soil materials that has been contaminated to any degree by contact with any part of the waste fill.

B. ON-SITE DEBRIS

On-site Debris means all nonuseable natural material produced by clearing, grubbing, or cleanup.

C. LEACHATE

Leachate is defined as any liquid, regardless of quality, that has come in contact with any part of the refuse, and includes all groundwater encountered on site, and any surface water that contacts any part of the landfill not covered by final cover, interim cover or sufficient subgrade embankment or low permeable soil as determined by the Engineer.

D. DEGREE OF COMPACTION

The Degree of Compaction is the percentage of the maximum density obtained by the test procedure presented in ASTM D698, and is abbreviated as a percent of laboratory-determined maximum density.

E. SUBGRADE EMBANKMENT

Subgrade Embankment shall be that material used to construct the final subgrade contours as shown on the plans. Material used for Subgrade Embankment may consist of clay, sand, gravel, pit run rock or a combination of these items meeting the requirements of these Specifications. "Soil which is contaminated with petroleum (Hydrocarbons) will be acceptable for this project only as 'subgrade embankment' if it has been treated to level one standards as defined in Oregon Administrative Rule (OAR) 340-22-305 to 360. Specific written verification of said treatment will be required by Metro prior to acceptance of this contaminated borrow material on the job site."

F. TYPE I SAND

Type I Sand shall be that material used to cover and protect the geosynthetic components of the landfill cover as shown on the plans.

G. TOPSOIL

Topsoil consists of suitable on-site topsoils and imported top soils used in the construction of the final cover system as shown on the plans. Topsoil materials shall be organic, friable and fertile in nature and shall be fully capable of supporting the growth of surface grasses at the St. Johns Landfill.

A. Existing topsoils shall be surface soils obtained above the existing low permeable soil at St. Johns Landfill. Satisfactory existing topsoils shall be free of subsoil, clay lumps, gravel, and other objects over 2" in diameter, and free of large roots, refuse, sticks or other objectionable material.

2.2 IMPORTED TOPSOIL

A. Shall be organic surface soils obtained in a depth of not more than 10" below native ground surface combined with yard debris compost.

B. Imported topsoil shall be 50% yard debris compost. Yard debris compost shall consist of brush, branches, leaves, grass clippings and clean woody yard debris. The yard debris must be ground so that a minimum of 95% of the material passing through a 5/8" screen opening. Compost shall be thoroughly mixed and heated (to 140° F) to ensure destruction of weed seed and plant pathogens. Only mature and stable compost will be acceptable; having temperature less than 20 degrees above ambient temperature and free of viable weed seed, adequate decomposition has occurred and minimal levels of herbicides and pesticides exist. All requirements to be verified by testing provided by the Contractor. The imported topsoil material shall be tested for nutrient composition (nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, N03-N and NH4-N), pH and salinity.

what requirements must be met?

C. Imported topsoil shall be pre-mixed (topsoil and yard debris compost) off-site. Contractor shall provide certification to the Engineer with each delivery stating that imported topsoil complies with above requirements.

2.3 TYPE 1 SAND

A. Shall consist of a clean, coarse to fine sand, with not more than 6 percent passing the No. 200 sieve, based on wet sieve analysis. The sand shall conform to the following gradation limits:

Sieve Size	% Passing (by weight)
1/2"	100
No. 4	80 - 100
No. 10	50 - 100
No. 40	5 - 80
No. 100	0 - 12
No. 200	0 - 6

The Type 'A' cover utilizes the existing low-permeability soil in its existing position. The in-place low-permeable soil will be recompacted under strict compaction control requirements; and ii) Final Cover Type 'B' would be located on the flat-top slopes of Subarea 1 and the flat area of the Powerline Corridor (PLC). The Type 'B' cover utilizes the existing low-permeability soil which will be removed from Subarea 1 and stockpiled. Twelve inches of low-permeability soil will be placed and compacted under strict conditions of moisture and compaction control.

B. The locations for Type 'A' and Type 'B' cover construction are shown on the Drawings.

3.2 EXISTING TOPSOIL REMOVAL, STOCKPILING AND REPLACEMENT

A. The Contractor shall develop and follow an approved plan for stripping areas of existing on-site topsoil, stockpiling of reusable topsoil, and placing existing reusable topsoil on the prepared slopes of the final cover.

B. The top portion of Subarea 1 is presently being used as a temporary stockpile for Dredge Sand. The present earthwork contractor will vacate Subarea 1 by April ??, 1992. However a thin layer of excess Dredge Sand estimated less than 4-inches thick will remain on the surface. The Contractor shall remove the excess Dredge Sand in conjunction with removing the Topsoil. The Contractor shall remove the upper 6 inch thickness of Topsoil in areas without Dredge Sand. The Contractor shall remove the Dredge Sand and the upper 6-inch thickness of Topsoil in areas with dredge sand. The Dredge Sand and Topsoil shall be placed in the same stockpile. No effort is required to separate the Dredge Sand and Topsoil. The locations of Topsoil and Dredge Sand removal and locations for stockpiling are shown on the Contract Drawings.

C. In areas without Dredge Sand stockpiling, existing grass vegetation may be removed with the underlying topsoil provided it is cut to a height not exceeding 3 inches at the time of topsoil removal, and thoroughly mixed with the underlying topsoil prior to or during the topsoil removal process. Grass clippings resulting from cutting the grass to the specified height, may also be mixed with the underlying topsoil provided the clippings are mulched and evenly spread over the mowed area in a layer not exceeding 1.5 inches thick prior to the topsoil removal process.

D. Topsoil deemed unsuitable for reuse by the Engineer shall be disposed of on site in Subarea 4 unless otherwise approved by the Engineer.

Unsuitable topsoil means soil material which appears to be unable to support the required growth of surface grasses. Topsoil suitable for reuse shall be placed in a stockpile at a location approved by the Engineer and/or shown on the Drawings. Stockpiled topsoil shall be kept free of contamination by refuse or other objectionable materials. Temporary covering of the stockpile with plastic to prevent contamination or erosion may be necessary.

3.3 EXCAVATION IN REFUSE

A. The variety of refuse disposed of within the landfill is unknown. Where excavation in refuse is required, the Contractor shall remove and dispose of all materials encountered in the refuse. Excavated refuse shall be disposed of on-site in Subarea 4 unless otherwise approved by the Engineer.

B. When it is necessary to excavate into refuse in order to perform any of the work, the Contractor shall follow an approved Health and Safety Plan during excavating, handling, and disposing of the refuse, and whenever working in proximity to exposed refuse. **The Contractor is cautioned that the possibility of encountering potentially harmful gases, liquids or wastes exists.**

C. Excavation of refuse may be required to obtain a portion of the grades shown on the plan will also be required for horizontal gas wells, condensate tanks and sedimentation basin construction.

D. Excavation into refuse may require surface water/leachate diversion and groundwater/leachate removal and disposal. Prior to any dewatering, the Contractor shall submit for approval to the Engineer a plan of the methods, installations and details of the proposed water control system and his intended disposal methods for contaminated groundwater/leachate collected during dewatering. The Contractor shall follow a plan approved by the Engineer for all dewatering. Dewatering activities shall be performed in accordance with the Contractors approved Health and Safety Plan.

3.4 EXCAVATION AND STOCKPILING OF EXISTING LOW PERMEABILITY SOIL

A. Existing Low Permeability Soil shall be excavated from areas to receive Type 'B' cover or Subgrade Embankment. The locations of Existing Low Permeability Soil removal and stockpiles are shown on the Contract Drawings.

B. The surface of the Existing Low Permeability Soil shall be free of all topsoil and other extraneous matter, and shall be approved by the

B. Sediment facilities shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed and potential for on-site erosion has passed.

C. The implementation, maintenance, replacement and additions to erosion/sedimentation control systems shall be the responsibility of the Contractor.

1.5 SUBMITTALS

A. Temporary measures required to control surface runoff, erosion and sedimentation during construction will be included with the Excavation, Embankment and Grading Plan required in Section 02220. Periodic updates of this portion of the plan may be required.

B. The measures to control surface water and erosion for completed work on this phase of the landfill closure as outlined in the Contract Documents will be submitted in the Sedimentation Control Plan no later than 20 days after Notice to Proceed.

C. Product information for materials required in this section will be submitted and approved prior to purchase.

2. PRODUCTS

2.1 HYDROSEEDING MATERIALS

A. Provide fresh, clean, dry, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide grass seed as follows:

1. "Mecklenberger" sheep fescue, 100 pounds (PLS) per acre.

   "Manhattan" perennial ryegrass, 50 pounds (PLS) per acre.

2. The application rates indicated above are given in Pure Live Seed (PLS) rates. PLS rate will be determined by the percent purity times percent germination. For example, a seed mix of 95% purity and 35% germination will equal 33% PLS. Therefore, 3 pounds of the seed mix will be required to equal 1 pound of PLS.

B. All fertilizers shall be of standard commercial manufacturer and grade. Fertilizer shall be furnished in standard, unopened, moisture-proof containers and in dry condition. Granular or pelletized forms shall be free from lumps and caking. Each container shall be marked with the

weight and manufacturers guaranteed analysis certifying the percentage of each ingredient.

Fertilizer needs shall be evaluated by the contractor prior to hydroseeding. Once topsoil has been placed, appropriate top soil analyses shall be performed based on one soil test per 5 acres to be hydroseeded. Analyses shall evaluate nutrient content, salinity, pH, organic content and other appropriate factors. Tests shall include both existing topsoils from the landfill and imported topsoils as specified.

what results are acceptable for these parameters?

Based on these tests, fertilizer makeup (nitrogen, phosphorous and potash) and rate of application (lbs. per acre) shall be determined to provide optimum growth for the seed mix.

by who?

C. All mulch materials shall be free of noxious weed seeds and plants and shall contain no substance detrimental to plant life. Wood cellulose fibre mulch shall be processed so that the wood fibers will remain uniformly suspended under agitation in water. The mulch shall also blend with seed, fertilizer and other typical additives of a hyroseeding mixture to form a homogeneous slurry.

This processed mulch shall have the ability to cover and hold grass seed in contact with soil. The wood fiber shall also have moisture-absorption and percolation properties to form a blotter-like ground cover. The cellulose fiber shall be colored green to visibly aid uniform application.

Wood cellulose fiber shall be shipped in packages of uniform weight (±5%) and labeled with the manufacturer's name and air-dry weight.

D. Hydro-Slurry Mix:

1. Seed Mix: 150 pounds (PLS) per acre
2. Fertilizer: As Required, (Paragraph B)
3. Wood Cellulose Fiber, dyed green: 1500 pounds per acre
4. Tackifier: As required

2.2 EROSION CONTROL MATTING/BLANKET

A. Shall be XCEL blanket manufactured by Soil Stabilization Co., or equal.

2.3 SEDIMENT FENCE

A. Conform with City's "Erosion Control Plan", Figure 3-3.

B. Filter fabric material shall conform to Section 02272-2.1.

2.4 STRAWBALE SEDIMENT BARRIER

A. Strawbales shall be standard 40 to 60 pound rectangular bales of cereal grain or seed straw.

2.5 PLASTIC SHEETING

A. Shall be polyethylene and have a minimum thickness of 6 mil.

B. Anchors to be sandbags with stakes, tires or other items suitable in size and weight to adequately hold the plastic sheeting in place during windy, wet weather. Anchors shall not have sharp edges, except stakes through sandbags.

3. EXECUTION

3.1 GENERAL EROSION CONTROL

A. Erosion control provisions shall meet or exceed the requirements of the City of Portland, Bureau of Environmental Services. Refer to City's "Erosion Control Plans Technical Guidance Handbook".

B. When provisions are specified and shown on the Drawings, they are the minimum requirements.

C. Contractor shall not permit sediment laden waters to enter off-site drainage facilities/sloughs.

D. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required. It shall be the responsibility of the Contractor to address new conditions that may be created and to provide additional facilities over and above minimum requirements as may be required.

3.2 SILTATION/SEDIMENTATION PONDS

A. Temporary siltation/sedimentation ponds shall be installed on site to desilt all stormwater or water pumped from excavations.

B. If additional siltation control is required, check dams or silt fences may be placed in streams or ditches receiving stormwater from areas disturbed by construction.

C. Siltation/sedimentation ponds shall be constructed in accordance with the requirements of the agencies having jurisdiction over facilities to receive discharge from siltation/sedimentation ponds.

3.3 PLACING EROSION CONTROL MATTING

A. Seed and fertilizer (Hydroseeding) shall be placed prior to placing of matting.

B. Erosion Control matting shall be unrolled parallel to the flow of water. Where more than 1 strip of matting is required to cover the given area, it shall overlap the adjacent mat a minimum of 4 inches. The ends of matting shall overlap at least 6 inches with the upgrade section on top.

C. The up-slope end of each strip of matting shall be staked and buried in a 6-inch deep trench with the soil firmly tamped against the mat. Three stakes per width of matting (1 stake at each overlap) shall be driven below the finish ground line prior to backfilling of the trench.

D. The Engineer may require that any other edge exposed to more than normal flow of water or strong prevailing winds be staked and buried in a similar manner.

E. Check-slots shall be placed between the ends of strips by placing a tight fold of the matting at least 6 inches vertically into the soil. These shall be tamped and stapled the same as upslope ends. Check-slots must be spaced so that one check-slot or one end occurs within each 50 feet of slope.

F. Edges of matting shall be buried around the edges of catch basins and other structures as herein described. Matting must be spread evenly and smoothly and in contact with the soil at all points.

G. Matting shall be held in place by approved wire staples, pins, spikes or wooden stakes driven vertically into the soil. Matting shall be fastened at intervals not more than 3 feet apart in 3 rows for each strip of matting, with 1 row along each edge and 1 row alternately spaced in the middle. All ends of the matting and check slots shall be fastened at 6-inch intervals across their width. Length of fastening devices shall be sufficient to securely anchor matting against the soil and driven flush with the finished grade.

3.4 HYDROSEEDING

A. Do not use wet seed or seed which is moldy or otherwise damaged in transit or storage (unless soaking seed for quick germination is approved by Metro). Do not use seed from containers opened before delivery to the job site or before hydro-slurry equipment is ready. Retain seed packaging for observation by Engineer.

B. Confirm that final subgrade is achieved, topsoil has been placed and tested (re: fertilizer needs) and is acceptable prior to commencing the hydroseeding operations. Hydroseed all areas covered by topsoil.

C. Mix specified seed, fertilizer, and mulch in water using equipment specifically designed for hydro-slurry application. Continue mixing until uniformly blended into a homogeneous slurry suitable for hydraulic application. The materials shall be applied through a pressure-spray system providing continuous, nonfluctuating applicate rate.

D. Apply slurry uniformly at the specified rates using a sweeping, horizontal motion. Clean hydro-mulch off areas not intended for hydroseeding which are inadvertently sprayed during applications.

E. Unless otherwise specified or approved, this work is to be performed from August 15 to October 1. The work shall be performed only at times when local weather and other conditions are not detrimental to seeding and mulching. The work shall not be undertaken when wind velocities would prevent uniform application of the materials or would drift the materials. Work shall be done in stages along the project as soon as practicable after completion of topsoil placement on areas to be seeded and mulched.

F. Inspection of any area will be made upon completion of hydro seeding. The work in any area will not be measured for payment until a uniform distribution of the materials is accomplished at the specified rate. Areas not receiving a uniform application, as determined by the Engineer, shall be reseeded, refertilized, or remulched at the Contractor's expense prior to payment.

3.5 STRAWBALE SEDIMENT BARRIER

A. Bales to be keyed into existing ground a minimum of 4 inches. Wood stakes are to be driven through the bales and into ground a minimum of 12 inches.

B. At no time shall more than a one foot depth of sediment be allowed to accumulate behind strawbale sediment barriers. Sediment must be removed or new lines of barriers installed uphill of sediment laden barriers.

3.6 PLASTIC SHEETING WITH ANCHORS

A. Plastic sheeting shall be installed and maintained tightly in place by using staked sandbags or tires on ropes (10' max. grid spacing). Other anchor materials may be used which provide similar hold-down characteristics. All seams shall be taped or weighted down full length and there shall be at least a 12-inch overlap of all seams. For seams parallel to the slope contour, the uphill sheet shall overlap the downhill sheet.

3.7 PROTECTING GEOSYNTHETICS

A. All stakes, whether for anchoring sand bags, plastic sheeting, strawbales, matting, or other material, shall be installed in such a way as to insure the integrity of the underlying geosynthetics.

* * * END OF SECTION * * *