Chapter 13.12 Earthwork

Sections:

13.12.010 Applicability
13.12.020 New materials required.
13.12.030 Geotextile fabric.
13.12.040 Frost-protection insulation.
13.12.050 Culvert materials.
13.12.060 Bedding materials.
13.12.070 Backfill materials.
13.12.080 Clearing and grubbing generally.
13.12.090 Clearing.
13.12.100 Restoration.
13.12.110 Bedding of utilities and service connections.
13.12.120 Backfill of utilities and service connections.
13.12.130 Driveway construction.
13.12.140 Construction in paved roads.
13.12.150 Construction in gravel roads.

13.12.010 Applicability. This chapter pertains to earthwork within the public rights-of-way particularly related to utilities, driveways and roadside drainage. (Ord. 85-25 Art. 20.1.1, 1985).

13.12.020 New materials required. All materials must be new. (Ord. 85-25 Art. 20.1.2(a), 1985).

13.12.030 Geotextile fabric. Geotextile fabric; Mirafi 500 or 600X, as directed by the engineer, (manufactured by Celanese) or equal:
a. Mirafi 500X Fabric Description and Properties. Mirafi 500X fabric is woven from monofilaments of polypropysoil chemicals and acids and alkalies within a pH range of 3 to 12. As with most synthetic fabrics, prolonged exposure to direct sunlight will cause deterioration.

Grab tensile strength	200 lb.
Mullen burst strength	375 psi.
Trapezoid tear strength	100 lb.
Modulus (load at 10% elongation)	110 lb.
Equivalent opening size	70-100 sieve
Water permeability coefficient (k)	0.005cm/sec.
Roll weight	175 lb.
Roll length	432' and 309'
Roll width	12'6" and 17'6"

b. Mirafi 600X Fabric Description and Properties. Mirafi 600X is a heavy-duty railroad track-bed fabric woven from monofilaments of stabilized polypropylene. Fabric edges are mechanically sealed to increase edge strength and eliminate raveling. Mirafi 600X is resistant to a wide range of chemicals and to ultraviolet degradation. The fabric is nonbiodegradable.

Grab tensile strength	300 lb.
Mullen burst strength	600 psi.
Trapezoid tear	120 lb.

strength	
Abrasion resistance	130 lb.
Puncture resistance	135 lb.
Modulus (load at 10% elongation)	150 lb.
Water permeability coefficient (k)	0.01 cm/sec.
Roll weight	210 lb.
Roll length	360'
Roll width	12'6"

(Ord. 85-25 Art. 20.1.2(b), 1985).

13.12.040 Frost-protection insulation. For frost-protection insulation, use only rigid board Styrofoam insulation material, Dow H.I. 40 or equal.
a. Generally, one inch insulation thickness equals one foot earth cover.
b. Styrofoam physical properties:

Density	2pcf. Minimum
Compressive strength (ASTM D1621-59T)	35 psi minimum at 5% deflection or yield
Water absorption(ASTM C177-53)	0.125% by vol. max.
Thermal conductivity (ASTM C177-63)	Max. 0.23 BTU/hr.ft. 2 F./in. Thickness

c. Patent royalties of $0.005 per board foot must be paid to Dow Chemical company for any insulation used for this purpose if not manufactured by Dow. "Royals" are required because of a Dow chemical company patent on the specific product "Styrofoam" physical properties as originated and marketed for use specifically as a frost-protection barrier. The burden of proof and payment rest with the contractor or supplier that chooses to do otherwise. The City is concerned only that proper insulation materials are used. "Dow Styrofoam" specifically or an "equal" in performance. In some cases "Dow Styrofoam" may be specifically called out in the project specifications. If so, the City would not allow an equal. (Ord. 85-25 Art. 20.1.2.(c), 1985).

13.12.050 Culvert materials. a. For culvert use only corrugated pipe; corrugations may be either annular or helical. The following types, sizes, and materials are approved:
1. Driveway culverts: Minimum eighteen inches in diameter, type (CMP) corrugated metal pipe galvanized steel conforming to ASSHTO --36 or M-218 and ASTM-A-444, or heavy gauge aluminum corrugated pipe conforming to AASHTO --196 and M-197, or type (CMP) corrugated metal pipe galvanized steel conforming to AASHTO --36 or M-218 and ASTM-A-444.
2. Cross culverts: Minimum twenty-four inches in diameter, type (CMP) corrugated metal pipe galvanized steel conforming to AASHTO --36 or M-218 and ASTM-A-444.
b. Culvert and sections will be required for all new road construction projects and in some cases may be required for existing road construction projects where drainage systems have been improved or upgraded as determined by the Public Works Inspector. (Ord. 85-25 Art. 20.1.2 (d), 1985)

13.12.060 Bedding materials. For bedding, use only granular classified bedding material as follows: two-inch minus, uniform gradation, clean gravel, three to ten (10) percent passing no. 200 size sieve. (Ord. 85-25 Art. 20.1.2 (e), 1985).

13.12.070 Backfill materials. For backfill, use only granular classified backfill materials as follows:
a. For subgrades and up to within two feet use two-inch minus, uniform gradation, clean gravel, three to ten percent passing no. 200 size sieve.
b. For the base course (generally the top two feet), use or replace as follows:
1. Salvage without contamination and replace the original materials; or

2. Replace with equal or better base course and cap materials as determined by the Public Works Inspector;
3. Generally base course material should be two-inch minus, uniform gradation, clean gravel, zero to six percent passing No. 200 size sieve. (Ord. 85-25 Art. 20.1.2 (f), 1985).

13.12.080 Clearing and grubbing generally. a. General. This section consists of performing removal of all vegetation, brush, trees, tree stumps, roots, and root mat to an approved disposal site and the preservation from injury or defacement of all objects designated to remain. Limits of clearing and grubbing shall be in conformance with right-of-way easements, and stipulations.
b. Roadways and Utilities. The contractor shall do all clearing and grubbing necessary in the construction of roadways and utilities; trees, brush and root mat removed in the clearing operations shall be hauled to a disposal site.
c. Inspection. All work must be inspected by the Public Works Inspector before acceptance. (Ord. 85-25 Art. 20.1.3 (a, b, c), 1985).

13.12.090 Clearing. a. General. This section shall consist of clearing the areas of all trees, brush, and other vegetation and disposing of the cleared spoils.
b. Construction. Within the areas staked, all trees, brush, and logs shall be removed and hauled away. All stumps shall be cut off a minimum of four inches above the ground. Chipping will be an acceptable alternate to clearing and hauling away of spoils.
c. Inspection. All work must be inspected by the Public Works Inspector before acceptance. (Ord. 85-25 Art. 20.1.4, 1985).

13.12.100 Restoration. a. Restoration. In certain cases, topsoil and/or seeding may be required as determined by the Public Works Inspector.
b. Inspection. All work must be inspected by the Public Works Inspector before acceptance. (Ord. 85-25 Art. 20.1.5, 1985).

13.12.110 Bedding of utilities and service connections. This section is limited to utility construction work, in the public rights-of-way, particularly installations made in the road section (prism).
a. Water service lines, sewer service lines and components, cross culverts and certain other utilities as determined by the Public Works Inspector shall be bedded and compacted to minimum ninety percent of maximum material density. (In some cases, suitable bedding material may be encountered in the excavation and imported bedding materials may not be required, as determined by the Public Works Inspector).
b. Bedding shall be placed in lifts of eight inches to twelve inches and shall cover the utility component from six inches to twelve inches.
c. All work must be inspected by the Public works Inspector before acceptance. (Ord. 85-25 Art. 20.1.6, 1985).

13.12.120 Backfill of utilities and service connections. This section is limited to utility construction work in the public rights-of-way, particularly installations made in the road section (prism).
a. Utility installations, cross culverts and certain other installations as determined by the Public Works Inspector shall be backfilled and compacted to minimum ninety-five percent of maximum material density in the top two feet and minimum ninety percent of maximum material density below two feet.
b. Backfill shall be placed in approximately horizontal layers in lifts of eight inches to twelve inches. Each layer to be thoroughly compacted.
c. Placement shall be done in such a manner and at such condition to avoid mixing of the classified materials.
d. Road shoulders shall be restored and generally matched at a 2:1 slope.
e. All work must be inspected by the Public Works Inspector before acceptance. (Ord. 85-25 Art. 20.1.7, 1985).

13.12.130 Driveway construction. This section is limited to the construction of driveways with or without culverts within the public rights-of-way.
a. Driveway construction will not begin until an initial inspection of the site is completed by the Public Works Inspector and the permit applicant or contractor.
b. A copy of the permit must be on the construction site.
c. The Public Works Inspector will determine the required culvert diameter and if a culvert is required at the time of initial inspection. In some cases, where a culvert is not initially required, the applicant may be required to install a culvert later if conditions warrant, as determined by the Public Works Inspector.
d. Driveway culverts shall be:
1. Eighteen inches minimum diameter; and
2. Twenty feet long minimum and maximum thirty-five feet long. Special conditions requiring longer culvert lengths

will be subject to the approval of the Public Works Director.
e. Culvert end sections shall be required as determined by the Public Works Inspector. All new development projects within the City will require end sections.
f. Driveway width (traveled way), minimum ten feet, maximum twenty feet.
g. The radius of a driveway may not exceed the distance from the property line to the road surface.
h. The street approach may not be less than twelve feet wide as measured at the street sideline (shoulder).
I. The driveway shoulders and backfill slopes must not exceed beyond the culvert length. Generally the driveway side slopes shall be constructed at a 2:1 ratio.
j. The driveway shall be constructed on a minus three percent grade from the road shoulder to the property wherever possible or as determined by the Public works Inspector.
k. Driveway ditches shall be constructed in such a manner that no scour will occur to the road ditch.
l. A driveway must not be constructed within forty-five feet of any road crossing or intersection unless prohibited due to the lot's size; in which case it shall be placed as far as possible from the intersection or road crossing as approved by the Public Works Inspector.
m. Culvert bedding material must not exceed two inches in diameter.
n. Material in the top two feet of the driveway from the road to the property line shall match the existing road surface but in no case shall exceed two inches in diameter.
o. All backfill material must be compacted in lifts of eight to twelve inches. Minimum compaction is ninety percent of maximum material density.
p. Driveways constructed on to paved roads must be surfaced with pavement (asphalt concrete) from paved road surface to property line. However, where a sidewalk or curb exists, it shall be replaced in a manner satisfactory to the inspector.
q. A minimum clearance between the proposed finished driveway grade and the lowest aerial utility conductor must be eighteen feet in accordance with the requirements of the National Electrical Safety Code (Section 23.)
r. The public rights-of-way, sidewalk, curb and gutter, and drainage must be restored to its original condition before any work can be accepted.
s. All driveways must be maintained by the owner in accordance with these standards.
t. The Public Works Inspector must be notified twenty-four hours in advance of any inspection requirements.
u. After the driveway is completed, the Public Works Inspector will contact the applicant or the contractor and specify necessary corrections or improvements.
v. Corrections not made in a timely fashion, as determined by the Public Works Director, will be cause for the driveway to be removed by the City at the expense of the contractor. (Ord. 85-25 Art. 20.1.8, 1985).

13.12.140 Construction in paved roads. This section pertains to utility construction work in the public rights-of-way, particularly work to be done in the road section (prism).
a. Utility crossings under paved roads must be bored and cased or driven and cased.
b. Open cut excavations are limited to water and/or sewer service hookup and to work outside the paved portions as may be required within the right-of-way alongside the road (i.e., back slopes and ditch line).
c. Open-cut excavations across paved roads may be considered only if:
1. Boring and diving methods were attempted and proven unsuccessful because of existing road conditions or because of existing utility locations; and
2. That the preventing conditions would impair the property installation of the required casing if bored or driven; and
3, Contractor obtains approval from the Public Works Director.
d. Some electrical or communication utility cable crossings may be allowed without casings if:
1. Proposed method has proven to be satisfactory by the Public Works Department; and
2. Contractor obtains approval from the Public Works Inspector.
e. All materials and workmanship mus comply with City ordinances and standard specifications.
f. Existing fabric which has been cut or removed must be replaced with material as defined in this section. All joinings must be overlapped by at least two feet.
g. All pavement must be replaced in a manner acceptable to the Public Works Inspector and in compliance with Chapter 13.20 of this title. (Ord. 85-25 Art. 20.1.9, 1985).

13.12.150 Construction in gravel roads. a. Open cut excavations, bored and cased, or driven and cased utility road crossing methods are approved.
b. Open-cut excavations for utility service hook up installations in the gravel road and right-of-way (R.O.W.) are approved.
c. Other utility work outside the roadway and shoulder as may be required within the R.O.W. alongside the road (i.e., within back slopes and ditch line) may also be approved depending upon permit application, review and approval by the Public Works Inspector.

d. Some electrical or communication utility cable crossings may be allowed without casings if:
1. Proposed method has proven to be satisfactory by the Public Works Department; and
2. Contractor obtains approval from the Public Works Inspector.
e. All materials and workmanship must comply to City ordinances and standard specifications.
f. Existing fabric which has been cut or removed must be replaced with fabric as defined in this section. All joinings must be overlapped by at least two feet.
g. The Public Works Inspector may require installation of geotextile fabric even in cases where no fabric previously existed in the roadway prism. Installation shall conform to manufacturer's recommendations and the fabric shall be placed according to the direction of the Public works Inspector. (Ord. 85-25 Art. 20.1.10, 1985)

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