DIVISION 32 - EXTERIOR IMPROVEMENTS

Accessibility: Meet ADA requirements.

Historic: Portland schools are generally quite old with older parking, driveway, and vehicle barriers. There are a variety of options for parking, driveway surfaces, and barriers.

Reference the Programmatic Agreement for Energy Efficiency, Weatherization, Rehabilitation and Interior Retrofit Projects, February 2012, Stipulation II J – Site Work, to determine what activities are allowed at Historic Register eligible schools without prior SHPO review.

Sustainability: Reduction of impervious surfaces reduces runoff as well as heat island effect. This can be accomplished by pervious paving materials and also by reduction of existing paved surfaces.

Exterior Improvements - Requirements

- Ensure parking is per ADA requirements. http://www.ada.gov/adastd94.pdf
- Ensure subgrade and base is properly prepared prior to paving operations.
- If porous paving materials are used, regular maintenance is required to remove debris and sediment from porous material.

Exterior Improvements - Recommendations

- As an alternative to porous paving materials, look for opportunities to reduce existing impervious surfaces with landscaping and other pervious materials.
- Consider replacing bollard and chain gate systems with swinging gates as recommended in Section 32-31-13 B 7.
- It is recommended to consult with an arborist where trees are present in the vicinity of proposed porous paving materials to minimize vegetation falling into the porous pavement voids.

32-12-16 Asphalt

A. Provide 1 1/2% minimum slope for drainage.
B. Service Driveways
C. Min. 6" compacted gravel base of 1-1/2" minus crushed rock, with a 1" cushion course of 3/4" minus crushed rock.
D. Asphalt concrete surfacing min. 3" in depth and composed of Oregon State Highway Division's Class C fine bin mix asphalt concrete.
E. Aggregate needs to be compacted to a minimum 90%.
F. Asphalt needs to be compacted to a minimum 88%.
G. New paving two (2) layers of 1-1/2” thickness. Refer to PPS District Standard Drawing No. S-129. See Appendix A.
H. Overlay paving compacted 1-1/2” thickness of Modified Class “C” asphalt.
I. Where the paving is in a fire lane, the gravel base should be a minimum of 9” and two lifts of asphalt at 2” each. The gravel base should be compacted in 3” lifts to 90% compaction.
J. Playgrounds and Walkways
    1. 4" gravel base, 1" cushion course and 1-1/2" of asphalted concrete meeting Oregon State Highway Division's Class D modified mix.

2. Overlay paving compacted 1-1/2" thickness of Modified Class "C" asphalt.

K. Asphalt Sealer Coatings
   1. Refined asphalt emulsion containing fiber, filler and color pigments.
   2. Sealer, Special Asphalt Products, Inc. or approved equal.

L. Asphalt edge conditions
   1. Where asphalt is cut for the purpose of planters, etc., a concrete curb/edge shall be installed to provide edge protection.

M. Installation
   1. Design must indicate placement of hot-mix asphalt binder course in number of lifts and thicknesses. Unless other conditions warrant, design tolerances from the above referenced standards are:
   2. Base and Binder Course Thickness: Within ½ inch.
   3. Surface Course Thickness: Within ¼ inch.
   4. Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straight edge applied transversely or longitudinally to paved areas:
   5. Base or Binder Course: ¼ inch
   6. Surface Course: 1/8 inch
   7. Crowned Surface: Test with crowned template centered and at right angle to crown.
   8. Maximum Variance from template is ¼ inch.
   9. Designate contractor to reset utility frames for manhole covers, cleanout covers, valve boxes, and other such units with areas to be paved to the final grade as part of this work. It is preferred that adjustments be made with appropriate paving rings. Surround the frames that have been adjusted to grade with a ring of compacted asphalt base prior to paving. Adjust frames as required for paving, providing temporary closures over openings to prevent damage during the rolling operations and construction traffic. Replace covers at the completion of the paving operation.
   10. Design concrete paving in lieu of asphalt, in any loading dock, dumpster pad, or receiving area subject to heavy vehicular traffic, or where liquid oxygen may be present.

N. Other Paving Standards
   1. Oregon Department of Transportation Pavement Services. http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Pages/PSIndex.aspx
   2. Excerpt from Washington County Transportation Design Standards

32-20-03 Asphalt Design

The wearing service of hot asphalt concrete (HMAC) roads shall be Level 2, 1/2-inch dense graded HMAC for local roads and level 3 1/2-inch dense graded HMAC for arterials, collectors and commercial roads. Minimum total thickness of asphalt concrete pavement section shall be three (3) inches. A minimum of two lifts is required with a minimum lift thickness of 1-1/2-inches and a maximum lift thickness of three (3) inches.

Asphalt concrete shall be designed using ODOT Contractor Mix design Guidelines for Asphaltic concrete.

All pavements will be tested for compaction and the compaction requirement for any level of mix and any lift shall be 92% of Moving Average Maximum Density (MAMD).

The compaction level requirement for Level 32, Level 3 and Level 4 job mix formulae is as follows:

Level 2 mix, 75 gyrations
Level 3 mix, 100 gyrations
Level 4 mix, 125 gyrations

Warm Mix Asphalt (WMA) additive or process may be used. Additives or processes shall be approved by the County prior to use. When using WMA the minimum temperature behind the paver shall be 185 degrees F.

Asphalt Pavement Design Excerpt from: Washington County Transportation Design Standards

32-12-43 Porous Flexible Pavement

A. Porous Pavement Design
   1. Porous pavement can require intensive on-going maintenance and is not typically allowed by the District. Specific approval is required for using porous pavement.
   2. Porous pavement section shall consist of the following:
      a. Uncompacted native subgrade, non-woven geotextile, aggregate choker course, clean aggregate base course.
      b. See the following for design standards:

https://www.cleanwaterservices.org/media/2171/porous-pavement.pdf32-15-00Aggregate Surfacing

A. Low Use Paths:
   1. 1" deep compacted decomposed basalt (not pea gravel) over 4" deep compacted 3/4" minus crushed rock over compacted subgrade.
   2. Each lift shall be sprinkled with water and compacted.
B. For higher use paths that will get bicycle or other heavier traffic, use 2" and 6" depths in place of those above.
C. Max grade for all paths to be 5% with max 2% cross slope

32-16-00 Removing Pavement

A. The District supports removal of unneeded paving where appropriate and the reduction of the associated heat island effect.
B. However, due to limited staff, volunteer jobs must include a plan for ongoing maintenance without relying on district staff.
C. Make sure the required amount of parking is maintained and get appropriate permits for pavement removal. http://www.portlandoregon.gov/bps/article/53320
D. When removing asphalt adjacent to building edge. Leave 3’ of asphalt along building face or plan for another impermeable surface to replace the asphalt.
E. When cutting existing asphalt, either a curb must be installed or a 45 degree angle cut shall be made to prevent asphalt from crumbling and limit trip hazards.
F. Test soil beneath asphalt before removing it.
G. Review Depave’s “How to Depave” resource. http://depave.org/learn/how-to-depave/

32-16-13 Concrete Curbs, Gutters, Sidewalks

A. Materials
   1. Form Material:

a. Wood or steel, straight, and of sufficient strength to resist springing during depositing and consolidating concrete.
b. Wood forms shall be two inch nominal surfaced plank or approved plywood forms.
c. Steel forms shall be of approved section with a flat surface at top.
d. Benders or thin plank forms may be used on curves, curb returns or grade changes.
e. Back forms for curb returns may be 1/2-inch benders, for full height of curb cleated together.

2. Portland cement - Concrete Compressive Strength: 3,000 psi in 28 days.
   a. Use no additives to cause rapid heating or setting.
   b. Entrained air shall be a required additive in amount of five percent, plus or minus one percent.
   c. Preformed Expansion Joint: Conform to requirements of AASHTO M 153 or AASHTO M 213, except material furnished under AASHTO M 213 shall be tested in conformance to ASTM D 1751 and shall be 1/2 inch.
   d. Use fillers conforming to AASHTO M 213, except binder.
   e. Curing Compound: White pigmented curing compound conforming to requirements of ASTM C 309.

B. Installation
   1. Base Preparation
      a. Construct and compacted base to not less than 95 percent of maximum density, at optimum moisture, as determined by AASHTO T-99 compaction control test, for a depth of 12 inches.
      b. Subgrade: Maintain in a smooth, compacted condition as specified in Section 31 2000, Earthwork.
      c. Place and compact aggregate base course for curb base.
   2. Forms
      a. Construct outside forms to full height of curb or gutter.
      b. Batter inside form as indicated and securely fasten to supporting outside form.
      c. Set curb forms to alignment and grade conforming to dimensions of curb shown.
      d. Hold forms rigidly in place by use of stakes placed at intervals not to exceed four feet.
      e. Use clamps, spreaders, and braces where required to insure rigidity in forms.
   3. Form removal:
      a. Remove forms on front of curb not less than two hours nor more than six hours after concrete has been placed.
      b. Maintain forms in back of curb in place until face and top of curb have been finished.
      c. Do not remove forms while concrete is sufficiently plastic to slump in any direction.
   4. Clean and coat forms with form oil each time before concrete is placed.
      a. Thoroughly consolidate concrete by tamping and spading, or with approved mechanical vibrators.
   5. Finishing
      a. Finish top surfaces of curbs prior to removal of curb face forms. Finish true to grade by means of a straightedge float, not less than 10 feet in length, operated longitudinally over surface of concrete.
      b. Construct form clamps so as not to interfere with finishing operation.
      c. Round top edges of curb with an edging tool to radius indicated. Brush floated surfaces with fine-hair brush using longitudinal strokes.

d. Immediately after removing front curb forms, trowel or rub face of curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed.
e. Except at grade changes or curves, provide finished surfaces that do not vary more than 0.01 foot when a 10 foot straightedge is placed on top and face of curb.
f. Correct irregularities exceeding above tolerance.
g. Provide visible surfaces and edges of finished curb free of blemishes, form and tool marks, and uniform in color, shape, and appearance.

6. Curb Forming Machines
   a. May be approved conditional on successful trial use.
   b. Discontinue use of equipment if equipment produces unsatisfactory results.
   c. Remove and dispose of off-site unsatisfactory work, and reconstruct new curb for full length between regularly scheduled joints.
7. Curing
   a. Apply liquid membrane-forming compound uniformly to damp concrete by pressure spray methods.
   b. Keep concrete constantly moist for a minimum of 72 hours.
   c. Protect concrete from contact and stain for a minimum of seven days.
8. Contraction Joints
   a. Form transverse contraction joints of weakened plane, at right angles to alignment.
   b. Align with proposed joints in concrete surfaces and other concrete structures abutting concrete curbs.
   c. Place a maximum of 15 feet.
   d. Form joints by grooving, by insertion and removal of plates, by insertion and leaving in place of preformed bituminous filler, by sawing, or by other means approved by Architect.
      i. Provide top width of joint not less than 1/8 inch nor greater than 1/4 inch, with depth of joint at least 1/3 of cross-sectional area of curb.
      ii. Tool edges of joints.
   e. Joints formed by sawing: Perform as soon as practicable after pouring and prior to occurrence of uncontrolled cracking.
9. Expansion Joint
   a. Expansion joints shall be placed between concrete slabs and vertical elements, such as walls, curbs, footings, etc. at a minimum of 45 foot intervals and will be required on each side of driveways at point of high curb.
10. Marking of Service Crossings
    a. At locations where sewer and water services cross under curb, plainly stamp upper surface of curb with “S” in case of sewer services, and “W” in case of water services.
    b. Stamp characters four inches high, and three to four inches wide.
       i. Stamp impressions 1/4 inch deep, and 1/4 inch to 3/8 inch wide.
       ii. Locate characters to be plainly visible and easily read from street side of curb.
11. Weather Precautions
    a. Cold Weather Precautions: Comply with ACI 306R, and as follows:
       i. Do not place concrete on frozen subgrade.
       ii. Remove ice and snow from reinforcing, forms, and embedded items.
       iii. Raise temperature of surfaces in contact with concrete above 40 degrees F. prior to concrete placement.
       iv. Minimum concrete temperature during placement: 65 degrees

v. Minimum air temperature during first 24 hours after protection removal: degrees
vi. Use of salts or chemical admixtures to prevent concrete freezing is prohibited.

b. Do not permit temporary heaters to locally over-heat or over-dry concrete.
c. Remove and replace freeze-damaged concrete.

12. Warm Weather Precautions:
    a. Comply with ACI 305R when temperature exceeds 90 degrees F. and wind exceeds 20 mph, and as follows:
        i. Maximum concrete temperature at time of placement: 75 degrees F.
        ii. Mix concrete minimum possible time, and place as soon as possible thereafter.
        iii. Sprinkle forms, reinforcing, embedded items, and subgrade with cool water immediately prior to concrete placement.
        iv. Protect unstripped formwork and exposed concrete surfaces against excessive drying with water spray or other approved method.
        v. Remove and replace damaged concrete.

C. Field Quality Control
1. Ready Mixed Concrete Inspection and Testing:
    a. Sample each truck load of ready mixed concrete, complying with ASTM C172.
    b. Perform one slump test for each truck load of ready mixed concrete, complying with ASTM C 143.
    c. Perform one air content test for each set of compressive strength specimens, complying with ASTM C 231.
    d. Make one set of 3 of compressive strength specimens for each day of structural concrete pouring or each 50 cubic yards or fraction thereof for each class of concrete, complying with ASTM C 31.
        i. Test one specimen in compliance with ASTM C 39 after curing 7 days, one specimen after curing 28 days, and retain one specimen for testing after 35 days or as directed by Architect.
2. Batch Ticket:
    a. Receive a batch weight ticket from each truck; batch ticket to comply with requirements of ASTM C 94 in Article 16 for Batch Ticket Information.
    b. Verify water/cement ratio.
        i. No water may be added if load is at specified ratio.
        ii. Reject truck if ratio does not conform.
3. Protection
    a. Protect completed curbs from damage.
    b. Repair damaged concrete and clean concrete discolored or damaged due to construction activities.
    c. Remove and replace damaged curbs entire length between regularly scheduled joints.
4. Backfilling Curbs
    a. Backfill curb with approved materials prior to placement of base course aggregate or paving operations.

32-18-00 Athletic and Recreational Surfacing

A. Synthetic Grass Surfacing: See attached PPS Standard Specification 32 18 01 Synthetic Turf System.
    a.

2. Shock Pads: Portland Public Schools requires shock pads to be installed under all new artificial turf fields to increase safety and minimize injuries due to falls and head injuries. See attached PPS Standard Specification 32 18 02 Shock Attenuation Pad System.

B. Playground surfacing.
   1. Note: See Division 11-68-00 for play structures, including nature play, and 12-93-00 for site furnishings.
   2. The district has a preference for rubber surfacing installed on existing hard surfaces or over compacted gravel. Other solid surface products will be considered. These ensure accessibility, ease maintenance and maintain safety standards much longer.
   3. The District does allow loose fill, including engineered wood fiber with District approval. Medium sized Hemlock preferred. Fir wood fiber not allowed.
   4. All new play equipment and surfaces must meet ADA-AG requirements and also HIC and ASTM standards.
   5. Surfacing must be approved for fall height of highest bar or surface of structure (for example the top bar of a guardrail rather than the height of the deck).
   6. Acceptable products:
      a. Rubber Tiles
         i. Tiles must interlock/clip together and an edge band shall be provided.
         ii. Tile must offer a 10 year warranty for failure and materials.
         iii. Manufacturer to warranty the install and approve surface and subsurface prior to install
         iv. Example of an acceptable material – Sof'Tile
      b. Poured-in-Place Rubber
         i. Use poured-in-place strategically as the success rate in this climate has been mixed.
         ii. Rubber must have a solid edge.
         iii. Rubber must be installed by a certified installer.
         iv. Rubber must offer a 10 year warranty for failure of install and materials.
      c. Artificial Turf Surfacing
      d. SMARTE Surfacing - SMARTE is a hybrid playground surface that incorporates secured, recycled rubber mulch in special "pillows" that are topped by a unitary layer.
         i. Must have a solid edge.
         ii. Must be installed by a certified installer.
         iii. Must offer a 10 year warranty for failure of install and materials.
   7. Artificial Mulch Surfacing: District does not allow due to maintenance challenges in inability to meet ADA and fall protection on an ongoing basis.

C. Installation of playground surfacing.
   1. All playground surfacing must comply with ASTM F1292 Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
   2. All playground surfacing must comply with ASTM 1951 standard specification for Accessibility for Safety Surfacing for Playgrounds.
   3. All playground surfacing must comply with ASTM 1487 standard specification for Playground Equipment for Public Use, including use zone requirements.

4. Install over minimum 4” thick, 6”x6”, 10 gauge welded wire mesh-reinforced concrete slab or compacted gravel. Install as per manufacturer’s printed instructions.
5. Slope concrete slab and surfacing minimum 1/4” per foot for drainage.
6. Engineered Wood Fiber (only in existing pits per item 3 above).
    a. Install at 12” minimum thickness (after compaction) over drainage system, increase depth as required for fall height.
    b. Provide a properly designed drainage system. Tie drainage into stormwater retention basin or storm sewer, as deemed appropriate.
    c. Provide perimeter curbing 2” above chip surface to prevent chips from spreading. If curb is adjacent to lawn it shall be flush with lawn surface and function as a mow strip.
    d. Provide minimum 2 concrete ramps into play area. Ramp shall not be within the play equipment use zones.

D. Tracks
1. Latex and Polyurethane track surfaces are acceptable. However, latex surfaces currently only have one local installer and therefore do not provide competition in the bidding process.

32-30-00 Site Improvements

A. General
1. Provide drainage at playground equipment. See section 32 18 00.
2. Open clear line of sight designs are required for safety and security.

B. Planting
1. Include landscaping in design. See Section 32-90-00

C. Plant Projection
1. Provide photographic record of existing grounds, including trees and shrubs.
2. Protect existing shrub, groundcover, lawn and other vegetation in place with protecting fencing.
3. Protect existing trees with tree protection fencing
4. Do not trench or compact within drip lines of trees unless approved by District and under the guidance of an arborist.
5. Replace all damaged vegetation or compensate as deemed equal by the District.

D. Circulation
1. Separation between traffic flows and classifications:
    a. Pedestrian and bike
    b. Vehicular, parent drop off and visitor parking
    c. Busses Service access and entrance areas
2. Two separate student drop off areas shall be constructed. One for parent pick up / drop off, one for school bus pick up / drop off.
3. Parking and walks should be designed and constructed to efficiently move vehicular and pedestrian traffic and use as little area as practical while still complying with local codes.
4. Consider adding covered entries for shelter for early arrivals.
5. Provide parking diagrams with signage and striping for approval by the District.
6. Pedestrian and Bike
    a. Provide bike parking as needed for the student body to encourage alternative transportation and physical fitness.
    b. Provide bike parking in a safe, accessible and visible location at the school.

c. Covered bike parking shall be provided when possible and shall follow District standard shelter detail. All alternative covered bike facilities will need District approval.

7. Bus Parking
   a. Bus parking areas must be flexible and able to accommodate a changing numbers of busses.
   b. Move busses to back and side of school with an ADA entrance when possible.
   c. All busses shall be located in one location to the fullest extent possible. The bus entrance shall be fully accessible.

32-30-10 School and Community Led Site Improvements

A. School and Community led site improvement projects must follow the PPS District process. http://www.pps.k12.or.us/departments/facilities/3391.htm

B. School improvements initiated by school and community groups must be maintainable by District staff. The maintenance staff has limited time and resources. Improvements that can't be maintained may detract from the schools perceived quality and may become a safety hazard.

C. Water and power needed by these improvements must be provided by the school or community organization.

D. No pressure treated lumber, railroad ties or other material with toxicity allowed for raised vegetable and planting beds.

32-31-13 Chain Link Fencing and Gates

A. Chain Link Fence
   1. Fence per PPS District Standard Drawing No. S-274 in Appendix A.
   2. Top rail and terminal post must be schedule 40 pipe.
   3. The locking system for the gate must have a hole no smaller than 7/16" for the lock. Lock to be provided by District.
   4. All chain link fences will require a mow strip along the entire length of the fence that is located in lawn. Mow strip shall be 12" wide concrete, measuring from outside edge of post, 12" wide on each side adjacent to turf. 6" wide on any side adjacent to planting beds to adequately surround post. No mow strip required if there is no turf on either side of fence. Please refer to section 32-94-00 Planting Accessories
   5. All new chain link fences shall provide an entrance for mowing access with access from loading and parking areas to all lawns.
   6. Consider galvanized, aluminum, welded wire mesh, wrought iron or powder coated fencing. Do not use vinyl or vinyl coated.

B. Swing Gate
   1. A swing gate is the district standard for use in all parking and driveway applications.
   2. Place behind property line at all driveway entries.
   3. Chain gates may not be used.
   4. Provide wide gates for access closure to replace bollards and chains.
      a. ODOT Gate ftp://ftp.odot.state.or.us/techserv/roadway/web_drawings/details/roadway/pdf/det1840.pdf

C. Chain Gate
   1. 3-1/2 inch IPS schedule 40 pipe.

2. 3'-9" above grade, 2' below grade set in concrete.
3. 1/2" eyelet welded 3'6" above grade.
4. 3/16" proof coil chain permanently affixed to either post. The owner will provide gate lock for other end.
5. Openings greater than 24 feet require removable intermediate post per PPS District Standard Drawing No. S-162 in Appendix A

D. Bollards
1. Provide removable bollards at the entrances to playgrounds where fencing is not located. Bollards per District detail S-162 (Appendix A) shall be set 60" on center.
2. Any bollard installed in turf or landscape should have a 12" concrete mow strip around it measuring from outside edge of post.

32-80-00 Irrigation Systems

General: The District does water lawns that have newer irrigation systems that are relatively efficient. Irrigating lawns is one of the "Integrated Pest Management" strategies to maintain a healthy and weed free lawn while reducing or eliminating the need for pesticides. Very few lawn systems on PPS properties are activated because of their state of condition. Newer schools such as Forest Park and Rosa Parks have quality irrigation systems that are in use.

The District prefers irrigation systems for all new construction as part of PPS's commitment to IPM (Board Policy 3.30.82 and 3.3.083 Regarding Integrated Pest Management Protocoll)

A. Submittals: Upon project completion the following must be submitted to the district.
1. As-Built Drawings
2. Maintenance Manual
3. Controller Reference Chart including seasonal programming.
4. Supplemental Equipment
5. Pressure Test signed off by a District irrigation specialist.

B. Coverage Test signed off by a District irrigation specialist.

C. Controllers:
1. Locate programmable electronic controllers in boiler rooms, field houses or similar secure area not accessible to the public.
2. New buildings and major remodels shall connect to the central control system: IMMS Hunter
3. Remodel projects and small additions can modify existing systems and controllers without being upgraded to central control unless central control is already used on side.
4. New building and major upgrades shall include weather monitoring including evapotranspiration (et) and rain sensors.

D. Sub Meter:
1. Irrigation sub meter is required to meter new irrigation systems.
2. Sub meter shall be set inside property line near domestic water meter.
3. Install sub meter in approved vault.

E. Back Flow:
1. Back-flow device may be installed with sub meter.

F. Valves:

1. Provide 3/4” ball valve vents and drains for winterizing system in accessible valve boxes. Locate control valves for athletic fields outside the field of play.

G. Piping:
   1. Material: PVC Schedule 40.System mains and laterals min. 18 inches below grade and mainline burial 24 inches under vehicular areas

H. Irrigation Heads
   1. Design system for sprayer type heads regardless of specific heads utilized. “MP rotator spray” heads are acceptable to be utilized, but District needs ability to change back to a sprayer type in the future if rotator spray heads do not work for us. Hunter, Rainbird or approved equal.
   2. “Hunter” type stainless steel riser, 6” pop up, “I-40” or “I-25” heads for large areas of turf (or district approved equal).
   3. Match precipitation rates per zone.
   4. Consider using low flow nozzles like the Hunter SRM.
   5. Pressure compensating heads
   6. Check valves at bottom of slope
   7. Checks valves on all heads in athletic fields

I. Drip Lines
   1. Drip irrigation is allowed by District approval only. Drip lines are susceptible to being cut by volunteer or student shovels causing water loss. They are only allowed by approval for establishment of plant material that will not require irrigation after 5 years..
   2. Zones: Separate zones should be based on aspect, slope, soil porosity, vegetation type and sun/shade.

J. Quick Coupler
   1. 1 minimum required. Locations and number are dependent on field/bed type and layout. PPS Athletics, Grounds, and maintenance staff to review locations.

K. Temporary irrigation systems (removal within 2 year)
   1. Provide a temporary irrigation system for stormwater plantings and other planted areas that should be fully established and not require ongoing watering.
   2.

L. Irrigation for Gardens
   1. Community Gardens
      a. All community gardens will need a separate water service and meter paid for and maintained by the community garden organization, not PPS.
   2. School Gardens
      a. School garden irrigation shall be set to a timer with limited hours of operation (e.g. during school operation hours). This will help reduce the risk of irrigation being left on.
   3. Inside raised garden beds, provide drip irrigation or soaker hoses rather than in-ground irrigation.

32-90-00 General Planting

A. General
   1. Design planting on a site by site basis consistent with existing soil conditions and the availability of automated irrigation.

2. Minimize restoration planting areas and habitat planting areas. While they are valuable in concept the District does not have the maintenance depth to maintain and sustain these areas into functioning ecosystems.
3. Minimize planting along building foundation. Ensure mature size of plantings will not block windows.
4. Offset mature size of planting a minimum of 3 feet from building foundation along the length of the building to allow for building maintenance.

B. Finished Surface
1. Finish surface of lawn areas, shrub beds and tree pits to the grade of existing landscape features.
2. Avoid the use of “raised” shrub beds.
3. Finished soil surface 1 inch below the top of pavement at pavement edges.
4. Top dress with compost mulch (composted from plant material without manure or other products) from a local vendor that is part of the US Composting Council (USCC) Seal of Testing Assurance Program.

32-91-00 Soil Preparation for Planting

A. Submittals
1. Soil test: Indicate pH, macro nutrients, micro nutrients, organic matter, particle size and type, salt levels, chemical analysis, physical analysis and any chemical deficiencies deleterious to the proper growth. Indicate amendments and fertilizers required to bring soil to optimal level for supporting plant growth.
2. Certified analysis of compost mixture components required by these specifications.
3. Guaranteed analysis of fertilizer mixes.
4. Integrated Pest Management Combine line’s 4&5.
5. Adhere to Board Policy 3.30.82 Environmentally Sustainable Business Practices section 2.i.A and 3.3.083 AD regarding Integrated Pest Management Protocol.

B. Soil Amendments Materials
1. Soil shall be consistent with fertility and PH levels requirements of selected specimen.
2. All soil and amendments shall be free of stones, wood, garbage, toxins or noxious seed.
3. 100% of topsoil shall pass a 1/4" mesh screen.

C. Amendments
1. Fertilizer(s) shall be used in the volume and type indicated in the soil test report.
2. Mineral amendments shall be used in the volume and type indicated in the soil test report.
3. Compost as outlined below.

D. Placement
1. Shrub beds
   a. Install compost per soil test recommendations.
2. Loosen subgrade of planting beds to a minimum depth of 6-inches; minimum depth of amended top soil is 6in.”Minimum 24-inch depth of amended topsoil. Trees
   a. Acceptable native soils preferred with minimum use of amendments.
3. Turf:

a. Sandy loam soil with 10 to 20 % fine grade plant compost to a depth to support root structure.

4. Application
   a. Soil amendments applied in a six-inch lift constituting the final soil placement.
   b. Amendments rototilled into the top 4 inches of the previous soil layer prior to final grading.
   c. Soil content to provide good drainage free of ponding.

32-92-00 Turf

A. Verify selection of seeded or sod systems with the District.
B. Irrigation is preferred for lawn and field turf for maintenance and Integrated Pest Management. See Division 32-80-00
C. Grass seed shall be “Oregon Blue Tag” or approved equal, free of weed seed.
D. Provide 1-year maintenance to include watering (if no irrigation), fertilizing and weed control.
E. Turf areas must allow for District mower access. Minimum turf area width is 10 feet. Under site constraints and on a project by project basis exceptions will be considered.
F. Maximum slope of turf for lawn areas is 15 degrees (1:7). Utility/steep slope areas, which are mowed less frequently (1-2 times annually) maximum slope 25 degrees (about 1:4).

32-93-00 Plant Materials

Refer to Portland Public Schools “Preferred Plant List” on PPS Design Standards website.

Note: Plants to meet current American Association of Nurserymen Standards for nursery stock.
Avoid invasive plants (English Ivy, Mint, Bamboo, etc.) hard to remove plants or plants that may form into thickets or require aggressive annual pruning (e.g. Redtwig Dogwood).
Select plants that require minimal maintenance (pruning, mowing, weeding, deadheading) or watering.”

32-93-33 Shrubs

A. Shrubs should be selected based on the following criteria. See appendix for pre-approved plants. Select drought tolerant species.
B. Select slow growing species to minimize maintenance.
C. Select disease and insect resistant species
D. Select evergreen woody shrubs that may help control weed growth by heavily shading ground. Example – Viburnum davidii
E. Avoid shrubs with thorns or toxic berries or leaves.
F. Avoid shrubs that require annual maintenance such as roses, perennials, fountain grass and ornamental grasses.
G. Plantings at existing facilities shall extend landscaping concept and plant species mix.
H. Shrubs 3-gallon minimum. This requirement may be adjusted to 1-gallon minimum with review and approval of District.
I. Mature size of shrubs 36 to 42 inches maximum height for security. Goal is to maintain sightlines and prevent unwanted activity. Exceptions to be considered with District review and approval.
J. Choose appropriate plants based on sun/shade exposure, soils and climate zone.

32-93-43 Trees

A. General
   1. Native species preferred.
   2. Trees that the City of Portland has classified as “noxious” or on their “Nuisance Plants” List are not allowed**.**
   3. Species selection according to site compatibility. Selected species shall not require irrigation after the second year.
   4. Select disease and insect resistant species.
   5. Select species resistant to wind and ice damage.
   6. No trees that bear fruit, berries, nuts, and thorns that create substantial litter.
   7. Trees planted within close proximity to synthetic turf fields, or possible future synthetic turf fields, must be chosen with the protection of the fields in mind. Excessive tree litter can cause damage to the turfs infill system and shorten the life span of the field. Tree types, quantities, and planting site locations require special consideration and planning. Needle bearing tree, such as Douglas fir and Pines, cause exceptional damage and should be avoided.
   8. Trees with high leaf and nut litter, such as Red Oak, are not allowed near playgrounds, sidewalks and other hardscape areas.

B. Tree Locations
   1. Provide a planting plan for all new trees. The planting plan shall include tree locations, number of trees, species of trees and mature canopy size. This shall be approved by District Grounds Foreman prior to purchasing or installing.
   2. Locate trees to provide shade and passive cooling on the south and west sides of buildings where possible and appropriate.
   3. At maturity, trees may not allow roof access or encroach into athletic playing zones. Different sports have different planting setbacks. Refer to the “Tree Planting Guidelines” for further information. District requires 10 feet, but prefers 20 feet, of unobstructed mowing space around tree.
   4. Maintain 20 feet of distance from play structures.
   5. Plant trees at least 20 feet from property lines.
   6. No planting trees over underground utilities.
   7. No plantings on steep hillsides that will make mowing unsafe for equipment operators.
   8. Street Trees to meet City of Portland Forestry requirements.

C. Trees and Pavement
   1. All trees next to pavement shall provide root barriers along pavement edge.
   2. Root barrier required for trees within 6’ of hardscape.
   3. Tree wells in pavement shall be covered in a compaction reducing material where applicable. This is especially important in high foot traffic areas (pick up and drop off, play zones, main entrances) Including:
   4. Tree grates
   5. Pervious pavers

D. Tree Lists
   1. Refer to the city of Portland Street Tree Planting Lists https://www.portlandoregon.gov/trees/60043

E. Maintenance
   1. Provide 2-Year maintenance to include watering, fertilizing and weed control. Follow District IPM plan.

F. Warranty
   1. Shrubs and trees warranty period to align with maintenance requirement above.

32-94-00 Planting Accessories

A. Mowing Strips
   1. Lawn areas adjacent to vertical barriers, a concrete mowing strip shall be provided.
   2. Size and configuration as indicated on PPS District Standard Drawing No. S-274 Standard Fence Detail – Typical Post & Plan details. See Appendix A.