32 00 00 Exterior Improvements

32 01 00 Operations and Maintenance of Exterior Improvements

.1 Existing plant material to be retained, including plants that may be affected by construction activities both within and outside the actual project limits, shall meet the protection and maintenance requirements specified in this section. Such plant and root systems shall be protected from damage, compaction and contamination resulting from construction.

.2 All deciduous trees within the work zone shall be protected with wood plank tree protection. Maintain tree protection during construction period. Remove only when risk of damage has passed and upon approval by the University's representative.

.3 Tree protection shall be 28 x 89 mm wood planks, minimum 1500 mm long, secured with two bands of metal strapping. Place wood planks around base of trunk at 150 mm maximum on center to provide full protection from impact and abrasion. Do not puncture or damage bark with wood planks or fasteners. Arrange wood planks around branches and other irregularities to provide protection without damaging tree.

.4 Prevent damage to trees and shrubs in lawn areas or planting beds that are to remain by erecting a snow fence barrier to provide a continuous barricade between designated plant materials and the work area prior to construction. Place snow fence at dripline of trees unless inadequate to provide a 1.5 m buffer zone between the fence and limit of construction. Dripline is defined as ground surface directly beneath tips of outermost branches, at least 3 m radius from the tree trunk or larger as directed by the University's representative. With the permission of the University's representative, the fence may be placed within dripline of tree to provide a buffer zone of up to 1.5 m, but in no case less than 1 m from the outer circumference of the trunk.

.5 Do not operate, park, repair or refuel equipment, do not store construction materials, or stockpile any earth materials within barricades or within 2 m of the outer edge of the drip line of a tree. Do not cause flooding or deposition of sediment where trees are located. Maintain barricades during construction operations and remove on completion as directed by the University's representative.

.6 Snow fence barrier shall be standard plastic fencing or approved equivalent in good condition, 1.2 m high, supported vertically by steel T-bars, and horizontally at the top of the fencing by 39 x 89 mm wood railing, bolted to the steel T-bars. T-bars are to be straight, 1.8 m long. Drive T-bars vertically 60 cm into ground, spaced maximum 4.5 m apart. Wire snow fence at 3 places to each T-bar. Stretch snow fence to prevent sag.

32 05 00 Common Work Results for Exterior Improvements

.1 Landscaping may be included in the building contract. Landscape design shall be reviewed by the Campus Grounds Advisory Committee (CGAC) and approved by the Campus Planning and Development Committee (CPDC).

32 14 00 Unit Paving

.1 Unit paving should be unified by set dimensions and colours for field paving, borders, banding and accents. Variety can be achieved by varying the pattern at specific locations

in response to the setting. The perimeter of unit paving areas should be defined by walls, curbs, and paver edging system and banding material, as appropriate for the location. Unit paver for field paving shall be 200 x 200 mm size in dark grey colour, and for borders and banding shall be 100 x 100 mm grid size, textured, natural (light grey) colour. Pavers shall be laid in stack bond pattern, flush with adjacent paving. The standard widths for unit paver border and banding shall be 600 mm and 400 mm respectively. The University shall approve paver size, colour and pattern for non-standard field, banding and accents.

.2 Unit pavers approved for use at walkways shall be of colour and pattern consistent with the predominant precedent in the streetscape and vicinity. Finish and detailing should be durable, attractive, low maintenance, slip resistant, wheelchair accessible and convenient for snow removal

32 16 00 Concrete Walks and Curbs

32 16 13 Curbs

.1 Concrete curbs at sidewalks shall be flush with sidewalk. Concrete curbs defining shrub beds and turf areas shall be raised a minimum of 100 mm above finish grade of adjacent paving.

.2 Exposed edges of concrete curbs shall be rounded or chamfered to prevent chipping and damage from maintenance equipment. Sharp edges and corners shall be avoided.

.3 The dimension, finish and detailing of concrete curbs should be compatible with the predominant precedent in the vicinity, and should be durable, attractive, and low maintenance.

.4 Curbs adjacent to hard surfaces shall be fitted with skateboard deterrent devices that are tamper-proof, safe, attractive, designed to minimize liability and blend in with the character of the site.

32 16 23 Sidewalks

.1 Walkway construction in a project should take into consideration the specific character of the site and the campus precinct, recognize the unique purpose of the project, ensure the continuity of design in the pedestrian circulation network, and effect economies in the long-term maintenance of that network. Walkway layout and dimension should follow desired line of pedestrian movement and adequately accommodate pedestrian traffic. Walkway detailing should signify pedestrian priority, indicate changes in use (e.g., city sidewalk, sidewalk widening, transition space and linkages), and provide clear separation between pedestrians and vehicles at high use zones.

.2 Major sidewalk shall be poured-in-place concrete. Width shall be 4.5 m and may be modified if justified by use and site conditions. Where city sidewalks need to be widened to accommodate pedestrian needs, sidewalk widening of l m or wider than the standard city sidewalk shall have a unit paver border at the back of the city sidewalk. The standard unit paver border shall be 600 mm wide, unless approved by the University. Unit paver shall be 100 x 100 mm grid size, textured, natural (light grey) colour, laid in stack bond pattern, flush with adjacent paving.

.3 Standard sidewalk shall be poured-in-place concrete, natural (light grey) colour, 2.8 m wide. Standard unit paver border at the back of the curb shall be determined on a project-by-project basis, depending on local conditions.

.4 Major walkways shall be 4.5 m to 6 m wide. Standard walkways shall be 2.8 m wide. Major and standard walkways shall be poured-in-place concrete, natural (light grey) colour, with unit paver border along both edges. The width of the border shall be approximately 750 mm (5 courses) wide for walkways 3 m or wider, and approximately 450 mm (3 courses) wide for walkways less than 3 m wide. The University shall approve variances in border width that are required to suit site and walkway proportion. Border shall be tumbled concrete unit paver 150 x 150 mm size, dark grey colour, laid in stack bond pattern. Walkway and border surfaces should finish flush.

.5 Minor walkway shall be a minimum 1.8 m wide poured-in-place concrete, natural (light grey) colour. If a minor walkway is not the sole accessible route to a facility, alternate materials may be accepted subject to University approval. Alternate materials should be durable, attractive, low maintenance, slip resistant, wheelchair accessible and convenient for snow removal.

.6 Concrete walkway configuration, finish and detailing should be compatible with the established design on campus, be appropriate for the intended use and maintenance equipment, and should be durable, attractive, low maintenance, slip resistant, wheelchair accessible and convenient for snow removal. Concrete shall be broom finish, in straight lines perpendicular to the primary direction of travel. Paving patterns may be adapted in response to setting but should ensure continuity with the established walkway design on campus. Unnecessary grade changes and steps should be avoided, and if present, alternate and convenient accessible routes should be provided.

.7 Patios and courts along major pedestrian routes shall be poured-in-place concrete to provide ease of wheelchair access. Field paving materials other than poured-in- place concrete is subject to university approval. The use of unit pavers shall be limited to borders, banding and accents.

.8 Poured-in-place concrete shall meet the appearance and performance criteria specified in these standards. Unit paver for border and banding shall be 100 x100 grid size, textured, natural (light grey) colour, laid in stack bond pattern, flush with adjacent paving. The standard widths for unit paver border and banding shall be 600 mm and 400 mm respectively, unless approved by the University.

32 30 00 Wood Fences and Gates

.1 Wood fence should be sturdy, durable, attractive, and low maintenance.

.2 Design should discourage climbing. Footing and joint detailing should minimize damage from moisture and impact from vehicles and maintenance equipment.

.3 Lumber shall be pressure-treated. Colour and finish should be compatible with the site and architectural character. Apply weatherproof sealant per manufacturer's specifications.

.4 Hardware should be rustproof and tamper resistant.

32 32 00 Retaining Walls

32 32 13 Cast-In-Place Concrete Retaining Walls

.1 Walls serve a variety of functions such as controlling the movement of people and vehicles, defining edges, and screening bicycles and cars. The design of walls should complement the setting and be appropriate for the intended use.

.2 Poured-in-place concrete is the preferred material. Other materials are subject to University approval.

.3 Exposed edges shall be rounded or chamfered to prevent chipping and damage from maintenance equipment. Sharp edges and corners shall be avoided.

.4 Finish and detailing should be compatible with the predominant precedent in the vicinity, and should be durable, attractive, and low maintenance. Seat wall should be minimum 400 mm wide in cross section. The standard concrete finish shall be natural (light grey) colour. Non-standard colours require University approval.

.5 Walls shall be fitted with skateboard deterrent devices that are tamper-proof, safe, attractive, designed to minimize liability and blend in with the site and architectural character.

32 31 00 Metal and Chain-link Fences and Gates

.1 Fence and fittings shall be aluminum, minimum 11 gauge.

.2 Minimum post size shall be 50 mm (1 7/8 in.) outside diameter. Fence post shall be direct buried in concrete footing for permanent installations.

.3 Chain-link fabric shall be secured on all sides to post and frame. Maximum panel module size shall be 50 ft. wide.

.4 Gate design should distribute forces evenly to avoid premature wear. Swing gate is preferred.

32 32 23 Segmental Concrete Unit Masonry Retaining Walls

.1 Retaining wall system using modular concrete units installed without mortar should be limited to areas of lower visibility and usage.

.2 The colour and face texture should be grey or earth tone, depending on site and building character. Natural rock-like texture is preferred. The top of wall should be finished with cap unit. Skateboard deterrent device along top of wall and Installations should follow manufacturer's specifications.

32 33 00 Site Furnishings

32 33 13 Bicycle Racks

.1 Bicycle racks should be in well-lit and convenient locations to meet the needs of potential users. Locations that allow casual supervision from building occupants and passers-by may provide additional safeguard against theft.

.2 Bicycle rack should allow the frame and one wheel to be locked to the rack with a high security, U-shaped shackle lock if both wheels are left on the bicycle.

.3 Bicycle rack shall be bolted to pavement. Placement of racks should allow for parking perpendicular to the rack on both sides. A minimum clearance of 2 m between parked bicycles is required for snow removal.

.4 Racks should be catalogue item rather than custom made. The preferred product is the Ring Rack by Bikeup Bicycle Parking Systems Inc.

32 33 23 Trash Receptacles

See Appendix A - 32 33 23 Trash Receptacle

.1 Trash receptacles should be located at major activity centres and along major routes. The location of individual units should not be visually intrusive.

.2 Receptacle unit should be durable, vandal resistant, attractive in design with easy to remove liner and protection of contents from rain and weather.

.3 Trash receptacle shall be production item, Victor Stanley model S-42 with S-2 spun steel dome, powder coat finish RAL 7024 graphite grey semi-gloss. Anchor to concrete using tamper-proof hardware.

32 33 43 Benches

See Appendix B/C/D - 32 33 43 Benches

.1 Benches should be conveniently located in areas of frequent use. A variety of seating arrangements for different social patterns and for choices in sun and shade should be provided. Seating arrangements can also help define a space.

.2 Bench should be catalogue item rather than custom made. The design should be comfortable, durable, attractive, and low maintenance.

.3 Freestanding bench shall have back with no arm rests. The base plate shall be anchored to a concrete pad or footing with tamper-proof hardware.

.4 Where the bench is built-in such as a seat wall, refer to Cast-in- Place Concrete Planter and Seat Walls, for requirements.

.5 Free-standing bench shall be Victory Stanley model NRB-6, 6 ft. length, surface mount base, powder coat finish RAL 7024 graphite grey semi-gloss.

32 39 00 Manufactured Site Specialties

32 39 13 Bollards

.1 Rigid and collapsible bollards are used to prevent access by unauthorized vehicles to walkways and fire lanes, but do not interfere with pedestrians. A special tool allows the collapsible bollard to be lowered to the ground, remaining attached to a hinge, and then replaced in the upright position.

.2 Bollards shall be Maxiforce 1 collapsible style bollard Model MF and rigid type bollard Model MF, supplied by G. Reale Enterprises, Inc., 3444 Marshall Road, Drexel Hill, PA

19026, Tel. 610-623-2611. Standard dimensions of extruded steel tubing are 6 in. x 3 in., above ground height is 32 in. Bollards shall have powder coat finish, RAL 7024 graphite grey semi-gloss. Apply reflective tape as specified. Installation shall be per manufacturer's specifications.

32 91 00 Planting Preparation

32 91 19 Landscape Grading

.1 Subgrade preparation is required under all areas designated to receive landscaping as shown on drawings.

.2 Subgrade should be free of rocks, weeds, roots, and other debris. Foreign material shall not be buried beneath areas to be landscaped.

.3 Completed subgrade should be even and have positive drainage. Subgrade should be scarified to a minimum 100 mm (4 in.) depth. Subgrade shall be approved by project manager before topsoil placement begins.

.4 Topsoil mixture shall be 3 parts Grade 1 topsoil, 1-part sterilized mushroom compost, 1-part peat moss. Mixture should avoid being excessively wet and should be free of weeds, roots, rocks, and other debris.

.5 Place topsoil in dry weather, on dry unfrozen grade to obtain minimum depth after settlement of 100 mm (4 in.) or depth specified in planting details. Allow settling to occur for 1 week or roll to facilitate settling. Top layer should be loosely raked to allow for rooting of seed or sod. Surface should be smooth, uniform and sufficiently firm to prevent sinkage pockets when irrigated. Surface should fall smoothly to catch basin rim and finish flush and ensure positive drainage away from building and sidewalks.

.6 Project manager should be present for inspection at all stages of grading.

32 92 00 Turf and Grasses

32 92 19 Seeding

.1 Seed mixture should be 60 percent Kentucky Blue Grass, 20 percent Red Fescue, 10 percent Annual Rye, 10 percent Perennial Rye

.2 Apply half of the seed at the recommended rate in a north-south direction, half in an east-west direction. Lightly rake to cover seed and roll. Water lightly and frequently until seed is established. Contractor should be responsible for two cuttings, the first at the highest level of the mower.

.3 Project manager should be present for inspection at all stages of seeding.

32 92 23 Sodding

.1 Sod should be laid within 24 hours of being cut. Sod should be laid in a brick-like pattern so that joints are staggered. Cuts should be made with a sharp instrument, preferably a knife or a spade. No overlaps or gaps should be present. Sod should be rolled immediately after installation to remove air from under the sod.

.2 Sod should be watered after installation to penetrate 300 cm (6 in.) into soil. Sod should be watered daily except in periods of intense heat or drought when frequency should be increased.

.3 Contractor is responsible for first two cuttings of sod. The first cutting should be approximately 10-14 days after installation when sod is firmly established. Cutting should be on the highest level of the mower.

.4 Project manager should be present for inspection at all stages of sodding.

32 93 00 Plants

.1 Tree planters for a single specimen in paved areas shall have a minimum inside dimension of 3.05 m (10 ft.). The minimum clearance from adjacent paving and structures (e.g., steps, curbs, walls, fences, and buildings) shall be 3.05 m (10 ft.) or 50% of the average mature spread for trees, and 900 mm (3 ft.) or 50% of the average mature spread for shrubs, whichever is the greater measurement. Departure from these minimum clearance requirements must have the approval of the University before installation begins.

.2 Planting mixture should be 3 parts topsoil, 1-part sterilized mushroom compost, 1-part peat moss, free of weeds, roots, stones, and similar material. It should be placed in layers of not more than 150 mm at a time.

.3 Installation requirements for subgrade, plant pit, planting soil mixture, root ball, mulch, finish grade around tree, staking, trunk wrap, and pruning shall be as shown in Appendix A, Figure 2.906.3-A.

.4 Installation requirements for subgrade, base of plant pit, planting soil mixture, root ball, mulch, and pruning shall be as shown in Appendix A, Figure 2.906.4-A.

.5 Planting should be inspected by the project manager at all stages of installation.

32 94 00 Planting Accessories

32 94 13 Landscape Edging

.1 Where the perimeter of unit pavers abuts planting areas or where no curb edge is present, paver-edging products are required.

.2 Aluminum edging system is preferred, and should have locking joining system with no obstructions, be durable, flexible, and non-rusting.

32 94 33 Precast Free-Standing Planters

.1 In general, cast-in-place planters are preferred to portable planters as the former provides better growing conditions. Corners should be rounded or chamfered; finish should be lightly textured natural (light grey).

.2 Portable planters shall be precast concrete, Cylindrical Grade Adjusting Planter Type JJR by Alpha Precast, sandblasted finish. Planter size shall be 36 in. (91.4 cm) diameter and 24 in. (61.0 cm) height. Planters shall allow drainage at base.

.3

32 94 43 Precast Tree Grates

.1 Tree grate finish, slot openings and detailing should enable barrier-free accessibility.

.2 Top of tree grate shall be level with adjacent pavement. A minimum clearance of 100 mm (4 in.) is required between the bottom of the tree grate and the finish grade of soil in the tree pit.

.3 Tree grate shall be precast concrete, Type TG1 (circular) and Type TG3 (square), by Alpha Precast, sandblasted finish. Tree grate size shall be 121.9 cm (4 ft.) minimum diameter or square, center hole shall be 45.7 cm (18 in.) diameter.