SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Erosion and sediment control through the use of the following:
   1. Dikes
   2. Swales
   3. Grade stabilization structures
   4. Sediment basins
   5. Sediment traps
   6. Silt fences
   7. Straw and bales
   8. Planting and ground coverage
   9. Maintenance of erosion control improvements
   10. Cleanup and removal of silt from roadways on-site and off-site

B. Dust alleviation and control by watering, matting, planting, etc.

C. Provision of all materials, equipment, and apparatus not specifically mentioned herein or noted on the plans, but which are obviously necessary to complete the dust and erosion control.

1.2 RELATED REQUIREMENTS
Not used

1.3 MEASUREMENT AND PAYMENT

A. Water Pollution Control

The contract lump sum price paid for bid item "Water Pollution Control Program" shall include full compensation for furnishing transportation, labor, materials, tools, equipment, and incidentals, and for doing all work involved in Water Pollution Control Program. Work includes, but not limited to, submitting water pollution control plan for City's review and approval prior to project construction, participation in stormwater construction inspections, use of best management practices during construction to prevent construction related pollutants from

entering the storm drain system, maintenance of storm water pollution prevention measures, and removal and disposal of measures after completion of work. All work shall be complete in place as accordance specifications, permits, and as directed by the Engineer

1.4 REFERENCE STANDARDS

A. Manual of Standards for Erosion and Sediment Control Measures - Association of Bay Area Governments (ABAG)

B. State of California Department of Transportation Standard Specifications (SS)

Section 21 Erosion Control

C. American Association of State Highway and Transportation Officials (AASHTO)

D. ABAG Manual of Standards for Erosion and Sediment Control Measures

1.5 QUALITY ASSURANCE

All work shall be done to the satisfaction of the designated representative of the geotechnical consultant, and shall meet the approval of the Engineer.

PART 2 - PRODUCTS

2.1 GENERAL

All materials shall conform to applicable requirements of SS Section 21, "Erosion Control", listed as follows and meeting the requirements of ABAG Manual of Standards for Erosion and Sediment Control Measures.

2.2 TOP SOIL

The soil on the site shall meet the following criteria:

A. The soil shall contain no more than seventy percent (70%) sand (as defined by USDA, Soil Conservation Service). This is to provide enough available water-holding capacity to support plant growth.

B. The soil shall have sufficient porous base (greater than thirty percent (30%)) to permit adequate root penetration and provide for exchange of gases and water.

C. The soil shall be free from any material harmful to plant growth.

D. Topsoil that has been graded from the site shall be stockpiled, whenever possible, for reapplication on exposed graded slopes during the final grading stage. The soil shall be disked into the existing soil to provide for a good bond.

2.3 SEED

A. A seed mix similar to the native plants and grasses or the following seed mix shall be applied at above the minimum rate specified below:

Seed Type	Minimum Application Rate (Pounds per Acre)
Blando Brome	30
Annual Ryegrass	20

B. All seed shall be certified live and delivered to the site tagged and labeled in accordance with the California Agricultural Code and shall be acceptable to the County Agricultural Commissioner.

2.4 FERTILIZER

A. Fertilizer shall contain a minimum of sixteen percent (16%) nitrogen, twenty percent (20%) available phosphoric acid, zero percent (0%) water soluble potash, and fifteen percent (15%) sulfur. It shall be uniform in composition, dry and free flowing, pellet or granular.

B. All fertilizer shall be delivered in unbroken or unopened containers, labeled in accordance with the applicable State regulations, and bearing the warranty of the producer for the grade furnished.

2.5 STRAW MULCH

Straw mulch shall be of un-rotted small grain straw and shall be applied at the rate of four thousand pounds (4,000#) per acre. Mulch materials shall be relatively free of all noxious weeds. If the straw is applied with a blower, it shall be chopped in lengths not shorter than six inches (6").

2.6 STRAW BALES

Straw shall be derived from wheat, oats, or barley. The Contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the County in which it is to be used is delivered to the site of the work. Straw that has been used for stable bedding shall not be used.

2.7 SILT FENCE

A. Filter fabric shall be a pervious sheet of synthetic polymer composed of at least eighty-five percent (85%) by weight ethylene, propylene, amide, ester, or vinylidene yarn, woven or non-woven, and shall contain stabilizers and/or inhibitors to resist deterioration by heat, water and ultra-violet light. The fabric shall conform to the following criteria:

1. The equivalent opening size (U.S. Standard Sieve) shall be within the range 70-100.

2. The tensile strength (ASTM D 1682 G "Test Method for Breaking Load and Elongation of Textile Fabric") shall be at least one hundred twenty pounds (120#). The strength of fabric required depends on the wire support fence. The strength given is the minimum for a six-inch (6") square mesh wire support fence. If extra strength fabric is used without a support fence, the strength required shall be two hundred pounds (200#) minimum with posts spaced on six foot (6') centers.

B. Posts for silt fences shall be either four-inch (4") square wood or 1.33 pounds per linear-foot steel with a minimum length of five feet (5'). Steel posts shall have projections for fastening wire to them.

C. Wire fence reinforcement for silt fences shall be a minimum of forty-two inches (42") in height, shall be a minimum of 14 gauge, and shall have a maximum mesh spacing of six inches (6").

2.8 LUMBER

Lumber shall be construction grade redwood rough finished, or approved equal.

2.9 PIPES

Pipes and conduits shall conform to applicable sections of these specifications and the requirement of the ABAG Manual of Standards for Erosion and Sediment Control Measures.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Equipment and materials shall be stored as to ensure the preservation of its quality and fitness for the work. Equipment and materials shall be located on the construction site so it can be used on short notice.

B. Erosion and sediment control measures shall be in place during the rainy season (October 1st through April 30th) and shall be frequently serviced to maintain their full function. However, for projects having the potential to cause water pollution, the Storm water Pollution Prevention Plan (SWPPP) must be

available on site and at all times and must be implemented year-round throughout the duration of the construction project. For the foregoing type of projects, no construction activity shall be performed until the SWPPP has been certified and appropriate Best Management Practices (BMPs) have been implemented in accordance with Section 2 of the California Storm water BMP Handbook for Construction as developed by the California Storm water Quality Association (CASQA), and such other storm water pollution regulatory agency implementing guidelines.

C. Dust control measures shall be implemented at all times during the construction period until no longer required. Contractor shall pay for the removal of all silt from the storm drain system and the inspection thereof.

3.2 TEMPORARY AND PERMANENT PLANTING OF EXPOSED SOILS

A. Before seeding, necessary drainage controls such as dikes at tops of slopes and swales on slope benches shall be installed to prevent runoff from eroding slopes before grass is established. Temporary drainage controls shall remain in place until permanent drainage facilities are installed or until slopes are stabilized and temporary controls are no longer necessary for continued slope stability.

B. The area to be seeded shall have a firm seed bed that has previously been roughened by scarifying, disking, harrowing, chiseling, or track-walking, or otherwise worked to a depth of two inches (2") to four inches (4") unless a roughed condition already exists. No implement shall be used that will create an excessive amount of downward movement of soil or clods on sloping areas. The seedbeds may be prepared at the time of completion of earth-moving work.

C. Seeding, fertilizing, and mulching shall be done by October 1st of any year.

D. Slopes above critical areas, such as a water supply reservoir or an existing residence, shall be stabilized by October 1st of any year. Irrigation shall be used if rainfall is insufficient to establish protection by this date.

E. Seed shall be distributed uniformly over the seedbed by hand broadcasting, hydro-seeding or other approved method. Seed shall be covered to a depth of one-quarter to one-half inch (1/4"-1/2"), except when seed is hydraulically applied with a mulch. Seed shall not have a soil cover greater than one inch (1").

F. Fertilizer shall be distributed uniformly over the seedbed at a rate of not less than five hundred pounds (500#) per acre. Fertilizer shall be applied in any way that will result in uniform distribution. Fertilizer shall be incorporated into the soil if possible. Incorporation may be as part of the seedbed preparation or as part of the seeding operation. Fertilizer may also be applied as a mix with seed and fiber in a slurry (see Paragraph H below).

G. A mulch cover shall be distributed uniformly over the surface of the seeded area. Mulching shall follow immediately after the seeding.
   1. For slopes flatter than 2:1 and within a fifty-foot (50') access of a straw blower, the following procedure shall be used: Straw mulch shall be applied at the rate of four thousand pounds (4,000#) per acre. The mulch shall be applied by hand, blower or other suitable equipment. The mulch shall be anchored in place using hand tools, mulching rollers, disks, nets, chemical tackifiers or other suitable means.

   2. For slopes steeper than two to one (2:1), mulch shall be applied hydraulically as specified in Item H, below.

H. Hydro-seeding is defined as the simultaneous application of seed, fertilizer, and mulch in a slurry.

   1. The hydro-seeder shall be equipped with a built-in continuous agitation system of sufficient operating capacity to produce a homogeneous slurry and with a discharge system that applies the slurry to the slopes at a continuous and uniform rate. Seed shall not remain in the slurry longer than thirty (30) minutes. The slurry shall contain the required fertilizer (see preceding Item F) and shall also contain wood fiber to be applied at the rate of one thousand five hundred pounds (1,500#) of wood fiber per acre.

   2. The water used shall be potable water or Class 1 or 2 agricultural irrigation water.

   3. The slurry shall be continuously mixed and shall be mixed for at least five (5) minutes after the last addition before application starts. The slurry shall be applied at a rate that is non-erosive and minimizes runoff. The slurry must have fibrous and/or chemical adhesives to ensure retention of seed mix on soil slopes.

I. Irrigation is optional, except on critical areas (see Paragraph D above).

   1. If irrigation is required or desired, the following procedure shall be used. The top one-inch (1") of soil of all seeded areas shall be kept moist for the first twenty-one (21) days after seeding. Moisture needs will be determined by visual observation. After twenty-one (21) days, the top six inches (6") of soil shall be kept moist until the first major rainstorm (minimum 1.0-inch per 24- hour period). The moisture level shall not be allowed to drop below fifty percent (50%) available moisture capacity.

   2. Irrigation shall not exceed one-half inch (0.5") of water applied per acre per irrigation on sandy soils, and one-inch (1.0") of water applied per acre per irrigation on loam- and clay-type soils.

   3. Irrigation water shall be potable or Class 1 or 2 agricultural irrigation water. Water shall be applied by sprinklers or similar devices at a non-erosive rate using the above criteria as a guide.

J. Seeded areas shall be inspected no more than thirty (30) days after planting and no more than thirty (30) days after the first rain. Follow-up inspections shall be done between sixty (60) and ninety (90) days after the first inspection and again in the spring. The spring inspection shall establish any corrective measures necessary before the next rainy season. If, at the sixty (60) day inspections, the vegetation is not established and/or erosion is expected to continue, slopes shall be reseeded and/or repaired. Eroded slopes shall be smoothed over, including the filling of rills and/or gullies, before reseeding starts. The reseeding operation shall follow the specifications given above.

3.3 TEMPORARY DIKES

A. The top width shall be a minimum of two feet (2').

B. The height of compacted earth fill dike shall be a minimum of eighteen inches (18") measured from the existing ground at the upslope toe to the top of the dike and at least twelve inches (12") above any outlet pipe. The maximum allowable water depth in the diked areas shall not exceed thirty inches (30").

C. The side slopes shall be 2:1 or flatter.

D. The grade along the face of the dike (flow area) shall be dependent on topography, but shall be a minimum of one percent (1%) (sufficient grade to drain) to an adequate outlet. Drainage must be positive. The "flow area" of the dike is defined as the upslope portion of the dike face and adjacent ground surface over which diverted runoff water flows.

E. The flow area shall be stabilized:
   1. Where the slope of the flow area exceeds five percent (5%); or

   2. Where the slope of the flow area is one percent (1%) to five percent (5%) and the maximum flow velocity from the ten (10) year frequency storm is exceeded as specified below:

Flow Area Surface	**Maximum Velocity (Feet per second)**
Sand and Sandy Loam	2.5
Silt Loam	3.0
Sandy Clay Loam	3.5
Clay Loam	4.0
Clay, Fine Gravel, Graded Loam to Gravel	5.0
Graded Silt to Cobbles	5.5
Shale, Hardpan, and Course Gravel	6.0

F. Stabilization, when required by Paragraph E above, shall be:

1. In accordance with the ABAG Standard and Sample Specifications for Grass Protection of Waterways, Swales and Dikes, when the dike intercepts runoff from a protected or stabilized area; or

2. By lining the flow area with stone that meets AASHTO M43 size No. 2 or 24 in a layer at least three inches (3") thick and pressed into the soil. The lining shall extend up the upslope side of the dike to a height of at least eight inches (8") measured vertically from the upslope toe and shall extend upslope from the upslope toe a distance sufficient to include the flow area.

G. Diverted runoff from a protected or stabilized area shall flow directly to a grade stabilization structure and/or receiving water channel. Diverted water from a disturbed or exposed upland area shall flow to a sediment trap or a sediment basin or to an area protected by these practices.

H. All dikes shall be machine-compacted with the tires or tracks going over at least ninety percent (90%) of the surface. There shall be a maximum of six inches (6") of lift between each compaction.

I. The dike shall be inspected periodically and maintained as required.

3.4 TEMPORARY SWALE

A. The bottom width shall be a minimum of seven feet (7') and the bottom shall be level.

B. The depth shall be a minimum of one-foot (1').

C. The side slope shall be two to one (2:1) or flatter (flat enough to allow construction traffic to cross if desired).

D. The grade shall be dependent on topography, but shall be a minimum of one percent (1%) (sufficient grade to drain) to an adequate outlet. Drainage must be positive.

E. The swale shall be stabilized:

1. Where the slope of the swale bottom exceeds five percent (5%), or

2. Where the slope of the swale bottom is one percent (1%) to five percent (5%) and the maximum flow velocity from the 10-year frequency storm is exceeded as specified below:

Swale Surface	Maximum Velocity (Feet per Second)
Sand and Sandy Loam	2.5
Silt Loam	3.0
Sandy Clay Loam	3.5
Clay Loam	4.0
Clay, Fine Gravel, Graded Loam to Gravel	5.0
Graded Silt to Cobbles	5.5
Shale, Hardpan, and Coarse Gravels	6.0

F. Stabilization, when required by Paragraph E above, shall be:

1. With grass protection when the swale receives runoff from a stabilized area; or

2. By lining the flow area with stone that meets AASHTO M43 size No. 2 or 24 in a layer at least three inches (3") thick and pressed into the soil. The lining shall extend across the bottom and up both sides of the channel to a height at least eight inches (8") vertically above the bottom.

G. At all points where the swale will be crossed by vehicles several times a day, the swale shall be stabilized according to preceding Paragraph 3.04 (F) 2, above, except that the stone lining shall be at least six inches (6") thick for the whole width of the traffic crossing.

H. The swale shall be located to take advantage of the most suitable outlet. The swale shall discharge without causing erosion at its outlet.

I. All trees, brush, stumps, obstructions and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

J. The swale shall be excavated and/or shaped to line, grade, and cross-section as required to meet the criteria specified herein, and be free of bank projections or other irregularities that will impede normal flow.

K. Fills shall be compacted as needed to prevent unequal settlement that would cause damage in the completed swale.

L. All earth removed and not needed in construction shall be spread or disposed of so it will not interfere with the functioning of the swale.

M. The swale shall be inspected periodically and maintained as required.

3.5 TEMPORARY GRADE STABILIZATION STRUCTURE

A. Rigid Pipe Slope Drain

1. The inlet pipe shall have a slope of three percent (3%) or steeper.

2. The top of the earth dike over the inlet pipe, and those dikes carrying water to the pipe, shall be at least one foot (1') higher at all points than the top of the inlet pipe.

3. The pipe shall be corrugated metal pipe with watertight connecting bands.

4. A riprap apron shall be provided at the outlet. This shall consist of six-inch (6") diameter rocks placed as shown on the plans.

5. The soil around and under the inlet pipe and entrance section shall be hand tamped in four-inch (4") lifts to the top of the earth dike.

6. Follow-up inspection and any needed maintenance shall be performed after each store.

B. Flexible Pipe Slope Drain

1. The inlet pipe shall have a slope of three percent (3%) or steeper.

2. The top of the earth dike over the inlet pipe, and those dikes carrying water to the pipe, shall be at least one foot (1') higher at all points than the top of the inlet pipe.

3. The inlet pipe shall be corrugated metal pipe with watertight connecting bands.

4. The flexible tubing shall be the same diameter as the inlet pipe and shall be constructed of durable material with hold-down grommets spaced no more than ten feet (10') on centers.

5. The flexible tubing shall be securely fastened to the corrugated metal pipe with metal strapping or watertight collars.

6. The flexible tubing shall be securely anchored to the slope by staking at grommets provided.

7. A riprap apron shall be provided at the outlet. This shall consist of six-inch (6") diameter rocks placed as shown on the plans.

8. The soil around and under the inlet pipe and entrance section shall be hand tamped in four-inch (4") lifts to the top of the earth dike.
9. Follow-up inspection and any needed maintenance shall be performed after each storm.

C. Paved Chute or Flume

1. The structure shall be placed on undisturbed soil or on well-compacted fill.

2. The cut or fill slope shall not be steeper than two-to-one (2:1) and shall not be flatter than twenty-to-one (20:1).

3. The top of the earth dike at the entrance, and those dikes carrying water to it, shall not be lower at any point than the top of the lining at the entrance of the structure.

4. The lining at the entrance to the structure shall extend above the crest as shown on the plans.

5. The lining shall be placed beginning at the lower end and proceeding up the slope to the upper end. The lining shall be well compacted and free of voids. The lining surface shall be reasonably smooth.

6. The entrance floor at the upper end of the structure shall have a slope toward the outlet of one-quarter to one-half inch (1/4" - 1/2") per foot.

7. The cut-off walls at the entrance and at the end of the discharge aprons shall be continuous with the lining.

8. The lining shall consist of Type 2 Portland cement concrete (3,000 psi), bituminous concrete or comparable non-erodible material.

9. An energy dissipater of adequate design shall be used to prevent erosion at the outlet.

3.6 SEDIMENT BASINS

A. Areas under the embankment and any structural works shall be cleared, grubbed, and stripped of any vegetation and root mat. In order to facilitate cleanup and restoration, the basin area shall be cleared also.

B. A cut-off trench shall be excavated along the centerline of earth-fill embankments. The minimum depth shall be two feet (2'). The cut-off trench shall extend up both abutments to the riser crest elevation. The bottom width shall be wide enough to permit operation of excavation and compaction equipment and a minimum of four feet (4') in width. The side slopes shall be no steeper than one to one (1:1). Compaction requirements shall be the same as those for the embankment. The trench shall be dewatered during the backfilling and compacting operations.

C. Fill material for the embankment shall be taken from approved fill areas. It shall be clean material soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material. Relatively pervious materials such as

sand or gravel (*Unified Soil Classes GW, GP, SW, and SP*) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six to eight inch (6" - 8") thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing the hauling equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment, or by the use of a compactor. The embankment shall be constructed to an elevation ten percent (10%) higher than the design height to allow for settlement if compaction is obtained with hauling equipment. If compactors are used for compaction, the overbuild may be reduced to not less than five percent (5%).

D. The principal spillway riser shall be securely attached to the discharge pipe by welding all around and all connections shall be watertight. The pipe and riser shall be placed on a firm, smooth soil foundation. The connection between the riser and the riser base shall be watertight. Pervious materials such as sand, gravel or crushed stone shall not be used as backfill around the pipe of anti-seep collars. The fill material around the pipe spillway shall be placed in four inch (4") layers and compacted under the shoulders and around the pipe to at least the same density as the adjacent embankment. A minimum of two feet (2') of hand-compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates shall have at least two and one-half feet (2-1/2') of compacted earth, stone or gravel placed over them to prevent flotation.

E. The emergency spillway shall not be installed in fill. Elevations, design width, and entrance and exit channel slopes are critical to the successful operation of the emergency spillway.

F. Baffles shall be constructed of four-inch by four-inch (4" x 4") posts and four-feet by eight-feet (4' x 8') by one-half inch (1/2") exterior plywood. The posts shall be set at least three feet (3') into the ground, no further apart than eight feet (8') center to center, and shall reach a height six inches (6") below the riser crest elevation. The plywood shall be securely fastened to the upstream side of the posts.

G. The embankment and emergency spillway shall be stabilized with vegetation immediately following construction.
H. Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws concerning pollution abatement shall be complied with.

I. State and local requirements shall be met concerning fencing and signs warning the public of hazards of soft sediment and floodwater.

J. Maintenance and repairs shall be carried out as follows:

1. All damages caused by soil erosion or construction equipment shall be repaired before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in or adjacent to a stream or floodplain.

K. When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits shall be leveled or otherwise disposed of in accordance with the approved erosion and sediment control plan.

3.7 SEDIMENT TRAPS

A. The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared.

B. The fill material for the embankment shall be free of roots or other woody vegetation, as well, as oversized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed.

C. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to within one foot (1') of the outlet elevation. Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

D. The structure shall be inspected after each rain and repairs made as needed.

E. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.

F. The structure shall be removed and the area stabilized when the remaining drainage area has been properly stabilized.

G. All cut-and-fill slopes shall be two-to-one (2:1) or flatter.

H. When a riser is used, all pipe joints shall be watertight.

I. When a riser is used, at least the top two-thirds of the riser shall be perforated with one-half inch (1/2") diameter holes spaced eight inches (8") vertically and ten to twelve inches (10"-12") horizontally.

J. When a pipe outlet is used, fill material around the pipe spillway shall be hand compacted in four-inch (4") layers. A minimum of one and one half feet (1.5') of hand-compacted backfill shall be placed over the pipe spillway. At least two

feet (2') of backfill shall be placed if construction equipment will cross over the pipe spillway.

K. When an earth or stone outlet is used, outlet crest elevation shall be at least one foot (1') below the top of the embankment. Pipe outlets shall be at least one-and one-half feet (1.5') below the top of the embankment.

L. When a crushed stone outlet is used, the crushed stone used in the outlet shall meet AASHTO M43, size No. 2, 24, or its equivalent such as MSHA NO. 2. Gravel meeting the above gradation may be used if crushed stone is not available. Crusher run is not acceptable.

3.8 TEMPORARY STRAW BALE DIKES

A. Bales shall be placed in a row with ends tightly abutting as shown on the Plan.

B. Each bale shall be embedded in the soil a minimum of four inches (4").

C. Bales shall be securely anchored in place by two (2) wood stakes driven through the bales. The first stake in each bale shall be driven toward the previously laid bale to force bale together.

D. The dike shall be inspected after each storm, and repair or replacement shall be made promptly as needed.

E. Bales shall be removed when they have served their purpose so as not to block or impede storm flow or drainage.

3.9 TEMPORARY SILT FENCE

A. The height of silt fence shall not exceed thirty-six inches (36"). On slopes, the fence line shall follow the contour as closely as possible. In small swales, the fence line shall be curved upstream at the sides to direct the flow toward the middle of the fence.

B. If possible, the filter fabric shall be cut from a continuous roll to avoid the use of joints. When joints are necessary, filter cloth shall be spliced only at a support post, with a minimum six-inch (6") overlap and both ends securely fastened to the post.

C. Posts shall be spaced a maximum of ten feet (10') apart and driven securely into the ground, a minimum of twelve inches (12"). When extra strength fabric is used without the wire support fence, post spacing shall not exceed six feet (6').

D. A trench shall be excavated approximately four inches (4") wide and four inches (4") deep along the line of posts and upslope from the barrier.

E. When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least one inch (1") long, tie wires or hog rings. The wire shall extend into the trench a minimum of two inches (2") and shall not extend more than thirty-six inches (36") inches above the original ground surface.

F. The standard strength filter fabric shall be stapled or wired to the fence, and eight inches (8") of the fabric shall extend into the trench. The fabric shall not extend more than thirty-six inches (36") above the original ground surface. Filter fabric shall not be stapled to existing trees.

G. When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions of Subparagraph F, above, applying.

H. The trench shall be backfilled and the soil compacted over the toe of the filter fabric.

I. Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

J. Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

K. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the barriers expected usable life and the barrier is still necessary, the fabric shall be replaced promptly.

L. Sediment deposits should be removed when deposits reach approximately one-half (1/2) the height of the barrier.

M. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

3.10 SPECIAL REQUIREMENTS

A. All basins and check dams shall have been pumped dry, and all debris and silt removed within twenty-four (24) hours after each storm.

B. Hydro-seed all fill and cut slopes as approved by the Engineer, with a vertical height of five feet (5') or more.

C. Changes to the erosion and sediment control plans to meet field conditions will be made only with the approval of, or at the direction of, the Engineer.

D. During the rainy season, all paved areas will be kept clear of earth material and debris. The site will be maintained so that a minimum of sediment-laden runoff enters the storm drainage system.

3.11 CONTROL OF GROUND WATER

The Contractor shall be solely responsible for dewatering excavations and subsequent control of ground water. The Contractor shall provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage, to the satisfaction of the Engineer, until backfilling is completed.

-END OF SECTION-