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MORNINGSTAR LANE SUMMIT STREET, PORTLAND, MAINE PREPARED FOR: MORNINGSTAR REAL ESTATE TRUST 9 CRAIGIE STREET PORTLAND, MAINE 04102

Table with columns: Date, Revision, LDM, PJP, Checked LDM, NO SCALE, Date 05-07-07, REVISION PER ENG/STAFF REVIEW COMMENTS, PRELIMINARY REVIEW - CITY OF PORTLAND, REVISION PER ENG/STAFF REVIEW COMMENTS, NO REVISION THIS SHEET, NO REVISION THIS SHEET, REVISION PER ENG/STAFF REVIEW COMMENTS

EROSION CONTROL NOTES

Job No. 21080008 Drawing

PRICING ONLY NOT FOR CONSTRUCTION JAN 10, 2012

EROSION AND SEDIMENTATION CONTROL PLAN MORNINGSTAR LANE SUMMIT STREET PORTLAND MAINE

The following plan has been developed to provide a strategy for controlling sedimentation and erosion from this project during and after construction of driveways, buildings, utilities, ponds, landscaping and other site work and improvements. This plan is based upon sound conservation practices such as those outlined in the "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices" manual by the Cumberland County Soil and Water Conservation District, and the Maine Department of Environmental Protection, dated March, 2003. It is not the intent of this document to supersede project Specifications, Drawings or other Contract Documents issued for this project which the Contractor shall also be responsible for. Please refer to these sources and the Erosion Control Drawings and Details included within the Drawing Set for more detailed information.

1.00 INTRODUCTION

Morningstar Real Estate Trust is proposing a ten lot subdivision on 5.7 +/- acres off Summit Street in Portland, Maine. The project will include approximately 780 feet of roadway ending in a cul-de-sac; underground utilities including municipal sewer and water, electrical, gas, and a storm drain system will also be provided. The project will also include construction of a stormwater collection system. The location of the facility is shown on the USGS quadrangle map in Figure 1. Stantec has also prepared Drawings and Specifications and Stormwater Management Report for this project. The accompanying Drawings for Morningstar Lane illustrate in detail the project scope, locations and methods of erosion control practices and measures required for this project. A detailed description of the project is included in the Stormwater Management Report.

1.01 Stormwater Management Measures - Additional measures may be required to protect existing and new stormwater conveyance or management systems. It is also very important to protect new and existing ditches, culverts and storm sewers with special measures such as check dams, drop inlet sediment barriers, sediment traps or similar measures to prevent sediment from entering conveyance systems and being transported long distances or to off-site locations.

1.02 Additional Permits - All work requiring additional permits, including local permits from towns or municipalities, shall be performed in accordance with all applicable standards therein.

2.00 CONSTRUCTION CALENDAR

2.01 General - Construction of the project is expected to begin immediately after obtaining all approvals and permits. It is likely that the construction will begin in the spring of 2008. However, unanticipated delays, scheduling problems or weather conditions may significantly alter these dates. The Contractor should give special attention to the sections pertaining to fall and winter construction as well as sensitive areas and requirements for temporary seeding, dormant seeding and mulching.

2.02 Definitions - The following definitions are terms commonly used throughout this report.

Table with columns: Seasons, Dates, Winter, Mid-Season, Spring, Summer, Fall

2.02.b Critical Areas - are specific areas identified herein or are subjected to significant erosion problems as observed in the field prior to, during or following construction activities, such as areas with steep slopes or channels in excess of 8%, newly graded slopes, detention/sedimentation ponds, highly erodible soils which will be exposed for more than one month or bare soils exposed during late fall and winter when no vegetation can grow.

2.02.c Erosion & Sedimentation Controls - are defined as the installation of silt fence, hay bales, erosion control berms, rip-rap, mulching, or erosion control matting or netting, check dams, inlet protection, construction entrances, diversions, level spreaders, sedimentation ponds, temporary risers or filters, and any other temporary or permanent measures required herein.

2.02.d Clearing - includes cutting and removing of over-story vegetation cover. It does not include grubbing. Limited cutting, thinning, use of heavy equipment and other clearing restrictions may apply to sensitive areas and wetland crossings.

2.02.e Grubbing - is the removal of grass, roots and scrub required to begin earthwork.

2.02.f Interim Period - a period of time that an unvegetated area sits unworked, awaiting the next phase of work.

2.02.g Earthwork - consists of the movement of soil by mechanical means including excavation, filling, grading, trenching, shaping and pond construction.

2.02.h Temporary - as used herein shall refer to the use and placement of erosion or sedimentation controls, seeding or other measures followed to be either removed, replaced, reseeded, or otherwise followed with permanent measures.

2.02.i Permanent or Final - as used herein shall refer to the use or placement of erosion or sedimentation controls, seeding or other measures which will remain through final project completion.

2.02.j Acceptance - as used herein shall mean verification by Owner and/or Engineer that the specific erosion control measure or device to be accepted is adequately constructed, performs satisfactorily as intended and is complete. Acceptance of a measure or device by Owner or Engineer shall be based upon visual observations and inspection and is not a warranty of compliance, compactness, structural integrity, workmanship or other construction related or qualitative factors which may require testing or other means of certification of compliance.

2.02.k Engineer - as used herein shall mean a representative of Stantec Consulting and/or an engineer, representative or inspector designated by DEP, Architect, or person designated by Owner as the Construction Site Engineer.

2.03 Schedule of Activities - The following activities, erosion control measures, or other items are required for the construction of this project or require specific measures or scheduling of activities to be conducted or restricted during the various construction seasons as herein defined above.

2.03.a Critical Area - all work proposed in the defined critical areas may be conducted all year. However, to the extent practical, erosion control measures for defined critical areas should be installed during Summer or Fall in advance of construction, in or adjacent to critical areas, anticipated or scheduled in the winter and mud season. Certain problem areas may become "critical areas" during the course of construction. Areas observed to be experiencing significant erosion problems shall be deemed critical areas and shall be stabilized with appropriate erosion control measures immediately prior to progressing with work in these areas as directed by Engineer.

2.03.b Erosion & Sedimentation Controls Installation - erosion control installation may occur all year long, except that submeasures shall be installed prior to commencement of earthwork and/or mulching shall be used where practical. Mechanical sweepers or washing of pavement shall be used where necessary to prevent and remove dust building on paved surfaces. All exposed soil surfaces shall be maintained to minimize dust by periodically misting bare areas with adequate water to prevent dust. Calcium Chloride solution spray should be used in areas experiencing significant dust problems and to reduce frequency of watering. Repetitive treatment shall be applied as necessary to accomplish adequate dust control.

2.03.c Clearing - clearing may occur all year long except during "mud season".

2.03.d Road Construction - This construction may occur in the spring, summer and fall seasons. It may be allowed in the winter season. However, the winter construction schedule must be followed.

3.00 EROSION CONTROL MEASURES

General - The construction of this project may require or incorporate the following measures or practices as needed or applicable. Such measures, where indicated on Drawings shall be implemented as shown or required herein. Additional measures not shown on Drawings may be required as specified herein or requested by the Engineer, as needed, in order to ensure the protection of resources or off-site properties.

3.01.a Straw Bales - shall be installed along the contours in the locations and as detailed on the Drawings. Straw bales may be required in addition to silt fencing or other measures in sensitive areas as shown on Drawings. Bales are to be embedded four inches into the existing soil and staked with ends tightly abutting adjacent bales. Where staking and embedding of straw (or hay) bales is impractical due to excessive roots, logs, or other construction hazards, straw bale barriers may be substituted with erosion control mix berms where approved by Engineer.

3.01.b Silt Fence - shall be installed along the contours in the locations and as detailed on the Drawings. Silt fence may be required in addition, or other locations, not indicated on Drawings, as warranted or determined by field conditions or as directed by Engineer. Silt fence may also be required in addition to straw bales or other measures in sensitive areas as shown on Drawings. Where staking and embedding fabric is impractical due to excessive roots, logs, or other construction hazards, silt fence may be substituted with erosion control mix berms or placement of six inches of crushed gravel along fabric flap on upslope side of fence, in lieu of burying fabric in trenchally where approved by Engineer.

3.01.c Storm Drain Inlet Protection - Temporary storm drain drop inlet or curb inlet barriers shall be used on all storm drains unless otherwise indicated on Drawings to prevent sediment from entering the storm drain system during construction. The intent is to provide a continuous sediment filter around the storm drain inlet. The filter may be constructed of silt fence, crushed stone, gravel, concrete blocks, hay bales, geotextiles or other proprietary products as detailed on the Drawings.

3.01.d Mulching - shall consist of spreading of straw (or hay) mulch over bare or disturbed areas. It shall be applied at the rates described herein. It will be substituted by matting where necessary or as specified herein. Alternate mulch materials or methods such as hydroseeding may be used only when approved by the Engineer. Mulching shall be substituted with matting in locations where it has proven to be ineffective in the field. Mulching rates shall be doubled where requested by Engineer based on observations in the field or in locations undergoing winter construction.

3.01.e Matting - shall consist of straw, coconut or excelsior sandwiched between photodegradable netting. Matting may be substituted with sod where desired. Netting over straw mulch may be substituted for matting only when approved by Engineer. Matting shall be used as follows:

3.01.e.i Where indicated on Drawings.

3.01.e.ii In the base of swales with less than 5% pitch. High velocity ditch lining or geotextile soft armor may be required in steep ditches (> 5%) or areas receiving significant concentrated flow.

3.01.e.iii On steep slopes where filling may occur or where mulching has proven to be ineffective in the field.

3.01.e.iv Where straw mulch has been determined to be ineffective based on observations made in the field or as directed by the Engineer.

3.01.f Rip-rap - shall be used in swales, steep slopes, pond spillways and outlets, etc. as shown on Drawings to protect soils from excess flow velocities. It shall be of the size and depths specified on the Drawings. A minimum rip-rap size of D50 = 6 inches shall be used if not otherwise indicated on Drawings. Rip rap may be required at locations where revegetation matting, high velocity ditch lining or soft armor is proven to be ineffective in the field as directed by Engineer.

3.01.g Flared End Sections - shall be installed on the inlets and outlets of culverts, field inlets and storm drain outlets where indicated on Drawings. Rip-rap inlet or outlet protection may be required in addition to flared end sections in locations where indicated on Drawings and in locations where flared end sections have proven to be ineffective in the field as directed by Engineer.

3.01.h Outlet Protection - Rip-rap outlets (aprons or plunge pools) shall be provided in locations where indicated on Drawings and Details, and in locations where flared end sections have proven to be inadequate to prevent scouring at the pipe outlet in the field, as directed by Engineer. The rip-rap shall be the same size as that specified on the Drawings. A D50 = 6 inches shall be used if not otherwise specified.

3.01.i Stone Check Dams - shall be installed in existing and proposed swales or at culvert inlets as shown on the Drawings. These check dams serve to reduce flow velocities in swales thus helping to reduce rilling. Check dams shall be constructed with a 6 inch tapered upper apron at the center as shown on Details to prevent breaching and scour at the outer edges along the sides of the ditch.

3.01.j Level Lip Spreader - Unless otherwise specified or indicated on Drawings, level lip spreaders will generally consist of 30 feet long, 6 inch to 12 inch deep, stone lined ponded areas discharging over level berms through a well vegetated buffer area. These spreaders will function to disperse channelized flow into shallow sheet flow. Construction and length of level lip spreaders shall be as detailed on the Drawings.

3.01.k Construction Entrance - A crushed stone stabilized construction entrance will be installed wherever construction traffic will cross the public road system. The size, type and locations of these shall be as shown and detailed in the Drawings. Entrances shall be constructed with a 6-inch minimum layer of 2 inch crushed stone. Stone entrances shall be placed on geotextile fabric and shall include a 10-foot x 10 foot taper on both sides of the entrance to allow for turning vehicles.

3.01.l Dust Control - Contractor shall take necessary steps to prevent blowing and airborne movement of dust from exposed soil surfaces. Maintaining natural or enhanced vegetative cover and/or mulching shall be used where practical. Mechanical sweepers or washing of pavement shall be used where necessary to prevent and remove dust building on paved surfaces. All exposed soil surfaces shall be maintained to minimize dust by periodically misting bare areas with adequate water to prevent dust. Calcium Chloride solution spray should be used in areas experiencing significant dust problems and to reduce frequency of watering. Repetitive treatment shall be applied as necessary to accomplish adequate dust control.

3.01.m Housekeeping Notes 1. Controls must be in place to prevent pollutants from being discharged from materials and equipment on site. Appropriate spill prevention, containment and response planning must be in place. 2. Protect groundwater from liquid petroleum products and other hazardous materials. These materials may not be handled or stored in areas draining to an infiltration area. 3. Control dust and erosion of soils during and after construction. Oil may not be used for dust control. 4. Keep site clean and orderly; remove litter, construction materials and chemicals.

4.00 EROSION CONTROL EXECUTION

General Construction Phase - The following general practices will be used to prevent erosion during construction of this project. Refer to Drawings and Details for applications, locations and installation methods. If Contractor is unclear regarding the use, location, installation, intended performance or maintenance of any prescribed erosion control measures, Contractor shall refer to the "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices" (BMP) Manual for detailed procedures or contact Engineer for assistance.

NOTE: Locations of all fence/hay-bale barriers are shown on Drawings for general purposes only to indicate the intent. Final locations should be modified based on actual field conditions and as site conditions warrant. Such field changes or modifications shall be approved by the Engineer.

4.01.a Following clearing only those areas under active construction shall be left in an untreated or unvegetated condition. 4.01.b Erosion Control Installation - Prior to the start of construction, silt fence, haybales, erosion control mix berms, stabilized construction entrances, stone check dams, inlet protection, or other appropriate measures, shall be installed adjacent to construction areas, around catch basins, at the toe of slopes and areas as shown on Drawings, or as otherwise required to protect against any construction related erosion. Immediately following construction of culverts and swales, stone check dams, ditch linings, etc. shall be installed, as shown on the Drawings.

4.01.c Topsoil will be stockpiled on-site when necessary in areas that have minimum potential for erosion, such as flat slopes or on-site borrow pits, and will be kept as far as possible from drainage areas. All stockpiles expected to remain longer than 15 days shall be: 4.01.c.i Encircled with haybales or silt fence at the down gradient sides of the stockpile. 4.01.c.ii Mulched with a second application of hay mulch and anchored with biodegradable netting if expected to remain over winter or beyond October 15<sup>th</sup>.

4.01.d Temporary Seeding and Mulching Schedule - During construction, all disturbed areas shall adhere to the schedules specified in TABLE 1 and SEEDING SCHEDULE below. (Note: refer to Section 4.02-Permanent Seeding and Mulching Plan for permanent seeding and mulching requirements.) 4.01.d.i The Contractor shall be responsible for monitoring daily weather reports when working in the identified sensitive areas and for monitoring weekly reports in other areas. Contractor shall adjust the work schedule in anticipation of rains and shall stabilize the site as indicated or required. 4.01.d.ii All completed areas that have been loamed and/or finish graded shall be permanently revegetated in accordance with Section 4.02-Permanent Seeding and Mulching Plan. 4.01.d.iii Temporary mulching and/or seeding shall commence immediately following initial fine grading of any area expected to remain bare for an interim period of more than 15 days (7 days for sensitive and critical areas). Stabilization or seeding requirements shall be determined in accordance with TABLE 1 and shall be implemented at the beginning of the expected interim period. In no case shall any bare area remain untreated for more than 15 days (7 days for sensitive and critical areas).

4.01.d.iv Interim periods for sensitive and critical areas are indicated in TABLE 1. However, exposed or bare soil in these areas shall be mulched at the completion of work, each day, if significant rainfall is predicted or eminent. 4.01.d.v Mulch application rate shall be doubled during winter construction. Where practicable mulch should be applied at the end of each days work for areas that have been fine graded or if snow is predicted or eminent. In no case shall any areas be left bare for more than 7 days. 4.01.d.vi Permanent seeding shall not be attempted during the fall or winter seasons (after September 1<sup>st</sup>) unless otherwise approved by Engineer. Should seeding be approved by Engineer during winter season, the Contractor shall follow procedures for dormant seeding. Refer to Section 4.02-Permanent Seeding and Mulching Plan for dormant seeding requirements. However, vegetation must be inspected and reseeded by Contractor as necessary in the following spring (April 15<sup>th</sup>) to ensure good vegetative cover. Acceptance of dormant seeding shall not occur until after May 1, in the following Spring. 4.01.d.vii Temporary seeding and mulch shall be inspected and maintained or repaired weekly. At a minimum, 75% of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim (mulch, filter barriers, check dams, etc.). Mulch shall be reapplied as necessary to completely cover soil.

4.01.d.viii Temporary seeding and mulch shall be inspected and maintained or repaired weekly. At a minimum, 75% of the soil surface should be covered by vegetation. If any evidence of erosion or sedimentation is apparent, repairs shall be made and other temporary measures used in the interim (mulch, filter barriers, check dams, etc.). Mulch shall be reapplied as necessary to completely cover soil.

4.01.d.ix Where temporary seeding is required, the rates specified in the Temporary Seeding and Mulching Schedule shall be adhered to. 4.01.d.x Fertilizing, seeding and mulching shall be done on loam the same day the loam is spread. Winter mulch rates shall apply as specified in the temporary seeding and mulching schedule. 4.01.d.xi On slopes greater than 3:1, straw matting or excelsior matting will be substituted for mulch, except that biodegradable netting over mulch may be used where approved by the Engineer.

4.01.e Inspection - Following final seeding, the site will be inspected every 30 days until 80% cover has been established. Reseeding and mulching shall be carried out in areas where inadequate catch is observed until adequate growth is established in all seeded areas, as agreed upon by the Engineer. The Contractor may be required to reseed during the following spring subsequent to winter or fall construction and seeding in order to provide 80% vegetative cover as required for Acceptance by Owner.

4.02 Permanent Seeding and Mulching Plan - The following general practices will be used to re-establish final vegetation. 4.02.a Loaming - A minimum of 6 inches (unless otherwise specified) of loam will be spread over disturbed areas and graded to a uniform depth and a natural appearance. All loam shall be as specified or approved by the Engineer. 4.02.b Final Seeding - All final seeding shall be completed immediately (within 7 days) following final grading. All final fertilizing and seeding shall adhere to the Specifications unless otherwise approved by the Engineer. Refer to Specification Section 02930. 4.02.c Mulching - All areas shall be mulched immediately after seeding. Immediately upon first signs of any evidence of significant erosion occurring, Contractor shall repair and mulch all such areas until area is stabilized. Mulching shall consist of hay mulch, hydro-mulch or any suitable substitute deemed acceptable by the Engineer. 4.02.c.i Straw mulch shall be applied at the rate of 2 tons per acre (90 lbs. or 2 bales/1,000 sq. ft.) unless otherwise specified. 4.02.c.ii Hydro-mulch shall consist of a mixture of asphalt, wood fiber or paper fiber and water sprayed over a seeded area. Hydro-mulch shall not be used during the fall, winter or mud season. 4.02.c.iii Mulching shall be monitored according to the monitoring schedule (Section 4.01.j). Should mulching prove to be ineffective, then netting or matting shall be used in its place. 4.02.d Dormant Seeding - Construction shall be planned to eliminate the need for seeding during the fall, winter or mud season. Dormant seeding shall not be used unless approved by Engineer. Should seeding be necessary between these dates, the following procedure shall be followed: 4.02.d.i Only unfrozen loam shall be used. 4.02.d.ii Loaming, seeding and mulching will not be done over snow cover. If snow exists, it must be removed prior to placement of seed. 4.02.d.iii No permanent seeding will be done during fall, winter or mud season unless specifically approved by the Engineer. If attempted, the normal seed application rate shall be doubled. Reseeding in spring by Contractor will be required in all areas with insufficient cover. 4.02.d.iv Where temporary seeding is required, the rates specified in the Temporary Seeding and Mulching Schedule shall be adhered to. 4.02.d.v Fertilizing, seeding and mulching shall be done on loam the same day the loam is spread. Winter mulch rates shall apply as specified in the temporary seeding and mulching schedule. 4.02.d.vi On slopes greater than 3:1, straw matting or excelsior matting will be substituted for mulch, except that biodegradable netting over mulch may be used where approved by the Engineer.

4.02.e Inspection - Following final seeding, the site will be inspected every 30 days until 80% cover has been established. Reseeding and mulching shall be carried out in areas where inadequate catch is observed until adequate growth is established in all seeded areas, as agreed upon by the Engineer. The Contractor may be required to reseed during the following spring subsequent to winter or fall construction and seeding in order to provide 80% vegetative cover as required for Acceptance by Owner.

TABLE 1 Maximum Expected Interim Period\* (Days) Temporary Mulching (Hay) Temporary Seeding (None) (Per temporary seeding schedule) More than 7 days during winter season 4-bales/1000 sq. ft. Dormant seeding only

\* Values in parentheses indicates interim period for sensitive & critical areas. \*\* Mulch application rates shall be 4 bales/1000sq ft for winter construction.

TEMPORARY SEEDING SCHEDULE Seed Seeding Rate (lbs/1000 sq. ft.) Seeding Depth (inches) Recommended Seeding Dates Annual Rye Grass 0.9 1/4 4/1 to 7/1 Sudan Grass 0.9 1/2 7/1 to 8/15 Perennial Rye 1.8 1/4 8/15 to 9/15 Grass Winter Rye Grass 2.6 1 9/15 to 10/15 Dormant Seeding 50% Winter Rye (2.6) 1 10/15 to 3/31 50% Annual Rye (0.9)

4.01.e Grading will be held to a maximum 3:1 slope where practical. Greater slopes may be used in ledge cut. All final-graded areas shall be stabilized with permanent seeding and mulching immediately after final grading is complete. If final grading will not be completed immediately, refer to the Temporary Seeding and Mulching Schedule. It is understood that immediately means within 5 days of the completion of work. Refer to Section 4.02 Permanent Seeding and Mulching Plan, herein. See Contract Specifications for additional, more specific, permanent seeding requirements.