI IN SOME OR ALL OF THE UNITS. CONDUCT AN ON-SITE PRESSURE CHECK IN EACH UNIT TO DETERMINE IF A PRESSURE REDUCING VALVE (PRV) IS REQUIRED. IF THE PRESSURE IS ABOVE 80 PSI, INSTALL A PRV IMMEDIATELY AFTER THE WATER METER.
- 4.4 ALL WATER SERVICE MATERIALS AND CONSTRUCTION METHODS TO CITY OF OTTAWA STANDARDS AND ONTARIO PROVINCIAL STANDARDS SPECIFICATIONS (OPSS & OPSD). WATERMAIN MATERIALS SHALL BE PVC PRESSURE CLASS 150 DR18. WATER SERVICE MATERIALS SHALL BE EITHER ASTM B88 TYPE "K" SOFT OR PEX TUBING SDR 9 TO AWWA C-904 TO CITY OF OTTAWA STANDARDS. METALLIC WARNING TAPE SHALL BE INSTALLED OVER ALL WATERMANS.
- 4.5 PROVIDE THRUST BLOCKS ON WATERMAIN AS PER DETAIL ON DRAWING C-8 AT ALL VALVES, TEES, CAPS, BENDS, REDUCERS OR OTHER FITTINGS. MINIMUM 100mm DIA. PIPES SHALL BE IN PIPE DIAMETER OR DICTION. RESTRAINING AS PER AS PER CITY OF OTTAWA DWG. NO. W25.5 & W25.6. ALL CONNECTIONS, RESTRAINT RODS AND VALVE BOLTS TO BE STAINLESS STEEL. CATHODIC PROTECTION & ANODE INSTALLATION AS PER CITY OF OTTAWA DWG. NO. W40, W42, W44 & W47.
- 4.6 PROVIDE A MINIMUM 2.4 m COVER OVER WATERMAIN AND WATER SERVICE CONNECTIONS. WHERE THE MINIMUM COVER IS NOT POSSIBLE INSULATE AS PER CITY OF OTTAWA DWG. NO. W22.
- 4.7 WHERE LESS THAN 2.4 m CLEARANCE FROM AN OPEN STRUCTURE (EG. MANHOLES & CATCH BASINS) PLACE INSULATION AROUND WATERMAIN AND WATER SERVICE CONNECTIONS AS PER CITY OF OTTAWA DWG. NO. W23.
- 4.8 WATERMAIN INSTALLED PARALLEL TO A SEWER SHALL BE LAID WITH A MINIMUM 2.5m BARREL TO BARREL HORIZONTAL SEPARATION FROM SEWERS AND SEWER MANHOLES. ALTERNATIVELY WATERMANS WITHIN 2.5m HORIZONTAL SEPARATION OF A SEWER SHALL BE INSTALLED SUCH THAT THE UNDERSIDE OF THE WATERMAIN IS A MINIMUM 500mm ABOVE THE TOP OF A SEWER.
- 4.9 WATER SERVICE CONNECTIONS SHALL BE CONSTRUCTED OF A SINGLE RUN OF PIPE WITH NO JOINTS OR FITTINGS BETWEEN THE WATERMAIN AND CURB STOP AND BETWEEN THE CURB STOP AND THE INSIDE FACE OF THE BUILDING.
- 4.10 THE WATERMAIN SHALL CROSS ABOVE THE SEWER AS PER CITY OF OTTAWA DRAWING NO. W25.2; PROVIDE A MINIMUM 250mm BARREL TO BARREL VERTICAL SEPARATION. IF IT IS NOT POSSIBLE FOR THE WATERMAIN TO CROSS ABOVE THE SEWER, CROSS BELOW THE SEWER AS PER CITY OF OTTAWA DRAWING NO. W25; PROVIDE A MINIMUM 500m BARREL TO BARREL VERTICAL SEPARATION AND ENSURE THAT THE WATER PIPE IS CENTERED AT THE POINT OF CROSSING SO JOINTS ARE AS FAR AS POSSIBLE FROM THE SEWER.

- 4.11 WATER SERVICE CONNECTIONS (50mm or LESS) SHALL CROSS THE SEWER AS PER CITY OF OTTAWA DRAWING NO. W38. PROVIDE A MINIMUM 300mm BARREL TO BARREL VERTICAL SEPARATION.
- 4.12 LOCATE FIRE HYDRANT AS PER CITY OF OTTAWA DWG. NO. W18. INSTALL FIRE HYDRANT AS PER CITY OF OTTAWA DWG. NO. W19. LOCATE FIRE HYDRANT 1.5 TO 2.5m FROM FACE OF CURB. LOCATE FIRE HYDRANT LEAD 2m FROM OUTSIDE EDGE OF CATCH BASINS AND MANHOLES. THERE SHALL BE NO VEGETATION OR OTHER OBSTRUCTIONS WITHIN 1.5m OF FIRE HYDRANT. THE PRIVATE FIRE HYDRANT SHALL BE RED WITH WHITE BONNETS AND CAPS TO CITY STANDARDS. AT THE END OF CONSTRUCTION PERFORM A FIRE FLOW TEST ON EACH FIRE HYDRANT AND SUBMIT REPORT TO THE ENGINEER. THE ENGINEER COLOUR CODE THE BONNETS AND CAPS OF THE MUNICIPAL FIRE HYDRANT AS PER CITY OF OTTAWA AND NFPA STANDARDS.
- 4.13 SERVICES SHALL BE INSTALLED AS PER CITY OF OTTAWA DRAWING S11.3.
- 4.14 THE SANITARY BUILDING DRAIN IN EACH DWELLING UNIT SHALL BE INSTALLED WITH A FULL-PORT BACKWATER VALVE TO CITY OF OTTAWA STANDARDS AND TO CITY OF OTTAWA DWG. NO. S14.1 OR S14.2.
- 4.15 THE STORM BUILDING DRAIN IN EACH DWELLING UNIT SHALL BE INSTALLED WITH A BACKWATER VALVE TO CITY OF OTTAWA STANDARDS AND TO CITY OF OTTAWA DWG. NO. S14.
- 4.16 ALL SEWER MATERIALS AND CONSTRUCTION METHODS TO CITY OF OTTAWA STANDARDS AND ONTARIO PROVINCIAL STANDARDS SPECIFICATIONS (OPSS & OPSD). SEWER MATERIAL SHALL BE PVC SDR-35 (SDR-28 FOR DIAMETERS 150mm or LESS) AND SHALL CONFORM TO CSA B182.2 AND SHALL HAVE BELL AND SPIGOT JOINTS WITH RUBBER GASKETS.
- 4.17 PROVIDE A MINIMUM 2.0 m COVER OVER SEWERS. WHERE THE MINIMUM COVER IS NOT POSSIBLE INSULATE AS PER DETAIL.
- 4.18 WHERE SERVICE CONNECTIONS CROSS UNDER A CULVERT; PLACE 100mm THICK INSULATION (3.0m wide and 4.0m IN LENGTH) OVER PIPES. CENTER INSULATION OVER PIPE. INSULATION SHALL BE DOW STRIPFOAM SM-HI-40 OR EQUAL.
- 4.19 MANHOLES & CATCH BASINS:
 - A. PRECAST MANHOLE UNITS: TO OPSD 1351 AND OPSD 701.010 WITH BASE SLAB OR MONOLITHIC BASE. TOP SECTIONS ECCENTRIC CONE OR FLAT LAB TOP TYPE WITH OPENING OFFSET FOR VERTICAL LADDER INSTALLATION.
 - B. MANHOLE STEPS: TO OPSD 405.01.
 - C. ADJUSTING THE SEPTIC SYSTEM (OSSO). SUBMIT THE SEPTIC SYSTEM ALUMINUM SURFACES IN CONTACT WITH OR CAST INTO CONCRETE SHALL HAVE POLYETHYLENE ANCHOR INSULATING SLEEVES.
 - D. PRECAST CATCH BASIN SECTIONS: TO OPSD 1351.
 - E. JOINTS: SHALL BE MADE WATERTIGHT USING BUTYL BASED, FLEXIBLE WATERSTOP/JOINT SEALANT MATERIAL.
 - F. SANITARY SERVICES: BENCH TO PROVIDE A SMOOTH U-SHAPED CHANNEL PER OPSD 701.021. SLOPE INVERT TO ESTABLISH SEWER GRADE.
 - G. STORM SEWERS: MANHOLES SHALL HAVE A 300mm SUMP AND CATCH BASINS AND DITCH INLETS SHALL HAVE A 600mm SUMP.
 - H. FRAMES, GRATES AND COVERS TO CITY OF OTTAWA DRAWINGS OR OPSD 401.010 GRATES AND COVERS TO BEAR EVENLY ON FRAMES. PAINTED WITH ONE SHOP COAT OF ASPHALT OR TAR BASE BLACK, ALL JOINTS AND CREVICES SHALL BE THOROUGHLY COATED.
 - I. GRANULAR BEDDING AND BACKFILL: OPSD GRANULAR A. RE-CYCLED GRANULAR MATERIALS ARE NOT PERMITTED.
 - J. THE INLET CONTROL DEVICE LOCATED IN THE OUTLET PIPE OF CATCH BASIN MANHOLES CB/MH-4 AND CB/MH-10) SHALL BE PLUG STYLE WITH A ROUND ORIFICE (WITH THE ORIFICE LOCATED AT THE BOTTOM OF THE PLUG) AND SHALL BE MANUFACTURED WITH A TRASH BASKET, MANUFACTURED BY PEDRO PLASTICS (OR APPROVED EQUAL) AND SIZED BY THE MANUFACTURER FOR A DISCHARGE RATE AS INDICATED ON PLAN. PRIOR TO INSTALLATION SUBMIT SHOP DRAWING TO ENGINEER FOR APPROVAL.

- 4.21 THE EXISTING WELLS SHALL BE ABANDONED AND DECOMMISSIONED IN ACCORDANCE WITH MINISTRY OF THE ENVIRONMENT (MOE) REGULATION 903 BY A LICENSED WELL CONTRACTOR.
- 4.22 THE EXISTING SEPTIC SYSTEMS SHALL BE DE-COMMISSIONED TO THE SATISFACTION OF THE DIRECTOR OF THE OTTAWA SEPTIC SYSTEM OFFICE (OSSO). SUBMIT THE SEPTIC SYSTEM DE-COMMISSIONING FORM TO THE OSSO. THE SEPTIC TANK SHALL BE PUMPED OUT AND EMPTIED BY A REGISTERED SEWAGE HAULER PRIOR TO DECOMMISSIONING. THE SEPTIC TANK SHALL BE LEFT IN THE GROUND AND BACKFILLED WITH SAND OR GRAVEL OR OTHER MATERIAL SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT A LICENSED FACILITY. ELECTRICAL DEVICES CONTAINING MERCURY SHALL BE REMOVED AND DISPOSED OF IN A LICENSED HAZARDOUS WASTE DISPOSAL FACILITY. THE SEPTIC SYSTEM LEACHING BED SHALL BE DISCONNECTED FROM THE SEPTIC TANK AND CAN BE LEFT IN THE GROUND UNLESS THE LEACHING BED IS EXCAVATED AS PART OF THE SITE DEVELOPMENT, IN WHICH CASE THE DISTRIBUTION PIPES SHALL BE DISPOSED AT A LICENSED HAZARDOUS WASTE DISPOSAL SITE. EXCAVATED CONTAMINATED SOIL SHALL BE SPREAD OR STOCKPILED ON SITE TO THE SATISFACTION OF THE OSSO OR DISPOSED OF IN A LICENSED WASTE DISPOSAL SITE.

5. CONSTRUCTION

- 5.1 PRIOR TO COMMENCING WORK:
 - A. OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE AUTHORITIES.
 - B. SIZE, DEPTH AND LOCATION OF EXISTING SERVICES, UTILITIES AND STRUCTURES AS INDICATED ON THE DRAWINGS ARE FOR GUIDANCE ONLY. ALL EXISTING SERVICES, UTILITIES AND STRUCTURES ARE SHOWN ON THE DRAWINGS FOR COMPLETENESS AND ACCURACY ARE NOT GUARANTEED. NOTIFY ALL APPLICABLE OWNERS, UTILITY COMPANIES AND AUTHORITIES HAVING JURISDICTION OF PROPOSED WORK AND LOCATE AND CLEARLY IDENTIFY ALL EXISTING SERVICES, UTILITIES AND STRUCTURES ON AND ADJACENT TO THE SITE. UNDERGROUND LOCATES (INCLUDING ONTARIO ONE CALL: 1-800-400-2255) SHALL BE CONDUCTED PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION. CONFIRM LOCATIONS OF BURIED SERVICES AND UTILITIES BY CAREFUL TEST EXCAVATIONS AND REPORT ANY DIFFERENCES TO THE ENGINEER.
 - C. EXISTING GRADE ELEVATIONS INDICATED ON THE DRAWINGS ARE FOR GUIDANCE ONLY. COMPLETENESS AND ACCURACY ARE NOT GUARANTEED. CONFIRM EXISTING GRADE ELEVATIONS AND REPORT ANY DIFFERENCES TO THE ENGINEER.
 - D. COORDINATE AND SCHEDULE WORK WITH THE AUTHORITIES AND OTHER TRADES.
 - E. SCHEDULE WORK TO PROVIDE THE MINIMUM DISRUPTION TO SERVICES.
- 5.2 MAINTAIN AND PROTECT FROM DAMAGE, SERVICES, UTILITIES AND STRUCTURES ENCOUNTERED.
- 5.3 PROTECT EXISTING BUILDINGS, TREES AND OTHER PLANTS, LAWNS, FENCES, SERVICE POLES, WIRES, PAVEMENT, SURVEY BENCH MARKS AND MONUMENTS AND OTHER SURFACE FEATURES FROM DAMAGE WHILE WORK IS IN PROGRESS. DO NOT DISTURB SOIL WITHIN BRANCH SPREAD OF TREES OR SHRUBS THAT ARE TO REMAIN.
- 5.4 PROVIDE TRAFFIC CONTROL AND SAFETY MEASURES INCLUDING ANY NECESSARY PERSONNEL AND THE SUPPLY, INSTALLATION, REMOVAL AND REPLACEMENT OF ALL NECESSARY SIGNAGE AND BARRIERS AS REQUIRED BY THE AUTHORITIES. IF APPLICABLE, PROVIDE TRAFFIC MANAGEMENT PLAN AS PER CITY OF OTTAWA REQUIREMENTS.
- 5.5 REMOVE OBSTRUCTIONS, ICE AND SNOW, FROM SURFACES TO BE EXCAVATED.
- 5.6 CUT PAVEMENT AND / OR SIDEWALK NEATLY ALONG LIMITS OF PROPOSED EXCAVATION IN ORDER THAT SURFACE MAY BREAK EVENLY AND CLEANLY.
- 5.7 COORDINATE AND PAY FOR GEOTECHNICAL INSPECTIONS AND COMPACTION TESTS OF SUBGRADE, PIPE BEDDING AND EACH LAYER OF SURROUND MATERIAL, BACKFILL, SUB-BASE, BASE AND ASPHALT TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT AND ENGINEER. SUBMIT GEOTECHNICAL INSPECTIONS AND COMPACTION REPORTS TO ENGINEER FOR REVIEW.
- 5.8 PRIOR TO CONSTRUCTION OF TPOIL STRIP REMOVE FROM SITE ALL EXPOSED Boulders, DEBRIS AND LIVE AND DEAD PLANT MATERIAL (EXCEPT TREES AND OTHER VEGETATION TO REMAIN). STRIP TPOIL FROM THE ENTIRE SITE. STOCKPILE TPOIL ON SITE AS DIRECTED BY CONSULTANT. DO NOT MIX TPOIL WITH SUBSOIL. CUT AND FILL AS NECESSARY TO ACHIEVE THE REQUIRED SUB-GRADE ELEVATION. DISPOSE OF SURPLUS AND UNSUITABLE EXCAVATED MATERIAL OFF SITE. FILL MATERIAL AND THE PLACEMENT AND COMPACTION OF THE FILL MATERIAL AS PER THE GEOTECHNICAL REPORT AND TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT. STOCKPILE GRANULAR AND FILL MATERIALS IN MANNER TO PREVENT SEGREGATION AND PROTECT FROM CONTAMINATION.
- 5.9 EXCAVATION, TRENCHING & BACKFILL:
 - A. SHORE AND BRACE EXCAVATIONS, PROTECT SLOPES AND BANKS AND PERFORM ALL WORK IN ACCORDANCE WITH ONTARIO REGULATION 213/91 UNDER THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND OTHER AUTHORITIES HAVING JURISDICTION.
 - B. KEEP EXCAVATIONS FREE OF WATER WHILE WORK IS IN PROGRESS. PROTECT OPEN EXCAVATIONS AGAINST FLOODING AND DAMAGE DUE TO SURFACE RUN-OFF.
 - C. EXCAVATION MUST NOT INTERFERE WITH BEARING CAPACITY OF ADJACENT FOUNDATIONS.
 - D. DO NOT OBSTRUCT FLOW OF SURFACE DRAINAGE OR NATURAL WATERCOURSES.
 - E. EXCAVATE TO LINES, GRADES, ELEVATIONS AND DIMENSIONS AS INDICATED.
 - F. EARTH BODIES OF EXCAVATIONS TO BE UNDISTURBED SOIL, LEVEL, FREE FROM LOOSE, SOFT OR ORGANIC MATTER.
 - G. ALL STRUCTURES WITHIN PAVED AREAS SHALL HAVE 4:1 FROST TAPERS FROM FROST LINE TO SUB-GRADE TO PROVIDE A MINIMUM 100mm CLEARANCE FROM FROST LINE.
 - H. CORRECT OVER-EXCAVATION WITH GRANULAR A COMPACTED TO NOT LESS THAN 95% OF CORRECTED MAXIMUM DRY DENSITY.
 - I. SUB-GRADE AND AREAS TO BE BACKFILLED TO BE FREE FROM DEBRIS, SNOW, ICE, WATER AND FROZEN GROUND.
 - J. DO NOT USE BACKFILL MATERIAL WHICH IS FROZEN OR CONTAINS ICE, SNOW OR DEBRIS.
 - K. BEDDING AND SURROUND MATERIAL FOR SEWERS SHALL BE OPSD GRANULAR A BEDDING AND SURROUND MATERIAL FOR WATERMAIN AND WATER SERVICE CONNECTIONS SHALL BE OPSD GRANULAR A OR OPSD GRANULAR M. RE-CYCLED GRANULAR MATERIALS ARE NOT PERMITTED.
 - L. DO NOT USE BEDDING, SURROUND OR BACKFILL MATERIAL WHICH IS FROZEN OR CONTAINS ICE, SNOW OR DEBRIS.
 - M. PIPE BEDDING SHALL BE 150mm THICK. SHAPE BED TRUE TO GRADE AND TO PROVIDE CONTINUOUS, UNIFORM SURFACE BEHIND PIPE.
 - N. PLACE SURROUND MATERIAL AROUND PIPES TO FULL WIDTH OF TRENCH AND TO 300mm ABOVE PIPES.
 - O. PLACE BEDDING AND SURROUND MATERIAL IN UNIFORM LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS. PLACE FILL AND BACKFILL MATERIAL IN UNIFORM LAYERS NOT EXCEEDING 300mm COMPACTED THICKNESS.
 - P. COMPACT EACH LAYER TO 95% OF CORRECTED DRY DENSITY BEFORE PLACING SUCCEEDING LAYER.
 - Q. DO NOT BACKFILL AROUND OR OVER CAST-IN-PLACE CONCRETE WITHIN 24 HOURS AFTER PLACING OF CONCRETE.

- R. BACKFILL MATERIALS WITHIN 1.8m OF PROPOSED GRADE SHALL MATCH THE MATERIALS EXPOSED ON THE TRENCH WALLS. BACKFILL BELOW 1.8m OF THE PROPOSED CAN CONSIST OF EITHER ACCEPTABLE NATIVE MATERIAL OR IMPORTED GRANULAR MATERIAL CONFORMING TO OPSD GRANULAR B TYPE I OR II. ANY ORGANIC SOILS OR TOPSOIL, IF ENCOUNTERED, SHALL BE REMOVED FROM THE EXCAVATION. IF ROCK IS USED AS BACKFILL IT SHALL BE WELL SHATTERED AND GRADED AND 200mm OR SMALLER IN DIAMETER. IF FROST IS PRESENT IN THE FILL, REMOVE IT INTO Voids IN THE ROCK FILL, THE UPPER SURFACE OF THE ROCK FILL SHALL BE COVERED WITH 150mm LAYER OF COMPACTED, WELL GRADED CRUSHED STONE PLACED ON GEOTEXTILE FABRIC.

- 5.10 PIPES:
 - A. HANDLE PIPE USING METHODS APPROVED BY MANUFACTURER.
 - B. LAY, CUT AND JOIN PIPES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - C. USE ONLY FITTINGS AS RECOMMENDED BY PIPE MANUFACTURER.
 - D. LAY PIPES ON PREPARED BED, TRUE TO LINE AND GRADE AND ENSURE BARREL OF EACH PIPE IS IN CONTACT WITH SHAPED BED THROUGHOUT ITS FULL LENGTH, FREE OF SACS OR HIGH POINTS.
 - E. DO NOT EXCEED MAXIMUM JOINT DEFLECTION RECOMMENDED BY PIPE MANUFACTURER.
 - F. WHENEVER WORK IS SUSPENDED, INSTALL REMOVABLE WATERTIGHT BULKHEAD AT OPEN END OF LAST PIPE LAID TO PREVENT ENTRY OF FOREIGN MATERIALS.
 - G. WHEN STOPPAGE OF WORK OCCURS, BLOCK PIPES TO PREVENT CREEP DURING DOWN TIME. MAKE WATERTIGHT CONNECTIONS TO MANHOLES.
 - H. JOINTS SHALL BE STRUCTURALLY SOUND AND WATERTIGHT.
 - I. REPAIR OR REPLACE PIPE, PIPE JOINT OR BEDDING FOUND DEFECTIVE.
- 5.11 SEWERS AND SEWER SERVICES:
 - A. CONSTRUCT SEWER TRENCHES AS PER CITY DWG S6 & S7.
 - B. RIGID STRUCTURES, INSTALL PIPE JOINTS NOT MORE THAN 1.2M FROM SIDE OF STRUCTURE.
 - C. MAINTAIN EXISTING SEWAGE FLOWS DURING CONSTRUCTION.
 - D. PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS, SPECIFICALLY, THE LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSD 410. REPAIR AND RETEST SEWER LINE AS REQUIRED. REPAIR VISIBLE LEAKS REGARDLESS OF TEST RESULTS.
 - E. CONDUCT TWO CCTV INSPECTIONS OF SEWERS. FIRST INSPECTION AFTER COMPLETION OF CONSTRUCTION, SECOND INSPECTION IMMEDIATELY PRIOR TO END OF WARRANTY PERIOD. A PAN AND TILT CAMERA SHALL BE USED. REPAIR SEWER LINE AS REQUIRED. SUBMIT REPORTS AND DVDS TO ENGINEER.
 - F. CONDUCT DYE TEST OF SANITARY SEWERS AND COORDINATE WITH ENGINEER. DYE TEST SHALL BE WITNESSED BY ENGINEER.
- 5.12 WATERMAIN:
 - A. INSTALL AND TEST TRACER WIRE ON THE WATER SERVICE CONNECTION AS PER 4.3.12 OF THE CITY OF OTTAWA WATER DISTRIBUTION DESIGN GUIDELINES AND DRAWING W36.
 - B. PRESSURE TEST TESTS AS PER AWWA C-605-5 AND CITY OF OTTAWA DESIGN GUIDELINES - WATER DISTRIBUTION SECTION 4.6.13.
 - C. CHLORINATION AS PER AWWA C-651-05 AND CITY OF OTTAWA DESIGN GUIDELINES - WATER DISTRIBUTION SECTION 4.6.13 & CITY DWG. W46.
- 5.9 MANHOLES & CATCH BASINS:
 - A. JOINTS SHALL BE MADE WATERTIGHT.
 - B. SET PRECAST CONCRETE BASE ON 150mm MINIMUM OF GRANULAR BEDDING COMPACTED TO 100% CORRECTED MAXIMUM DRY DENSITY.
 - C. MAKE EACH JOINT WATERTIGHT WITH RUBBER RING GASKETS.
 - D. PLACE GRANULAR BACKFILL MATERIALS IN A UNIFORM LAYERS TO COMPACTED THICKNESS OF 150mm, COMPACTED MAXIMUM DRY DENSITY TO 95% OF CORRECTED MAXIMUM DRY DENSITY.
 - E. PLACE FRAME AND COVER ON TOP SECTION TO ELEVATION AS INDICATED, IF ADJUSTMENT REQUIRED USE CONCRETE RINGS TO A MAXIMUM OF 300mm.
 - F. CLEAN UNITS OF DEBRIS, FOREIGN AND SURPLUS MATERIALS. REMOVE FINIS AND SHARP PROJECTIONS. PREVENT DEBRIS FROM ENTERING SYSTEM.
 - G. PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS, SPECIFICALLY, THE LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSD 407.
 - 5.13 MAINTAIN RECORD DRAWINGS AND RECORD ACCURATELY DEVIATIONS FROM THE ORIGINAL CONTRACT DOCUMENTS CAUSED BY SITE CONDITIONS AND CHANGES MADE BY CHANGE ORDER OR ADDITIONAL INSTRUCTIONS. RECORDS SHALL BE MAINTAINED AND MADE AVAILABLE ON-SITE FOR REVIEW THROUGHOUT THE CONSTRUCTION PERIOD. MARK CHANGES IN RED INK. RECORD DRAWINGS SHALL INCLUDE BUT NOT NECESSARILY LIMITED TO CHANGES OF DIMENSION AND DETAIL; CHANGES TO GRADE ELEVATIONS; AND HORIZONTAL AND VERTICAL LOCATIONS OF UNDERGROUND SERVICES, UTILITIES AND APPURTENANCES REFERENCED TO A PERMANENT SURFACE STRUCTURE. SUBMIT AS-BUILT DRAWINGS TO ENGINEER AT THE END OF CONSTRUCTION.
- 5.14 CONCRETE BARRIER CURBS SHALL BE