NOTE: THE BELOW SPECIFICATIONS ALSO APPLY TO THE ARTIFICIAL TURF INSTALLATION & MAINTENANCE, WHICH IS CONSIDERED PERMEABLE PAVEMENT. ALL REFERENCES TO PERMEABLE PAVEMENT BELOW SHALL APPLY TO THE ARTIFICIAL TURF ON THIS PROJECT

PERMEABLE PAVEMENT INSTALLATION NOTES

PERMEABLE PAVEMENT CONSTRUCTION SEQUENCE

EXPERIENCE HAS SHOWN THAT PROPER INSTALLATION IS CRITICAL TO THE EFFECTIVE OPERATION OF A PERMEABLE PAVEMENT SYSTEM.

SOIL EROSION AND SEDIMENT CONTROLS

THE FOLLOWING SOIL EROSION AND SEDIMENT CONTROL GUIDELINES MUST BE FOLLOWED DURING CONSTRUCTION:

- ALL PERMEABLE PAVEMENT AREAS MUST BE FULLY PROTECTED FROM SEDIMENT INTRUSION BY SILT FENCE OR CONSTRUCTION FENCING, PARTICULARLY IF THEY ARE INTENDED TO INFILTRATE RUNOFF.
- PERMEABLE PAVEMENT AREAS INTENDED TO INFILTRATE RUNOFF MUST REMAIN OUTSIDE THE LIMITS OF DISTURBANCE DURING CONSTRUCTION TO PREVENT SOIL COMPACTION BY HEAVY EQUIPMENT AND LOSS OF DESIGN INFILTRATION RATE (UNLESS THE AREA HAS BEEN DETERMINED TO HAVE A LOW CALIFORNIA BEARING RATIO AND WILL REQUIRE COMPACTION DURING THE PERMEABLE PAVEMENT CONSTRUCTION PHASE) (ASTM, 2009). WHERE IT IS INFEASIBLE TO KEEP THE PROPOSED PERMEABLE PAVEMENT AREAS OUTSIDE OF THE LIMITS OF DISTURBANCE, THERE ARE SEVERAL POSSIBLE REMEDIES FOR THE IMPACTED AREA.
  - IF EXCAVATION IN THE PROPOSED PERMEABLE PAVEMENT AREAS CAN BE RESTRICTED, THEN REMEDIATION CAN BE ACHIEVED WITH DEEP TILLING PRACTICES. THIS IS ONLY POSSIBLE IF IN SITU SOILS ARE NOT DISTURBED ANY DEEPER THAN 2 FEET ABOVE THE FINAL DESIGN ELEVATION OF THE BOTTOM OF THE AGGREGATE RESERVOIR COURSE. IN THIS CASE, WHEN HEAVY EQUIPMENT ACTIVITY HAS CEASED, THE AREA IS EXCAVATED TO GRADE, AND THE IMPACTED AREA MUST BE TILLED TO A DEPTH OF 12 INCHES BELOW THE BOTTOM OF THE RESERVOIR LAYER.
  - ALTERNATIVELY, IF IT IS INFEASIBLE TO KEEP THE PROPOSED PERMEABLE PAVEMENT AREAS OUTSIDE OF THE LIMITS OF DISTURBANCE, AND EXCAVATION OF THE AREA CANNOT BE RESTRICTED, THEN INFILTRATION TESTS WILL BE REQUIRED PRIOR TO INSTALLATION OF THE PERMEABLE PAVEMENT TO ENSURE THAT THE DESIGN INFILTRATION RATE IS STILL PRESENT. IF TESTS REVEAL THE LOSS OF DESIGN INFILTRATION RATES, THEN DEEP TILLING PRACTICES MAY BE USED IN AN EFFORT TO RESTORE THOSE RATES. IN THIS CASE, FURTHER TESTING MUST BE DONE BEFORE THE PERMEABLE PAVEMENT CAN BE INSTALLED TO ESTABLISH THAT DESIGN RATES HAVE BEEN ACHIEVED.
  - FINALLY, IF IT IS INFEASIBLE TO KEEP THE PROPOSED PERMEABLE PAVEMENT AREAS OUTSIDE OF THE LIMITS OF DISTURBANCE, EXCAVATION OF THE AREA CANNOT BE RESTRICTED, AND INFILTRATION TESTS REVEAL DESIGN RATES CANNOT BE RESTORED, THEN A RESUBMISSION OF THE SWMP WILL BE REQUIRED.
- PERMEABLE PAVEMENT AREAS MUST BE CLEARLY MARKED ON ALL CONSTRUCTION DOCUMENTS AND GRADING PLANS.
- DURING CONSTRUCTION, CARE SHOULD BE TAKEN TO AVOID TRACKING SEDIMENTS ONTO ANY PERMEABLE PAVEMENT SURFACE TO AVOID POST-CONSTRUCTION CLOGGING AND LONG-TERM MAINTENANCE ISSUES.
- ANY AREA OF THE SITE INTENDED ULTIMATELY TO BE A PERMEABLE PAVEMENT AREA WITH AN INFILTRATION COMPONENT SHOULD NOT BE USED AS THE SITE OF A TEMPORARY SEDIMENT TRAP OR BASIN. IF LOCATING A TEMPORARY SEDIMENT TRAP OR BASIN ON AN AREA INTENDED FOR PERMEABLE PAVEMENT IS UNAVOIDABLE, THE REMEDIES ARE SIMILAR TO THOSE DISCUSSED FOR HEAVY EQUIPMENT COMPACTION.
  - IF IT IS POSSIBLE, RESTRICT THE INVERT OF THE SEDIMENT TRAP OR BASIN TO AT LEAST 1 FOOT ABOVE THE FINAL DESIGN ELEVATION OF THE BOTTOM OF THE AGGREGATE RESERVOIR COURSE OF THE PROPOSED PERMEABLE PAVEMENT. THEN REMEDIATION CAN BE ACHIEVED WITH PROPER REMOVAL OF TRAPPED SEDIMENTS AND DEEP TILLING PRACTICES.
  - AN ALTERNATE APPROACH TO DEEP TILLING IS TO USE AN IMPERMEABLE LINEAR TO PROTECT THE IN SITU SOILS FROM SEDIMENTATION WHILE THE SEDIMENT TRAP OR BASIN IS IN USE.
  - IN EACH CASE, ALL SEDIMENT DEPOSITS IN THE EXCAVATED AREA MUST BE CAREFULLY REMOVED PRIOR TO INSTALLING THE SUB-BASE, BASE, AND SURFACE MATERIALS. THE PLAN MUST ALSO SHOW THE PROPER PROCEDURES FOR CONVERTING THE TEMPORARY SEDIMENT CONTROL PRACTICE TO A PERMEABLE PAVEMENT BMP, INCLUDING DEWATERING, CLEANOUT, AND STABILIZATION.

PERMEABLE PAVEMENT INSTALLATION

THE FOLLOWING IS A TYPICAL CONSTRUCTION SEQUENCE TO PROPERLY INSTALL PERMEABLE PAVEMENT, WHICH MAY NEED TO BE MODIFIED DEPENDING ON THE PARTICULAR TYPE OF PERMEABLE PAVEMENT THAT IS BEING INSTALLED.

STEP 1: STABILIZE CONTRIBUTING DRAINAGE AREA. CONSTRUCTION OF THE PERMEABLE PAVEMENT SHOULD ONLY BEGIN AFTER THE ENTIRE CDA HAS BEEN STABILIZED. THE PROPOSED SITE SHOULD BE CHECKED FOR EXISTING UTILITIES PRIOR TO ANY EXCAVATION. DO NOT INSTALL THE SYSTEM IN RAIN OR SNOW AND DO NOT INSTALL FROZEN BEDDING MATERIALS.

STEP 2: INSTALL SOIL EROSION AND SEDIMENT CONTROL MEASURES FOR THE PERMEABLE PAVEMENT. AS NOTED ABOVE, TEMPORARY SOIL EROSION AND SEDIMENT CONTROLS ARE NEEDED DURING INSTALLATION TO DIVERT STORMWATER AWAY FROM THE PERMEABLE PAVEMENT AREA UNTIL IT IS COMPLETED. SPECIAL PROTECTION MEASURES, SUCH AS EROSION CONTROL FABRICS, MAY BE NEEDED TO PROTECT VULNERABLE SIDE SLOPES FROM EROSION DURING THE EXCAVATION PROCESS. THE PROPOSED PERMEABLE PAVEMENT AREA MUST BE KEPT FREE FROM SEDIMENT DURING THE ENTIRE CONSTRUCTION PROCESS. CONSTRUCTION MATERIALS CONTAMINATED BY SEDIMENT MUST BE REMOVED AND REPLACED WITH CLEAN MATERIAL.

STEP 3: MINIMIZE IMPACT OF HEAVY INSTALLATION EQUIPMENT. WHERE POSSIBLE, EXCAVATORS OR BACKHOES SHOULD WORK FROM THE SIDES TO EXCAVATE THE RESERVOIR LAYER TO ITS APPROPRIATE DESIGN DEPTH AND DIMENSIONS. FOR SMALL PAVEMENT APPLICATIONS, EXCAVATING EQUIPMENT SHOULD HAVE ARMS WITH ADEQUATE EXTENSION SO THEY DO NOT HAVE TO WORK INSIDE THE FOOTPRINT OF THE PERMEABLE PAVEMENT AREA (TO AVOID COMPACTION). CONTRACTORS CAN UTILIZE A CELL CONSTRUCTION APPROACH, WHEREBY THE PROPOSED PERMEABLE PAVEMENT AREA IS SPLIT INTO 500- TO 1,000-SQUARE FOOT TEMPORARY CELLS WITH A 10- TO 15-FOOT-WIDE EARTH BRIDGE IN BETWEEN, SO CELLS CAN BE EXCAVATED FROM THE SIDE. EXCAVATED MATERIAL SHOULD BE PLACED AWAY FROM THE OPEN EXCAVATION SO AS TO NOT JEOPARDIZE THE STABILITY OF THE SIDE WALLS.

STEP 4: PROMOTE INFILTRATION RATE. THE NATIVE SOILS ALONG THE BOTTOM OF THE PERMEABLE PAVEMENT SYSTEM SHOULD BE SCARIFIED OR TILLED TO A DEPTH OF 3 TO 4 INCHES PRIOR TO THE PLACEMENT OF THE FILTER LAYER OR GEOTEXTILE FABRIC. IN LARGE-SCALE PAVING APPLICATIONS WITH WEAK SOILS, THE SOIL SUBGRADE MAY NEED TO BE COMPACTED TO 95% OF THE STANDARD PROCTOR DENSITY TO ACHIEVE THE DESIRED LOAD-BEARING CAPACITY.

NOTE: THIS MAY REDUCE OR ELIMINATE THE INFILTRATION FUNCTION OF THE INSTALLATION, AND IT MUST BE ADDRESSED DURING HYDROLOGIC DESIGN.

STEP 5: ORDER OF MATERIALS. GEOTEXTILE FABRIC SHOULD BE INSTALLED ON THE SIDES OF THE RESERVOIR LAYER (AND THE BOTTOM IF THE DESIGN CALLS FOR IT). GEOTEXTILE FABRIC STRIPS SHOULD OVERLAP DOWN-SLOPEBY A MINIMUM OF 2 FEET AND BE SECURED A MINIMUM OF 4 FEET BEYOND THE EDGE OF THE EXCAVATION. WHERE THE FILTER LAYER EXTENDS BEYOND THE EDGE OF THE PAVEMENT (TO CONVEY RUNOFF TO THE RESERVOIR LAYER), INSTALL AN ADDITIONAL LAYER OF GEOTEXTILE FABRIC 1 FOOT BELOW THE SURFACE TO PREVENT SEDIMENT FROM ENTERING INTO THE RESERVOIR LAYER. EXCESS GEOTEXTILE FABRIC SHOULD NOT BE TRIMMED UNTIL THE SITE IS FULLY STABILIZED.

STEP 6: INSTALL BASE MATERIAL COMPONENTS. THE UP-GRADIENT END OF UNDERDRAINS IN THE RESERVOIR LAYER SHOULD BE CAPPED. WHERE AN UNDERDRAIN PIPE IS CONNECTED TO A STRUCTURE, THERE SHALL BE NO PERFORATIONS WITHIN 1 FOOT OF THE STRUCTURE. ENSURE THERE ARE NO PERFORATIONS IN CLEAN-OUTS AND OBSERVATION WELLS WITHIN 1 FOOT OF THE SURFACE.

STEP 7: STONE MEDIA. SPREAD 6-INCH LIFTS OF THE APPROPRIATE STONE AGGREGATE (USUALLY NO. 2 OR NO. 57 STONE) WASHED CLEAN AND FREE OF FINES. PLACE AT LEAST 4 INCHES OF ADDITIONAL AGGREGATE ABOVE THE UNDERDRAIN, AND THEN COMPACT IT USING A VIBRATORY ROLLER IN STATIC MODE UNTIL THERE IS NO VISIBLE MOVEMENT OF THE AGGREGATE. DO NOT CRUSH THE AGGREGATE WITH THE ROLLER.

STEP 8: RESERVOIR MEDIA. INSTALL THE DESIRED DEPTH OF THE BEDDING LAYER, DEPENDING ON THE TYPE OF PAVEMENT, AS INDICATED IN TABLE 3-12.

STEP 9: PAVING MEDIA. PAVING MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER OR INDUSTRY SPECIFICATIONS FOR THE PARTICULAR TYPE OF PAVEMENT.

PERMEABLE PAVEMENT (CONT)

PERMEABLE INTERLOCKING CONCRETE PAVER INSTALLATION

THE BASIC INSTALLATION PROCESS IS DESCRIBED IN GREATER DETAIL BY SMITH (2006):

- PLACE EDGE RESTRAINTS FOR OPEN-JOINTED PAVEMENT BLOCKS BEFORE THE BEDDING LAYER AND PAVEMENT BLOCKS ARE INSTALLED. PERMEABLE INTERLOCKING CONCRETE PAVEMENT SYSTEMS REQUIRE EDGE RESTRAINTS TO PREVENT VEHICLE LOADS FROM MOVING THE PAVER BLOCKS. EDGE RESTRAINTS MAY BE STANDARD CURBS OR GUTTER PANS, OR PRECAST OR CAST-IN-PLACE REINFORCED CONCRETE BORDERS A MINIMUM OF 6 INCHES WIDE AND 18 INCHES DEEP, CONSTRUCTED WITH CLASS A3 CONCRETE. EDGE RESTRAINTS ALONG THE TRAFFIC SIDE OF A PERMEABLE PAVEMENT BLOCK SYSTEM ARE RECOMMENDED.
- PLACE THE NO. 57 STONE IN A SINGLE LIFT. LEVEL THE FILTER COURSE AND COMPACT IT INTO THE RESERVOIR COURSE BENEATH WITH AT LEAST FOUR PASSES OF A 10-TON STEEL DRUM STATIC ROLLER UNTIL THERE IS NO VISIBLE MOVEMENT. THE FIRST TWO PASSES ARE IN VIBRATORY MODE, WITH THE FINAL TWO PASSES IN STATIC MODE. THE FILTER AGGREGATE SHOULD BE MOIST TO FACILITATE MOVEMENT INTO THE RESERVOIR COURSE.
- PLACE AND SCREED THE BEDDING COURSE MATERIAL (TYPICALLY NO. 8 STONE). FILL GAPS AT THE EDGE OF THE PAVED AREAS WITH CUT PAVERS OR EDGE UNITS. WHEN CUT PAVERS ARE NEEDED, CUT THE PAVERS WITH A PAVER SPLITTER OR MASONRY SAW. CUT PAVERS NO SMALLER THAN 1/3 OF THE FULL UNIT SIZE.
- PAVERS MAY BE PLACED BY HAND OR WITH MECHANICAL INSTALLERS. FILL THE JOINTS AND OPENINGS WITH STONE. JOINT OPENINGS MUST BE FILLED WITH ASTM D448 NO. 8 STONE; ALTHOUGH, NO. 8P OR NO. 9 STONE MAY BE USED WHERE NEEDED TO FILL NARROWER JOINTS. REMOVE EXCESS STONES FROM THE PAVER SURFACE.
- COMPACT AND SEAT THE PAVERS INTO THE BEDDING COURSE WITH A MINIMUM LOW-AMPLITUDE 5,000-POUND-FOOT,75- TO 95-HZ PLATE COMPACTOR.
- DO NOT COMPACT WITHIN 6 FEET OF THE UNRESTRAINED EDGES OF THE PAVERS.
- THE SYSTEM MUST BE THOROUGHLY SWEPT BY A MECHANICAL SWEEPER OR VACUUMED IMMEDIATELY AFTER CONSTRUCTION TO REMOVE ANY SEDIMENT OR EXCESS AGGREGATE.
- INSPECT THE AREA FOR SETTLEMENT. ANY BLOCKS THAT SETTLE MUST BE RESET AND RE-INSPECTED.
- INSPECT THE FACILITY 18 TO 30 HOURS AFTER A SIGNIFICANT RAINFALL (0.5 INCH OR GREATER) OR ARTIFICIAL FLOODING TO DETERMINE WHETHER THE FACILITY IS DRAINING PROPERLY.

CONSTRUCTION SUPERVISION

SUPERVISION BEFORE, DURING, AND AFTER CONSTRUCTION BY A QUALIFIED PROFESSIONAL IS RECOMMENDED TO ENSURE PERMEABLE PAVEMENT IS BUILT IN ACCORDANCE WITH THESE SPECIFICATIONS. ASTM TEST C1781 OR C1701 MUST BE PERFORMED TO ENSURE INITIAL PAVEMENT PERMEABILITY OF AT LEAST 6 INCHES PER HOUR. INSPECTION CHECKLISTS THAT REQUIRE SIGN-OFFS BY QUALIFIED INDIVIDUALS SHOULD BE USED AT CRITICAL STAGES OF CONSTRUCTION TO ENSURE THE CONTRACTOR'S INTERPRETATION OF THE PLAN IS CONSISTENT WITH THE DESIGNER'S INTENT.

DOEE'S CONSTRUCTION PHASE INSPECTION CHECKLIST FOR PERMEABLE PAVEMENT PRACTICES CAN BE FOUND IN APPENDIX L – CONSTRUCTION INSPECTION CHECKLISTS.

SOME COMMON PITFALLS CAN BE AVOIDED BY CAREFUL CONSTRUCTION SUPERVISION THAT FOCUSES ON THE FOLLOWING KEY ASPECTS OF PERMEABLE PAVEMENT INSTALLATION:

- STORE MATERIALS IN A PROTECTED AREA TO KEEP THEM FREE FROM MUD, DIRT, AND OTHER FOREIGN MATERIALS.
- THE CDA SHOULD BE STABILIZED PRIOR TO DIRECTING WATER TO THE PERMEABLE PAVEMENT AREA.
- CHECK THE AGGREGATE MATERIAL TO CONFIRM IT IS CLEAN AND WASHED, MEETS SPECIFICATIONS AND IS INSTALLED TO THE CORRECT DEPTH. AGGREGATE LOADS THAT DO NOT MEET THE SPECIFICATIONS OR DO NOT APPEAR TO BE SUFFICIENTLY WASHED MAY BE REJECTED.
- CHECK ELEVATIONS (I.E., THE INVERT OF THE UNDERDRAIN, INVERTS FOR THE INFLOW, AND OUTFLOW POINTS) AND THE SURFACE SLOPE.
- MAKE SURE THE PERMEABLE PAVEMENT SURFACE IS EVEN, RUNOFF SPREADS EVENLY ACROSS IT, AND THE STORAGE BED DRAINS WITHIN 48 HOURS.
- ENSURE CAPS ARE PLACED ON THE UPSTREAM (BUT NOT THE DOWNSTREAM) ENDS OF THE UNDERDRAINS.
- INSPECT THE PRETREATMENT STRUCTURES (IF APPLICABLE) TO MAKE SURE THEY ARE PROPERLY INSTALLED AND WORKING EFFECTIVELY.
- ONCE THE FINAL CONSTRUCTION INSPECTION HAS BEEN COMPLETED, LOG THE GPS COORDINATES FOR EACH FACILITY AND SUBMIT THEM FOR ENTRY INTO THE BMP MAINTENANCE TRACKING DATABASE.

RUNOFF DIVERSION STRUCTURES ARE RECOMMENDED TO PROTECT LARGER PERMEABLE PAVEMENT APPLICATIONS FROM EARLY RUNOFF-PRODUCING STORMS, PARTICULARLY WHEN UP-GRADIENT CONVENTIONAL ASPHALT AREAS DRAIN TO THE PERMEABLE PAVEMENT. THIS CAN HELP REDUCE THE INPUT OF FINE PARTICLES OFTEN PRODUCED SHORTLY AFTER CONVENTIONAL ASPHALT IS LAID.

PERMEABLE PAVEMENT MAINTENANCE CRITERIA

MAINTENANCE IS A REQUIRED AND CRUCIAL ELEMENT TO ENSURE THE LONG-TERM PERFORMANCE OF PERMEABLE PAVEMENT. THE MOST FREQUENTLY CITED MAINTENANCE PROBLEM IS SURFACE CLOGGING CAUSED BY ORGANIC MATTER AND SEDIMENT. PERIODIC STREET SWEEPING WILL REMOVE ACCUMULATED SEDIMENT AND HELP PREVENT CLOGGING; HOWEVER, IT IS ALSO CRITICAL TO ENSURE THAT SURROUNDING LAND AREAS REMAIN STABILIZED.

THE FOLLOWING TASKS MUST BE AVOIDED ON ALL PERMEABLE PAVEMENTS:

- SANDING
- RESEALING
- RESURFACING
- POWER WASHING
- STORAGE OF SNOW PILES CONTAINING SAND
- STORAGE OF MULCH OR SOIL MATERIALS
- CONSTRUCTION STAGING ON UNPROTECTED PAVEMENT

IT IS DIFFICULT TO PRESCRIBE THE SPECIFIC TYPES OR FREQUENCY OF MAINTENANCE TASKS THAT ARE NEEDED TO MAINTAIN THE HYDROLOGIC FUNCTION OF PERMEABLE PAVEMENT SYSTEMS OVER TIME. THE FREQUENCY OF MAINTENANCE WILL DEPEND LARGELY ON THE PAVEMENT USE, TRAFFIC LOADS, AND THE SURROUNDING LAND.

ONE PREVENTATIVE MAINTENANCE TASK FOR LARGE-SCALE APPLICATIONS (E.G., PARKING LOTS) INVOLVES VACUUM SWEEPING ON A FREQUENCY CONSISTENT WITH THE USE AND LOADINGS ENCOUNTERED IN THE SITE. MANY EXPERTS CONSIDER AN ANNUAL, DRY-WEATHER SWEEPING IN THE SPRING MONTHS TO BE IMPORTANT. THE CONTRACT FOR SWEEPING SHOULD SPECIFY THAT A VACUUM SWEEPER BE USED THAT DOES NOT USE WATER SPRAY, SINCE SPRAYING MAY LEAD TO SUBSURFACE CLOGGING. TYPICAL MAINTENANCE TASKS ARE OUTLINED IN:

Table 3-13 Typical Maintenance Tasks for Permeable Pavement Practices

Frequency	Maintenance Tasks
After installation	▪ For the first 6 months following construction, the practice and CDA should be inspected at least twice after storm events that exceed 0.5 inch of rainfall. Conduct any needed repairs or stabilization.
Once every 1–2 months during the growing season	▪ Mow grass in grid paver applications (clippings should be removed from the pavement area).
As needed	▪ Stabilize the CDA to prevent erosion. ▪ Remove any soil or sediment deposited on pavement. ▪ Replace or repair any pavement surfaces that are degenerating or spalling.
2–4 times per year (depending on use)	▪ Mechanically sweep pavement with a standard street sweeper to prevent clogging.
Annually	▪ Conduct a maintenance inspection ▪ Remove weeds as needed.
Once every 2–3 years	▪ Remove any accumulated sediment in pretreatment cells and inflow points.
If clogged	▪ Conduct maintenance using a regenerative street sweeper or a vacuum sweeper ▪ Replace any necessary joint material.

SEASONAL MAINTENANCE CONSIDERATIONS

WINTER MAINTENANCE FOR PERMEABLE PAVEMENTS IS SIMILAR TO STANDARD PAVEMENTS, WITH A FEW ADDITIONAL CONSIDERATIONS:

- LARGE SNOW STORAGE PILES SHOULD BE LOCATED IN ADJACENT GRASSY AREAS SO THAT SEDIMENT AND POLLUTANTS IN SNOWMELT ARE PARTIALLY TREATED BEFORE THEY REACH THE PERMEABLE PAVEMENT.
- SAND OR CINDERS SHOULD NEVER BE APPLIED FOR WINTER TRACTION OVER PERMEABLE PAVEMENT OR AREAS OF STANDARD (IMPERVIOUS) PAVEMENT THAT DRAIN TOWARD PERMEABLE PAVEMENT, SINCE IT WILL QUICKLY CLOG THE SYSTEM.
- WHEN PLOWING PLASTIC REINFORCED GRID PAVEMENTS, SNOW PLOW BLADES SHOULD BE LIFTED 0.5 INCH TO 1 INCH ABOVE THE PAVEMENT SURFACE TO PREVENT DAMAGE TO THE PAVING BLOCKS OR TURF. POROUS ASPHALT, PERVIOUS CONCRETE, AND SOME PERMEABLE PAVERS CAN BE PLOWED SIMILARLY TO TRADITIONAL PAVEMENTS, USING SIMILAR EQUIPMENT AND SETTINGS.
- CHLORIDE PRODUCTS SHOULD BE USED JUDICIOUSLY TO DEICE ABOVE PERMEABLE PAVEMENT DESIGNED FOR INFILTRATION, SINCE THE SALT WILL BE TRANSMITTED THROUGH THE PAVEMENT. SALT CAN BE APPLIED BUT ENVIRONMENTALLY SENSITIVE DEICERS ARE RECOMMENDED. PERMEABLE PAVEMENT APPLICATIONS WILL GENERALLY REQUIRE LESS SALT APPLICATION THAN TRADITIONAL PAVEMENTS.

WHEN PERMEABLE PAVEMENTS ARE INSTALLED ON PRIVATE RESIDENTIAL LOTS, HOMEOWNERS WILL NEED TO (1) BE EDUCATED ABOUT THEIR ROUTINE MAINTENANCE NEEDS AND (2) UNDERSTAND THE LONG-TERM MAINTENANCE.

IT IS RECOMMENDED THAT A QUALIFIED PROFESSIONAL CONDUCT A SPRING MAINTENANCE INSPECTION AND CLEANUP AT EACH PERMEABLE PAVEMENT SITE, PARTICULARLY AT LARGE-SCALE APPLICATIONS. DOEE'S MAINTENANCE INSPECTION CHECKLISTS FOR PERMEABLE PAVEMENTS AND THE MAINTENANCE SERVICE COMPLETION INSPECTION FORM CAN BE FOUND IN APPENDIX L – CONSTRUCTION INSPECTION CHECKLISTS.

TREE PRESERVATION NOTES

PROTECT TREES AND SOIL DURING CONSTRUCTION SEQUENCE

PHYSICAL BARRIERS SHOULD BE PROPERLY INSTALLED AROUND THE CRITICAL ROOT ZONE (CRZ) OF TREES TO BE PRESERVED. THE CRZ SHALL BE DETERMINED BY A LANDSCAPE PROFESSIONAL FROM THE ABOVE LIST, AND IN GENERAL IS EQUAL TO 1.5 FEET OF TREE PROTECTION (RADIUS OF CIRCLE) FOR EVERY 1 INCH IN TREE DIAMETER. FOR EXAMPLE, A 10-INCH DIAMETER TREE WOULD HAVE A CRZ RADIUS EXTENDING 15 FEET FROM THE TREE. THE BARRIERS MUST BE MAINTAINED AND ENFORCED THROUGHOUT THE CONSTRUCTION PROCESS. TREE PROTECTION BARRIERS INCLUDE HIGHLY VISIBLE, WELL-ANCHORED TEMPORARY PROTECTION DEVICES, SUCH AS 6-FOOT-TALL CHAIN LINK OR 4-FOOT WOODEN SNOW FENCING. ALL PROTECTION DEVICES MUST REMAIN IN PLACE THROUGHOUT CONSTRUCTION.

IF LAND DISTURBANCE IS PROPOSED WITHIN THE CRZ, THE TREE MAY BE COUNTED FOR PRESERVATION ONLY IF A TREE PRESERVATION PLAN IS PREPARED AND CERTIFIED BY ONE OF THE LANDSCAPE PROFESSIONALS IN THE LIST ABOVE (SEE "INVENTORY EXISTING TREES" SECTION). REFER TO DOEE'S EROSION AND SEDIMENT CONTROL MANUAL REGARDING TREE PROTECTION MEASURES THAT CAN BE TAKEN DURING CONSTRUCTION.

PRESERVED TREE BMPS MUST BE INCLUDED WITHIN THE LIMIT OF DISTURBANCE (LOD) DELINEATED ON THE PLANS TO BE COUNTED TOWARD MEETING STORMWATER MANAGEMENT REQUIREMENTS, EVEN IF NO DISTURBANCE TAKES PLACE WITHIN THE PROTECTED ZONE.

PROTECT TREES AFTER CONSTRUCTION

MAINTENANCE COVENANTS, AS DESCRIBED BELOW, ARE REQUIRED TO ENSURE THAT PRESERVED TREES ARE PROTECTED.

TREE MAINTENANCE CRITERIA

WATER NEWLY PLANTED TREES REGULARLY (AT LEAST ONCE A WEEK) DURING THE FIRST GROWING SEASON. WATER TREES LESS FREQUENTLY (ABOUT ONCE A MONTH) DURING THE NEXT TWO GROWING SEASONS. AFTER THREE GROWING SEASONS, WATER TREES ONLY DURING DROUGHT. THE EXACT WATERING FREQUENCY WILL VARY FOR EACH TREE AND SITE.

A GENERAL HORTICULTURAL RULE OF THUMB IS THAT TREES NEED 1 INCH OF RAINFALL PER WEEK DURING THE GROWING SEASON. THIS MEANS NEW TREES NEED A MINIMUM OF 25 GALLONS OF WATER A WEEK TO STAY ALIVE HTTP://CASEYTREES.ORG/GET-INVOLVED/WATER/). WATER TREES DEEPLY AND SLOWLY NEAR THE ROOTS. LIGHT, FREQUENT WATERING OF THE ENTIRE PLANT CAN ACTUALLY ENCOURAGE ROOTS TO GROW AT THE SURFACE. SOAKER HOSES AND DRIP IRRIGATION WORK BEST FOR DEEP WATERING OF TREES. IT IS RECOMMENDED THAT SLOW LEAK WATERING BAGS OR TREE BUCKETS ARE INSTALLED TO MAKE WATERING EASIER AND MORE EFFECTIVE. CONTINUE WATERING UNTIL MID-FALL, TAPERING OFF DURING LOWER TEMPERATURES.

PRUNING IS USUALLY NOT NEEDED FOR NEWLY PLANTED TREES BUT MAY BE BENEFICIAL FOR TREE STRUCTURE. IF NECESSARY, PRUNE ONLY DEAD, DISEASED, BROKEN OR CROSSING BRANCHES AT PLANTING. AS THE TREE GROWS, LOWER BRANCHES MAY BE PRUNED TO PROVIDE CLEARANCE ABOVE THE GROUND, OR TO REMOVE DEAD OR DAMAGED LIMBS.

DOEE'S MAINTENANCE INSPECTION CHECKLIST FOR TREE PLANTING AND PRESERVATION AND THE MAINTENANCE SERVICE COMPLETION INSPECTION FORM CAN BE FOUND IN APPENDIX M – MAINTENANCE INSPECTION CHECKLISTS.

POST-PLANTING TREE PROTECTION

ONCE THE TREE HAS BEEN PROPERLY PLANTED, 2 TO 4 INCHES OF ORGANIC MULCH MUST BE SPREAD OVER THE SOIL SURFACE OUT TO THE DRIP LINE (THE OUTERMOST CIRCUMFERENCE OF THE TREE CANOPY) OF THE TREE. IF PLANTING A CLUSTER OF TREES, MULCH THE ENTIRE PLANTING AREA. SLOW-DECOMPOSING ORGANIC MULCHES, SUCH AS SHREDDED BARK, COMPOST, LEAF MULCH, OR WOOD CHIPS PROVIDE MANY ADDED BENEFITS FOR TREES. MULCH THAT CONTAINS A COMBINATION OF RECOMMENDED AS MULCHES BECAUSE THEY DECOMPOSE RAPIDLY AND REQUIRE FREQUENT APPLICATION, RESULTING IN REDUCED BENEFITS.

FOR WELL-DRAINED SITES, UP TO 4 INCHES OF MULCH MAY BE APPLIED. FOR POORLY DRAINED SITES, A THINNER LAYER OF MULCH SHOULD BE APPLIED. MULCH SHOULD NEVER BE MORE THAN 4 INCHES DEEP OR APPLIED RIGHT NEXT TO THE TREE TRUNK; HOWEVER, A COMMON SIGHT IN MANY LANDSCAPED AREAS IS THE "MULCH VOLCANO." THIS OVER-MULCHING TECHNIQUE CAN CAUSE OXYGEN AND MOISTURE-LEVEL PROBLEMS, AND DECAY OF THE LIVING BARK AT THE BASE OF THE TREE. A MULCH-FREE AREA, 2 TO 3 INCHES WIDE AT THE BASE OF THE TREE, MUST BE PROVIDED TO AVOID MOIST BARK CONDITIONS AND PREVENT DECAY.

STUDIES HAVE SHOWN THAT TREES WILL ESTABLISH MORE QUICKLY AND DEVELOP STRONGER TRUNK AND ROOT SYSTEMS IF THEY ARE NOT STAKED AT THE TIME OF PLANTING. STAKING FOR SUPPORT MAY BE NECESSARY ONLY FOR TOP-HEAVY TREES OR AT SITES WHERE VANDALISM OR WINDY EXPOSURE ARE A CONCERN.

IF STAKING IS NECESSARY FOR SUPPORT, TWO STAKES USED IN CONJUNCTION WITH A WIDE FLEXIBLE TIE MATERIAL WILL HOLD THE TREE UPRIGHT, PROVIDE FLEXIBILITY, AND MINIMIZE INJURY TO THE TRUNK. TO PREVENT DAMAGE TO THE ROOT BALL, STAKES SHOULD BE PLACED IN UNDISTURBED SOIL BEYOND THE OUTER EDGES OF THE ROOT BALL. PERHAPS THE MOST IMPORTANT PART OF STAKING IS ITS REMOVAL. OVER TIME, GUY WIRES (OR OTHER TIE MATERIAL) CAN CUT INTO THE GROWING TRUNK BARK AND INTERFERE WITH THE MOVEMENT OF WATER AND NUTRIENTS WITHIN THE TREE. STAKING MATERIAL SHOULD BE REMOVED WITHIN 1 YEAR OF PLANTING.

IN AREAS IN OR ADJACENT TO PARKS, NATURAL AREAS, AND OPEN SPACES WHERE DEER PRESENCE IS EVIDENT AND BUCK RUB IS A COMMON PROBLEM RESULTING IN SIGNIFICANT PREVENTABLE DAMAGE TO NEWLY PLANTED TREES, CONSIDER INSTALLATION OF DEER PROTECTION FENCING, AS ILLUSTRATED IN FIGURE 3.48.

ANY PROPOSED DEVIATION FROM THE STORMWATER MANAGEMENT DETAILS OR SPECIFICATIONS SHOWN ON THESE PLANS WILL REQUIRE SUBMISSION TO DOEE AS A FORMAL PLAN REVISION FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. ALL SUBMITTALS RELATED TO THE STORMWATER MANAGEMENT FACILITIES SHALL BE PROVIDED TO THE OWNER, ARCHITECT, AND CIVIL ENGINEER FOR REVIEW AND COMPLIANCE VERIFICATION.

GOVERNMENT OF THE DISTRICT OF COLUMBIA
PERMIT OPERATIONS DIVISION
PLANS APPROVED
Permit No. BCIV2300110 Date 11/16/23

These plans are conditionally approved as submitted or noted during plan review and are subject to field inspection. Approved plans must be kept on site and are needed for all inspections. No changes or modifications to these plans. Changes require a revision permit with the revised plans. Trade Permits are required for trade work. e.g. Electrical or Plumbing

Structural Review - Glenn Kechejian - 11-16-2023
DDOT Review - Shawntanishia Zackery - 11-16-2023
DOEE SE-SW Review - Saba Gharavi - 11-16-2023
HPRB Review - Timothy Dennee - 11-16-2023
DC Water Review - Vahid Bilvardi - 11-16-2023

VIKA CAPITOL
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MARET SCHOOL
PROPOSED ATHLETIC FIELDS
SQUARE 2319, LOT 832
5901 UTAH AVE NW
WASHINGTON, D.C. 20015

STORMWATER MANAGEMENT NOTES AND DETAILS

VIKA CAPITOL REVISIONS

#	DATE	DESCRIPTION

**NOTE
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DISTRICT OF COLUMBIA
KYLE U. OLIVER
PE900770
3/17/2023
CIVIL
PROFESSIONAL ENGINEER

DATE: 23-FEB-2023
DES. KUO DWN. BJR
SCALE: AS SHOWN
PROJECT/FILE NO. VC0626D
SHEET NO. CIV1120

Board of Zoning Adjustment
District of Columbia
CASE NO.21100
EXHIBIT NO.26E