



# City of Kingman

## Development Services – Building Department

### Grading Excavation and Earthwork Construction Policy

[Based on 2012 IBC Chpts 18, 33 & Appendix J]

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### **FAQ - Do I need a Grading Permit ?**

1. Grading &/or Filling a Residential or Commercial Subdivision
  - Yes [J103.1]
2. Grading &/or Filling a Residential Lot
  - Yes if quantity of earth moved exceeds 185cy [J101.1]
  - Yes if more than one lot is involved [J101.1]
  - No otherwise
3. Grading &/or Filling a Commercial Lot [Lot zoned other than R-R & R-1]
  - Yes if quantity of earth moved exceeds 185cy [J101.1]
  - Yes if more than one lot is involved [J101.1]
  - No otherwise
4. Grading in conjunction with an Issued Building permit approved plan
  - No additional grading permit is required [J103.2 exp.#2]
5. Grading prior to obtaining a Building Permit
  - See 1 thru 3 above
6. Grading on a Lot where the use will never have a building
  - See J103.2 If not exempted a Grading permit is required

### **FAQ - Do I need a Soils Report ?**

1. Grading a Residential or Commercial Subdivision
  - Yes – no exceptions
2. Grading &/or Filing a Residential Lot
  - No – if:
    - meets 1803.5 exception 1 or 2, and
    - the building & site meet criteria in 1802.2 [see J104.3 exp.]
  - Otherwise - Yes
3. Grading Commercial Lot w/ NO specific Building plan
  - Yes
  - Otherwise Check with the Building Official [see J104.3 exp.]
4. Grading a Commercial Lot w/ an Exempt Building
  - No – if:
    - meets 1803.5 exception 1 or 2, and
    - the building & site meet criteria in 1802.2 [see J104.3 exp.]
  - Otherwise - Yes [see J104.3]
5. Grading a Commercial Lot w/ a Non-Exempt Building
  - Yes [see J104.3]

6. Building on a previously Graded lot with less than 1' of old & new fill
  - No - if the building & site meet criteria in 1802.2 [see J104.3 exp.]
  - Otherwise - Yes [see J104.3]
7. Grading on a Lot where the use will never have a building
  - Check with the Building Official [see J104.3 exp.]

### **FAQ - Do I need Grading Special Inspection ?**

Whether or not a Grading Permit is required:

1. All Grading that requires a soils report
  - Yes - shall have Special Inspection per the soils report
2. All fills > 12" and < 48" in depth
  - Yes - shall have Special Inspection per the soils report, or
  - Have compaction tests etc. per 1803.5 exc 1 or 2 [see #1 above]
3. All fills > 48"
  - Yes - shall have Special Inspection per the soils report

### **FAQ - Do I have to build my foundation pad pursuant the soils report?**

1. If the soils report is required – Yes.

# City of Kingman - Grading Excavation and Earthwork construction policy

## Geotechnical Investigations: Section 1803

**1803.2 Investigations required.** Geotechnical investigations shall be conducted in accordance with Sections 1803.3 through 1803.5. Geotechnical reports shall be prepared by a registered design professional. Recommendations included in the report and approved by the Building Official shall be incorporated in the construction documents. Geotechnical reports shall be required for all projects that require new foundations.

Exception: At the option of the Building Official, the following projects may be exempted from submitting a geotechnical report:

1. Single story commercial
  - Equal to or less than 3000 square feet and
  - Equal to or less than 20 occupants and
  - Site Class "D" is accepted assumption and
  - Design soil bearing pressure  $\leq 1,500$  psf is required.
2. An approved subdivision pad certification is presented and approved.
3. Habitable remodels or additions to a dwelling unit
  - a. Site Class "D" is accepted assumption and
  - b. Design soil bearing pressure  $\leq 1,500$  psf is required.
4. Storage, garage, agricultural and similar use buildings associated with a dwelling unit
  - a. Site Class "D" is accepted assumption and
  - b. Design soil bearing pressure  $\leq 1,500$  psf is required.
5. All Fences.
6. Mobile homes, trailers, factory built modular buildings and pre-engineered carports.
7. Signs less than 50 feet in height.
8. The **building official** shall be permitted to waive the requirement for a geotechnical investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1803.5.1 through 1803.5.6 and Sections 1803.5.10 and 1803.5.1 1.

**1803.3 Basis of investigation.** Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

**1803.3.1 Scope of investigation.** The scope of the geotechnical investigation including the number and types of borings or soundings, the equipment used to drill or sample, the in-situ testing equipment and the laboratory testing program shall be determined by a **registered design professional and 1803.3.2.**

**1803.3.2 Minimum exploration requirements:** The minimum exploration requirements are as follows:

1. For areas less than or equal to one acre, a minimum of two explorations.
2. For areas greater than one acre, but less than five acres, a minimum of one exploration for the first acre and one for each additional two acres, or portion thereof.
3. For areas greater than or equal to five acres, but less than twenty acres, a minimum of three explorations plus one additional exploration for each three acres above five.
4. For areas greater than or equal to twenty acres, a minimum of eight explorations plus one additional exploration for each five acres or fraction thereof above twenty.
5. Building additions of less than 2,000 square feet shall require a minimum of one exploration within the foot print of the addition...
6. For signs, towers, and monopoles whose locations are known and only that area of the site is to be developed, a minimum of one exploration at the location is required.

7. The minimum depth of the exploration shall be ten feet into undisturbed soils. Exploration depth shall be increased a necessary to evaluate the suitability of the material within the foundation's depth of influence as determined by the registered design professional. Should refusal be encountered the exploration can be terminated. However, at least three-fourths of the required explorations shall be to the minimum depth. The geotechnical report shall clearly state the criteria used to determine that refusal was met. When information regarding the final grades is made available, the registered design professional shall determine if the explorations originally documented in the geotechnical report meet the depth requirements.

**1803.4 Qualified representative.** The investigation procedure and apparatus shall be in accordance with generally accepted engineering practice. The **registered design professional** shall have a fully qualified representative on site during all boring or sampling operations.

**1803.5 Investigated conditions.** Geotechnical investigations shall be conducted as indicated in Sections 1803.5.1 through 1803.5.12.

**1803.5.1 Classification.** Soil materials shall be classified in accordance with ASTM D 2487.

**1803.5.2 Questionable soil.** Where the classification, strength or compressibility of the soil is in doubt or where a load-bearing value superior to that specified in this code is claimed, the **building official** shall be permitted to require that a geotechnical investigation be conducted.

**1803.5.3 Expansive soils.** In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist.

Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D 4318.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75  $\mu\text{m}$ ), determined in accordance with ASTM D 422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.
4. Expansion index greater than 20, determined in accordance with ASTM D 4829.

**1803.6 Reporting.** The soil classification and design load-bearing capacity shall be shown on the construction document. Where required by the building official, a written report of the investigation shall be submitted that shall include, but need not be limited to, the following information:

1. A plot showing the location of test borings and/or excavations. The plot shall be dimensioned and shall show the approximate location of all existing structures.
2. A complete record of the soil samples.
3. A record of the soil profile.
4. Depth of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement, and varying soil strength; and the effects of adjacent loads. Provide provisions to mitigate the effects of collapsible soils, soluble soils, uncontrolled fill, chemical heave, and corrosive soils.
6. Expected total and differential settlement.
7. Pile and pier foundation information in accordance with section 1808.2.2.
8. Special design and construction provisions for footings or foundations founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with section 1803.5.

10. Soil classification by the Unified Soil Classification System (ASTM D 2487). Backup data on tests performed in the soil classification shall be included.
11. Address, if applicable, the possible impacts on adjoining properties and mitigating measures to be undertaken.
12. Suitability of onsite soils for use as fill material.
13. Provide grading requirements for onsite and import soils (where applicable) including, but not limited to, swell, solubility, and sulfates.
14. Geotechnical design considerations for drainage structures, as applicable.
15. Trenching or other special procedures for determining fault and fissure(s) locations. The potential for differential movement across a fault and fissuring should be evaluated.
16. Procedures for mitigation for geological hazards.
17. Erosion control requirements, as applicable, see J101.
18. Anticipated structural loads and type of proposed structure.
19. Site class per section 1615.1.1 and Table 1615.1.1.

## **SECTION 1804** **EXCAVATION, GRADING AND FILL**

**1804.1 Excavation near foundations.** Excavation for any purpose shall not remove lateral support from any foundation without first underpinning or protecting the foundation against settlement or lateral translation.

**1804.2 Placement of backfill.** The excavation outside the foundation shall be backfilled with soil that is free of organic material, construction debris, cobbles and boulders or with a controlled low-strength material (CLSM). The backfill shall be placed in lifts and compacted in a manner that does not damage the foundation or the waterproofing or damp proofing material.

**Exception:** CLSM need not be compacted.

**1804.3 Site grading.** The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 20 units horizontal (5-percent slope) for a minimum distance of 10 feet (3048 mm) measured perpendicular to the face of the wall. If physical obstructions or lot lines prohibit 10 feet (3048 mm) of horizontal distance, a 5-percent slope shall be provided to an approved alternative method of diverting water away from the foundation. Swales used for this purpose shall be sloped a minimum of 2 percent where located within 10 feet (3048mm) of the building foundation. Impervious surfaces within 10 feet (3048 mm) of the building foundation shall be sloped a minimum of 2 percent away from the building.

**Exception:** Where climatic or soil conditions warrant, the slope of the ground away from the building foundation shall be permitted to be reduced to not less than one unit vertical in 48 units horizontal (2-percent slope). The procedure used to establish the final ground level adjacent to the foundation shall account for additional settlement of the backfill.

**1804.4 Grading and fill in flood hazard areas.** In flood hazard areas established in Section 1612.3, grading and/or fill shall not be approved:

1. Unless such fill is placed, compacted and sloped to minimize shifting, slumping and erosion during the rise and fall of flood water and, as applicable, wave action.
2. In floodways, unless it has been demonstrated through hydrologic and hydraulic analyses performed by a registered design professional in accordance with standard engineering practice that the proposed grading or fill, or both, will not result in any increase in flood levels during the occurrence of the design flood.
3. In flood hazard areas subject to high-velocity wave action, unless such fill is conducted and/or placed to avoid diversion of water and waves toward any building or structure.
4. Where design flood elevations are specified but floodways have not been designated, unless it has been demonstrated that the cumulative effect of the proposed flood hazard area encroachment, when combined with all other existing and anticipated flood hazard area encroachment, will not increase the design flood elevation more than 1 foot (305 mm) at any point.

**1804.5 Compacted fill material.** Where shallow foundations will bear on compacted fill material, the compacted fill shall comply with the provisions of an *approved* geotechnical report, as set forth in Section 1803.

**Exceptions:**

1. Compacted fill material 12 inches (305 mm) in depth or less need not comply with an *approved* report, provided the in-place dry density is not less than 90 percent of the maximum dry density at optimum moisture content determined in accordance with ASTM D 1557. The compaction shall be verified by *special inspection* in accordance with Section 1705.6.
2. *Fill material less than 48 inches in depth on a single building lot shall:*
  - i. *Be free of any organic material and construction debris and any material over 12 inches in diameter*
  - ii. *Have a density report, with density readings at one foot vertical intervals from at least two locations per building pad.*
  - iii. *Be compacted to a minimum of 90 percent Modified Proctor in accordance with ASTM D1557*
  - iv. *Be graded or otherwise improved to drain to an approved point of discharge.*
  - v. *Have property line protection in the form of retaining walls as required by the Building Official.*

**1804.6 Controlled low-strength material (CLSM).** Where shallow foundations will bear on controlled low-strength material (CLSM), the CLSM shall comply with the provisions of an *approved* geotechnical report, as set forth in Section 1803.

## **Residential Grading and Drainage Requirements COK 5.8**

Lots or parcels developed for single family or duplex residential use shall be graded or otherwise improved to drain to an approved point of discharge, such as the street gutter, drainage culver, drainage channel, drywell, retention basin or other approved method. Any proposed drainage across private property boundaries shall be by a specific recorded easement and a permanently built, erosion proof, water-way that drains to an approved location. All points of discharge other than the street gutter shall be designed according to the “Kingman Area Master Drainage Plan”.

### **Residential Grading/Drainage Plan**

Applications for residential permits shall be accompanied by a Grading/Drainage Plan that includes:

1. Drawings to scale minimum 20:1.
2. Existing grade contours at one foot vertical elevations for entire lot plus 15 foot beyond the lot.
3. Finished grade contours for entire lot
4. Elevation and location of the point of drainage discharge.
5. Elevations and locations of the flow of drainage away from the structures and to the point of discharge.
6. Finished floor elevation, set at least plus 12 inches + 2% above the point of discharge, for all structures, or the water surface for swimming pools.
7. Location of any private sewage systems.

## **Appendix Chapter J: GRADING** **J101 GENERAL**

**J101.1 Scope.** The provisions of this appendix apply to grading, excavation and earthwork construction, including cuts, fills and embankments *including hillside developments, new and existing subdivisions, moving more than 185 yards of dirt and all work on more than one individual lot.* Where conflicts occur between the technical requirements of this chapter and the geotechnical report, the geotechnical report shall govern.

**J101.2 Flood hazard areas.** The provisions of this chapter shall not apply to grading, excavation and earthwork construction, including fills and embankments, in floodways within flood hazard areas established in Section 1612.3 unless it has been

demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed work will not result in any increase in the level of the base flood.

## **J102 DEFINITIONS**

**J102.1 Definitions.** For the purposes of this appendix chapter, the terms, phrases and words listed in this section and their derivatives shall have the indicated meanings.

**BENCH.** A relatively level step excavated into earth material on which fills is to be placed.

**BUILDING PAD.** *The soil, cut or fill site, outlined by the area of the footprint of the building plus a minimum of 5 additional feet (1529 mm) to the exterior. This includes any type of foundation system for the structure.*

**CALICHE.** *A generally hard, rock-like crust of highly carbonated soil material formed at or near the ground surface. This material can exist in thin laminations or can be several feet in thickness. Materials classified as medium hard, hard, or very hard caliche shall be treated as "rock."*

**CHEMICAL ANALYSIS.** *The use of chemical methods in soils analysis to determine the specific content of soluble salt.*

**COMPACTION REPORT.** *A report which provides the in place density of soil.*

**COMPACTION.** The densification of a fill by mechanical means.

**CUT.** See Excavation.

**DOWN DRAIN.** A device for collecting water from a swale or ditch located on or above a slope, and safely delivering it to an approved drainage facility.

**EROSION.** The wearing away of the ground surface as a result of the movement of wind, water or ice.

**EXCAVATION.** The removal of earth material by artificial means also referred to as a cut.

**FAULT.** *A fracture or zone of fracturing in geologic materials (soil or rock) along which there has been displacement of the sides relative to one another parallel to the fracture.*

**FAULT, HOLOCENE ACTIVE.** *A fault with recognized activity within Holocene time (within the past 11,000 years).*

**FAULT, QUATERNARY ACTIVE.** *A fault with recognized activity within Quaternary time (within the past 1.6 million years).*

**FAULT INACTIVE.** *A fault without recognized activity within Quaternary time (within the past 1.6 million years).*

**FILL.** Deposition of earth materials by artificial means.

**GEOLOGICAL ENGINEER.** *A professional engineer registered in the State of Arizona.*

**GEOTECHNICAL REPORT (SOILS REPORT).** *Data and engineering recommendations resulting from site exploration which evaluates the soil conditions and general site characteristics and suitability of the site for the proposed construction. A registered design professional shall prepare the report.*

**GRADE.** *The vertical location of the ground surface.*

**GRADE, EXISTING.** *The grade prior to grading.*

**GRADE, FINISHED.** *The final grade of the site that conforms to the approved plan.*

**GRADING.** *An excavation or fill or combination thereof.*

**GRADING PERMIT.** *The permit required by City of Kingman UDC 5.24 D. (5.), 6.220 C., 9.26 (1) a. and includes all building or grading permits required for grading by the International Building Code and other standards as adopted by the Building Official. If there is a conflict as to which permit or permit process applies to a specific case, the procedures that are most stringent apply.*

**HILLSIDE DEVELOPMENT.** A Hillside Development is a parcel of land with a fifteen (15) percent or greater Average Cross Slope (ACS) or any parcel of land that has a twenty five (25) percent slope in an area that includes a vertical drop of ten (10) feet or more and runs parallel to one of the contour lines for at least fifty (50) feet.

**KEY.** A compacted fill placed in a trench excavated in earth material beneath the toe of a slope.

**PAD CERTIFICATION REPORT.** An interim grading report stamped and signed by a registered design professional certifying that the building pad was constructed in conformance with the recommendations set forth in the geotechnical report of record.

**PAD RECERTIFICATION REPORT.** A report stamped and signed by a registered design professional certifying that the building pad currently is in conformance with the recommendations set forth in the geotechnical report of record. This report contains explicit information and data that verifies compliance with the geotechnical report of record including any approved supplements or addendums.

**REFUSAL.** Refusal while advancing an exploration is recognized as a Standard Penetration blow count, as defined by ASTM 1586-99, exceeding 100 blows per full lineal foot.

**REGISTERED DESIGN PROFESSIONAL:** An Architect or Engineer Registered in the State of Arizona.

**SLOPE.** An inclined surface, the inclination of which is expressed as a ratio of horizontal distance to vertical distance.

**SPECIAL GEOTECHNICAL CONSIDERATION AREA.** (reserved)

**TERRACE.** A relatively level step constructed in the face of a graded slope for drainage and maintenance purposes.

## **J103 PERMITS REQUIRED**

**J103.1 Permits required.** Except as exempted in Section J103.2, no grading shall be performed without first having obtained a permit therefore from the Building Official. A grading permit does not include the construction of retaining walls or other structures.

**J103.2 Exemptions.** A grading permit shall not be required for the following:

1. Grading in an isolated, self-contained area, provided there is no danger to the public, and that such grading will not adversely affect adjoining properties.
2. Excavation for construction of a structure permitted under this code.
3. Cemetery graves.
4. Refuse disposal sites controlled by other regulations.
5. Excavations for wells, or trenches for utilities.
6. Mining, quarrying, excavating, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulations, provided such operations do not affect the lateral support of, or significantly increase stresses in, soil on adjoining properties.
7. Exploratory excavations performed under the direction of a registered design professional for the sole purpose of preparing a geotechnical report.

Exemption from the permit requirements of this appendix shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

**J103.3 Hazards.** Whenever the building official determines that any existing excavation or embankment or fill on private property has become a hazard to life and limb, or endangers property, or adversely affects the safety, use or stability of a public way or drainage channel., the owner of the property upon which the excavation or fill is located, or other person or agent in control of said property, upon receipt of notice in writing from the Building Official, shall within the period specified therein repair or eliminate such excavation or embankment to eliminate the hazard and to be in conformance with the requirements of this code.

## **J104 PERMIT APPLICATION AND SUBMITTALS**

**J104.2 Grading plan requirements.** All grading plans shall be prepared, stamped, and signed by a registered design professional. The following items must be included on all grading plan submittals:

1. Project name, general vicinity of the proposed site, name and address of the owner and the plans preparer.

2. *Property limits and accurate contours of existing ground and details of terrain and area drainage.*
3. *Limiting dimensions, elevations or finish contours to be achieved by the grading, proposed drainage channels and related construction.*
4. *Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams and other protective devices to be constructed with, or as a part of, the proposed work together with a map showing the drainage area and the estimated runoff of the area served by any drains.*
5. *Location of all existing building or structures on the property where the work is to be performed and the location of existing buildings or structures within 50 feet of the property boundary including their finished floor elevations.*
6. *Recommendations included in the geotechnical report shall be incorporated in the grading plans or specifications. The recommendations may be included by reference.*
7. *Dates of the geotechnical report together with the names, addresses, and phone numbers of the firms or individuals who prepared the report.*
8. *Locations of other existing topographic features either natural or man-made such as streets, drainage structures, pavements, fence walls, etc*
9. *All private and/or dedicated easements.*
10. *Details and cross sections at property lines, fences, retaining walls, berms, wall openings, etc.*
11. *Details and cross sections of typical fill slopes and cut slopes*
12. *Typical details of fill-over-natural slopes and fill-over-cut slopes where fill is to be placed on natural or cut slopes steeper than 5H:1V*
13. *Elevation datum and benchmarks*
14. *Existing contours at least 50 feet beyond the property lines*
15. *Proposed finish contours or spot elevations at the property corners and at swale flow lines*
16. *Elevations of curbs or centerlines of roads or streets*
17. *Earthwork quantities in cubic yards and scope of work including estimated quantities of excavation and fill.*
18. *Minimum finished building pad elevations*
19. *Setback dimensions of cut and fill sites from site boundaries(J108.1)*
20. *Lots and blocks, all lots fully dimensioned.*
21. *Buildable area within individual lots based on locations relative to toe and heel of slopes in accordance with IBC 1805.3. The placement of buildings and structures on and or adjacent to slopes steeper than 3H:1V (33.3% slope) shall be in accordance with IBC 1805.3*
22. *Registered design professional original seal (wet seal), signature and date or a City of Kingman Engineering Department stamp and signature stating, "This is a true and exact copy of the original document on file in this office."*

**J104.3 Geotechnical report.** *A report prepared by a registered design professional which shall identify the nature and distribution of existing soils, conclusions and recommendations for grading procedures, soil design criteria for any structures or embankments required to accomplish the proposed grading, and where necessary, slope stability studies, and recommendations and conclusions regarding site geology. (See Chapter 18)*

Exception: A *Geotechnical* report is not required where the building official determines that the nature of the work applied for is such that a report is not necessary.

**J104.4 Liquefaction study.** *For sites with mapped maximum considered earthquake spectral response accelerations at short period (Ss) greater than 0.5g as determined by Section 1615, a study of the liquefaction potential of the site shall be provided, and the recommendations incorporated in the plans.*

**Exception:** A liquefaction study is not required where the building official determines from established local data that the liquefaction potential is low.

## **J105 INSPECTIONS.**

**J105.1 General.** *Inspection of grading operations shall comply with the provisions of this section. The permittee shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this code. The permittee shall engage an approved agency, if required by the Building Official.*

**J105.1.1 Completion of work and final reports.** *Report submittal shall be in compliance with section 1704.1.2.*

**J105.1.1.1 Final Grading report.** *Upon completion of pad grading (or foundation construction) and prior to a footing or foundation inspection, a Final Grading report shall be provided by an approved agency. Grading (or foundation construction) shall be observed and tested by an approved agency. The approved agency shall prepare the report, signed by a registered design professional certifying that the grading and earthwork are complete and substantially comply with the requirements of the geotechnical report of record including any approved supplements or addenda. At the option of the Building Official, a Pad Certification report submitted in*

accordance with SECTION J105.1.1.2 may be accepted as an interim report prior to a footing or foundation inspection. A Final Grading report will then be required prior to receiving a Final Inspection.

The Final Grading Report itself will contain all applicable test data and analysis of the data. Specific project information is also required if there were any changes to the geotechnical report of record or unusual circumstances encountered during grading. The report shall also include the following information:

1. Compaction test results, requirements, locations, depth of backfill at test locations and names of technicians conducting the tests
2. Moisture Density values and curves that include classifications for all soils used in the grading operation
3. Description of structure or pad including the proposed use
4. Grading plan showing approximate locations of tests, dates and depths of over-excavation observations, original contours and finish pad elevations.
5. Swell and solubility test requirements and results. This information shall be provided if required by the geotechnical report of record, elsewhere in the code, or if imported soils were utilized
6. Type of foundation system applicable to work being certified (i.e. spread footing, strip footings, combination footings, drilled shafts, etc.)
7. Import material used, source of import, and tests indicating compliance with the geotechnical report of record recommendations, and classification in relation to IBC Table 1904.3
8. A statement describing the process of pad grading. Where applicable, this shall include, but not be limited to the minimum depth of over-excavation, blending operations, the use of import soils, nested aggregate, organics encountered, and removal of unsuitable soils
9. The preceding requirements shall be presented for each pad or structure being certified

The Final Grading report remains valid for a maximum of six months after the completion of grading. The six month period begins at the first test date of the final test of the final lift of the structural pad. Once expired, a Pad Recertification report is required.

**J105.1.1.2 Pad Certification report.** This letter/report is used as an interim document until a Final Grading report is completed (i.e., a Final Grading report for the entire project or a particular phase(s) of a project). The approved agency shall prepare this report signed by a registered design professional and certifying that the grading and earthwork are complete and substantially comply with the requirements of the geotechnical report of record including any approved supplements or addenda. Specific project information is also required if there were any changes to the geotechnical report of record or unusual circumstances encountered during grading.

This report shall include the following information for each pad or structure:

1. The first test date of the final test of the final lift
2. Permit number and pad or structure description
3. Classification of foundation soils in relation to IBC Table 1904.3
4. Classification of foundation soil for expansive properties.
5. (future use)

**J105.1.1.3 Pad Recertification report.** This report is required when a Final Grading report or Pad Certification report has expired or if required by the Building Official. The approved agency shall prepare this report signed by a registered design professional certifying the current suitability of the pad(s). The condition of the pad(s) is discussed, tests performed and their results are presented and discussed, and any additional grading or reworking is discussed. The conclusions are stated and based upon the current condition of the pad(s) compared to completion at original grading and a statement that the current condition of the pad(s) substantially complies with the requirements of the geotechnical report of record including any approved supplements or addenda.

As a minimum, pad moisture data and standard sixty pounds per square foot swell test results, if applicable, are included in this report. The tests shall be conducted on a representative number of pads.

The report remains valid for no longer than six months after the latest test date. Once expired, the pad(s) recertification will require an evaluation by a registered design professional to confirm the applicability of current site conditions.

**J105.1.1.4 Finished Floor Elevation Certificate.** An Arizona Design Professional or Registered Land Surveyor shall certify the lowest habitable finished floor elevation to the elevation on the approved plans upon completion of the slab inspection and placement or the placement of the final construction form for the finished floor. All certifications required by the section shall be provided to and accepted by the Building Official prior to performance of any additional inspections. The minimum finished floor elevation shall comply with the approved plans and the allowable tolerance shall be minus (-) 0.09 feet to plus (+) 0.3 feet of the finished floor elevation detailed on the approved plans.

**J105.1.1.5 Drainage Compliance Report.** Upon completion of final grading, and prior to the final building inspection, a statement of compliance for drainage shall be provided by the registered design professional of record or the developer when approved by the building official.

This report shall state that site conditions at the time of final construction provide positive drainage in compliance with the approved drainage plan or the plot and grading plan.

When engineered drainage features, facilities, or structures are required by the approved plans, the registered design professional of record shall verify that installed and constructed elements are in compliance with the approved plans. This includes site detention, lot to lot drainage, and drainage conveyance devices.

**J105.1.1.6 Notification of Noncompliance.** If in the course of fulfilling their respective duties under this appendix, the registered design professional or the approved agency finds that the work is not being done in conformance with this appendix or the approved plans the discrepancies shall be immediately reported in writing to the contractor, the permittee, and to the Building Official.

**J105.2 Special Inspections.** The special inspection requirements of Section 1704 shall apply to work performed under a grading permit where required by the Building Official.

## **J106 EXCAVATIONS**

**J106.1 Maximum slope.** The slope of cut surfaces shall be no steeper than is safe for the intended use, and shall be no steeper than 2H: 1V (50% slope) unless the applicant furnishes a geotechnical report justifying a steeper slope.

**Exceptions:** 1. a cut surface may be at a slope of  $\geq 2.0$  horizontal to 1 vertical (67 percent) provided that all the following are met:

- 1.1. It is not intended to support structures or surcharges.
- 1.2. It is adequately protected against erosion.
- 1.3. It is no more than 8 feet (2438mm) in height.
- 1.4. It is approved by the building official.
2. A cut surface in bedrock shall be permitted to be at a slope of 1 horizontal to 1 vertical (100 percent).

**J106.2 Excess Excavation.** A disposal area must be designated prior to the issuance of a grading permit if off-site disposal of waste or excess excavation is anticipated. A grading permit and fill control may be required for the disposal area. Written permission from the owner of the designated disposal area shall be required.

## **J107 FILLS.**

**J107.1 General.** Fills shall conform to provision of this section. Fill slopes shall not be constructed on natural or cut slopes steeper than 2H: 1V (50% slope), unless otherwise recommended in the approved geotechnical report. The slope of fill surfaces shall be no steeper than is safe for the intended use. Fill slopes steeper than 2J:1V (50% slope) shall be justified by the approved geotechnical report.

**J107.2 Surface preparation.** The ground surface shall be prepared to receive fill by removing vegetation, topsoil and other unsuitable materials, and scarifying the ground to provide bond with the fill material.

**J107.3 Benching.** Where existing grade is at a slope steeper than 5J:1V (20%) and the depth of the fill exceeds 5 feet (1524 mm), benching shall be provided in accordance with Figure J0.7.3. A key shall be provided that is at least 10 feet (3048 mm) in width and two feet (610 mm) in depth, when the slope height exceed 20 feet. The maximum bench height shall be three feet.

**J107.4 Fill material.** Fill material shall not include organic, frozen or other deleterious materials. No rock or similar irreducible material greater than 12 inches (305 mm) in any dimension shall be included in fills.

**J107.5 Compaction.** All fill material shall be compacted to a minimum 90% of maximum density as determined by ASTM D1557, Modified Proctor, in loose lifts not exceeding 12 inches (305 mm) in depth, unless otherwise justified in the approved geotechnical report.

**J107.6 Maximum slope.** The slope of fill surfaces shall be no steeper than is safe for the intended use. Fill slopes steeper than 2 horizontal to 1 vertical (50 percent) shall be justified by soils reports or engineering data.

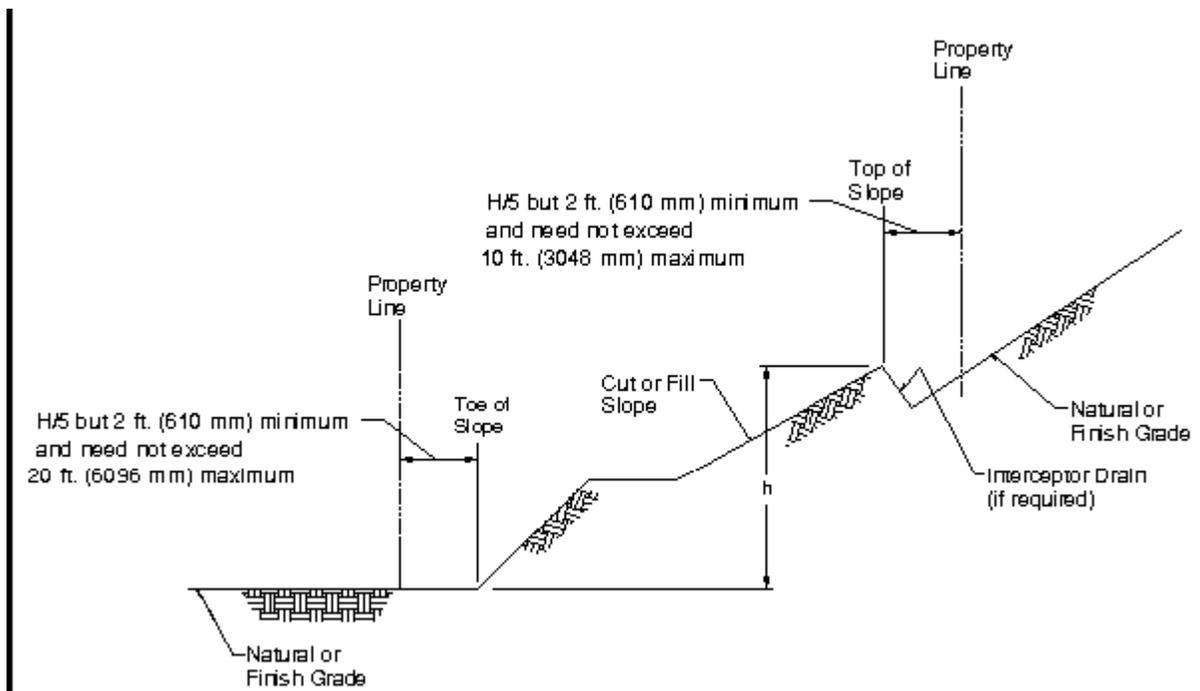
## **J108 SETBACKS.**

**J108.1 General.** Cut and fill slopes shall be set back from the property lines in accordance with this section. Setback dimensions shall be measured perpendicular to the property lines and shall be as shown in Figure J108.1, unless substantiating data is submitted justifying reduced setbacks.

**J108.2 Top of slope.** The setback at the top of a cut slope shall not be less than that shown in Figure J108.1, or than is required to accommodate any required interceptor drains, whichever is greater.

**J108.3 Slope protection.** Where required to protect adjacent properties at the toe of a slope from adverse effects of the grading, additional protection, approved by the Building Official, shall be included. Such protection may include, but shall not be limited to:

1. Setbacks greater than those required by Figure J108.1
2. Provisions for retaining walls or similar construction, *and this provision shall be shown on the plat.*
3. Erosion protection of the fill slopes
4. Provision for the control of surface waters



For SI: 1 foot = 304.8 mm

**FIGURE J108.1  
DRAINAGE DIMENSIONS**

## **J109 DRAINAGE AND TERRACING**

**J109.1 General.** Drainage facilities and terracing shall be provided in accordance with the requirements of the section.

**Exception:** Drainage facilities and terracing need not be provided where the ground slope is not steeper than 3H: 1V (33%).

**J109.2 Terraces.** Terraces at least 6 feet (1829 mm) in width shall be established at not more than 30 foot (9144 mm) vertical intervals on all cut or fill slopes to control surface drainage and debris. Suitable access shall be provided to allow for cleaning and maintenance.

Where more than two terraces are required, one terrace, located at approximately mid-height, shall be at least 12 feet (3658 mm) in width.

Swales or ditches shall be provided on terraces. They shall have a minimum gradient of 20H:1V (5%) and shall be paved with concrete not less than 3 inches (76 mm) in thickness, or with other materials suitable to the application. They shall have a minimum depth of 12 inches (305 mm) and a minimum width of 5 feet (1524mm).

A single run of swale or ditch shall not collect runoff from a tributary area exceeding 13,500 square feet (1256 m<sup>2</sup>)(projected) without discharging into a down drain.

**J109.3 Interceptor drains.** Interceptor drains shall be installed along the top of cut slopes receiving drainage from a tributary width greater than 40 feet, measured horizontally. They shall have a minimum depth of 1 foot (305 mm) and a minimum width of 3 feet (915 mm). The slope shall be approved by the Designated Official, but shall not be less than 50H: 1V (2%). The drain shall be paved with concrete not less than 3 inches (76 mm) in thickness, or by other materials suitable to the application. Discharge from the drain shall be accomplished in a manner to prevent erosion and shall be approved by the Building Official.

**J109.4 Drainage across property lines.** Drainage across property lines shall not exceed that which existed prior to grading. Excess or concentrated drainage shall be contained on site or directed to an approved drainage facility. Erosion of the ground in the area of discharge shall be prevented by installation of non-erosive down drains or other devices.

## **J1010 EROSION CONTROL.**

**J1010.1 General.** The faces of cut and fill slopes shall be prepared and maintained to control erosion. This control shall be permitted to consist of effective planting.

**Exception:** Erosion control measures need not be provided on cut slopes not subject to erosion due to the erosion-resistant character of the materials.

Erosion control for the slopes shall be installed as soon as practicable and prior to calling for final inspection.

**J1010.2 other devices.** Where necessary, check dams, cribbing, riprap or other devices or methods shall be employed to control erosion and provide safety.

### **J1010.3 Standards**

**J1010.3 Standards.** *The following standards of quality shall apply:*

1. *ASTM D1557. Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft).*
2. *ASTM D1556. In Place Density of Soils by the Sand-Cone Method.*
3. *ASTM D 922 and D 3017. Density of Soils by Nuclear Methods and In Place Moisture Contact.*

## **Appendix L –Retaining Walls**

A NEW Appendix L is added to read: **APPENDIX L - RETAINING WALLS**

**L1.01 General.** *It shall be unlawful for any person, contractor, firm or corporation to erect, install, construct or replace retaining wall contrary to the provisions of this code.*

**L1.02 Applicable regulations.** *All regulations and requirements of the Building Code and any amendments, deletions and additions thereto shall apply to the erection, installation or construction of any retaining wall except that which may be inconsistent with this chapter.*

## **L2.0 DEFINITIONS**

*For the purpose of this chapter, certain terms are defined as follows:*

**CUT.** *See Excavation.*

**EXCAVATION.** *The removal of earth material by artificial means also referred to as a cut.*

**FENCE.** A structure of temporary or semi-permanent material such as wrought iron, wire, wood, screen, vinyl, plastic, etc...erected for purposes of enclosure, division of property or decoration.

**FILL.** The deposition of earth materials by artificial means.

**RETAINING WALL.** Any wall that is used to resist the lateral displacement of earth or any other material with a difference in elevation of the material from one side to the other exceeding 48 inches (4 foot) in height.

**WALL.** A structure of stone, brick, masonry, concrete or other similar permanent material, raised to some height and erected for purposes of enclosure, division of property or decoration.

### **L3.0 PERMITS.**

**L3.1 Permits required.** No retaining wall regulated by this code shall be erected, constructed, enlarged, altered, repaired, moved, improved, removed, converted or demolished unless a separate permit for each retaining wall is obtained from the Building Official.

**L3.2 Separate permits required.** A separate permit is required for each parcel of land upon which a retaining wall is to be located.

**EXCEPTION:** Only one permit is required for multiple fence(s), wall(s) and/or retaining wall(s) constructed along property lines in connection with the development of a subdivision, provided that a legal description of the property is submitted together with a dimensioned plot plan showing the exact location of the fence, wall and/or retaining wall and all other recorded lot and easement lines.

**L3.3 Application for a retaining wall permit.** To obtain a permit, the applicant shall first file an application on a form furnished by the jurisdiction for that purpose. The application shall include the following:

1. **the** name and address of the owner of the real property upon which the fence, wall and/or retaining wall is to be located.
2. **the** type of material to be used for construction of the fence, wall and/or retaining wall.
3. **the** total length, height and square footage of each fence, wall and/or retaining wall.
4. The authorized agent to perform construction.
5. A dimensioned drawing that identifies the location of each fence, wall and/or retaining wall with respect to the property or lot lines, easements, streets, other rights-of-way. Existing construction and drainage features shall be clearly identified on the drawings.
6. **the** location of all light standards, gas and water meters, and fire hydrants.
7. Other information deemed pertinent by the Building Official.

**L3.4 Drawings and specifications.** Drawings and specifications required for retaining walls shall be prepared by a registered design professional. The design shall be in accordance with the applicable chapters of the IBC.

Exceptions:

1. The City of Kingman retaining wall design can be used for retaining walls up to six high.
2. Drawings or specifications for fences and walls need not be submitted unless required by the Building Official.

### **L4.0 GENERAL REQUIREMENTS AND LIMITATIONS**

**L4.1 General.** General requirements and limitations shall be as follows:

1. No fence, wall and/or retaining wall shall be placed within a right-of-way unless granted permission by the authority having jurisdiction.
2. **the** height and location of a fence, wall and/or retaining wall shall comply with all zoning ordinances and regulations of the authority having jurisdiction.
3. Fences, walls and/or retaining walls shall not be constructed closer than 18 inches (457.2 mm) from any light standard, gas meter or water meter, and shall be in accordance with published standards of the department or agency having

authority of utility easements, when located within a utility easement. Fences, walls and/or retaining walls shall not be constructed closer than 30 inches (762 mm) from the back or 36 inches (914.4 mm) from either side of a fire hydrant.

4. Special inspection, if required, shall be in accordance with Chapter 17.

#### ***L4.2 Required inspections.***

1. All footings shall be inspected to verify location to property line, structures, and compliance to the approved plans and permit.
2. Concrete foundations shall not be poured until footings have been inspected and approved by the Building Official.
3. No retaining wall shall be grouted until the reinforcing required has been inspected and approved by the Building Official.
4. No retaining wall shall be backfilled until verification of the required damp-proofing and drainage has been inspected and approved by the Building Official.

***L4.3 Natural drainage.*** No permits shall be issued for fences, walls and/or retaining walls, which would block any natural drainage channel.

***L4.4 Prohibited materials.*** Walls, fences and retaining walls shall not be constructed of materials which impose a direct safety hazard, such as pointed posts, stakes or pickets, components intended for electrocution, embedded glass, nails, barbed or razor type wire, or other sharp, cutting objects.

***EXCEPTION:*** Manufactured barbed or razor ware may be used when its detailed use, location, and construction requirements are approved by the authority having jurisdiction.

### **L5.0 IMPLEMENTATION.**

***L5.1 Implementation.*** The Building Official is empowered to formulate procedural guidelines to be used in implementing this chapter.

## **Special Inspection: Soils Section 1704.7**

**1704.1.2 Report requirement.** Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.





## Commercial Site & Subdivision Grading Permit Application Submittal Requirements

Generally all Grading shall conform to the following codes and ordinances:

1. 2003 International Building Code – Chapter 18 & Appendix J
2. City of Kingman - Grading Excavation and Earthwork construction policy
3. Kingman City Code 5-6, 5-7, 5-8, 5-264

### **All Grading Permit Applications Shall Include:**

1. Complete a Grading Permit Application – include the estimated construction cost of retaining walls
2. Submit a Soils Report prepared by an Arizona Registered Design Professional [IBC J104.3]
3. 5 sets of Grading Plans sealed sign & dated prepared by an AZ Design Professional (one set wet sealed)
  - Provide Existing & Finished Grade contours at 1' vertical elevation intervals - extend 15' beyond parcel(s)
  - Dimension the top & toe of cut & fill slopes to adjacent parcel lines
  - Maximum plan sheet size 24" x 36"
4. Show all of the boundaries of the Parcels involved on the Grading Site plan
5. Dimension all of the parcel boundaries on the Grading Site plan
6. Locate all existing and proposed Retaining Walls & Drainage Structures on the Grading Site plan
7. Provide the structural design of all Retaining Walls and Drainage Structures [When Retaining Walls are included in the Grading Design, the required building permit will be automatically prepared by building department staff.]
8. Locate all required and proposed Screen Fence walls on the Grading Site Plan
9. Clearly Identify all Drainage Easements & Drainage Parcels
10. Clearly Identify where Historic Flows are preserved in the design [IBC J109.4]
11. Clearly identify where Erosion Control is required & accomplished [IBC J110]
12. Identify where Benching is required [IBC J107.3]
13. Identify all finished slopes greater than 2:1 [IBC J106.1 & J107.6]
14. "Boundary Survey" – Identify all perimeter boundary markers for the parcel(s) included
15. Identify the limits of all FEMA Flood Zones involved
16. Provide the Drainage Study per the Drainage Design and Administrative Manual; Calculations are required for predevelopment and post development runoff and as the basis for design of conveyance and detention/retention facilities [KCC 5-264] Exception: individual single family residence & duplex lots
17. Record the estimated quantities of Excavations & Fills in cubic yards
18. Special Inspection Certificate specifying the Special Inspector [IBC J105.2]

### **Commercial and Public Site Grading Permit Applications shall also include:**

1. Show all existing & proposed buildings, structures, and other impervious surfaces on the Grading Site plan
2. Show all of the existing and proposed infrastructure improvements, streets, sidewalks, utilities etc...
3. Show all existing and proposed private sewer systems &/or Interceptor locations.
4. When grading is in preparation for a new building show all intended Exit discharge routes, Safe dispersal areas & ADA Accessible Routes if known.

### **Residential Subdivision and Lot Grading Permit Applications shall include:**

1. The Special Inspector Shall also:
  - Certify that the building pad elevation conforms to the Design for each parcel
  - Certify the Final Elevation of the Point of Discharge for each parcel

Note: New Subdivision grading permit applications may be submitted at the time of the Final Plat submittal. An early application may make it possible for the Grading Permit to be approved by the time City Council approves the subdivision. **It is the Goal of the Building Department staff and plan review team to complete the plan review and provide written comments or a Grading permit within 15 working days after receiving a complete submittal package, including the grading plan review fee.**

## Excerpts from the 2006 International Building Code

### GRADING PERMITS REQUIRED

**J103.1 Permits required.** Except as exempted in Section J103.2, no grading shall be performed without first having obtained a permit therefore from the building official. A grading permit does not include the construction of retaining walls or other structures.

**J103.2 Exemptions.** A grading permit shall not be required for the following:

1. Grading in an isolated, self-contained area, provided there is no danger to the public, and that such grading will not adversely affect adjoining properties.
2. Excavation for construction of a structure permitted under this code. [These grading provisions will be considered during the Building Permit Application plan review process]
3. Cemetery graves.
4. Refuse disposal sites controlled by other regulations.
5. Excavations for wells, or trenches for utilities.
6. Mining, quarrying, excavating, processing or stockpiling rock, sand, gravel, aggregate or clay controlled by other regulations, provided such operations do not affect the lateral support of, or significantly increase stresses in, soil on adjoining properties.
7. Exploratory excavations performed under the direction of a registered design professional. This phrase was added to assure that the "exploratory excavation" is not to begin construction of a building prior to receiving a permit for the sole purpose of preparing a soils report.

Exemption from the permit requirements of this appendix shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of this jurisdiction.

### GRADING SPECIAL INSPECTIONS

**J105.2 Special Inspections.** The special inspection requirements of Section 1704.7 shall apply to work performed under a grading permit where required by the building official.

**1704.7 Soils.** The special inspections for existing site soil conditions fill placement and load-bearing requirements shall follow Sections 1704.7.1 through 1704.7.3. The approved soils report, required by Section 1802.2, shall be used to determine compliance.

**Exception:** Special inspections not required during placement of fill less than 12 inches (305 mm) deep.

**1704.7.1 Site preparation.** Prior to placement of the prepared fill, the special inspector shall determine that the site has been prepared in accordance with the approved soils report.

**1704.7.2 During fill placement.** During placement and compaction of the fill material, the special inspector shall determine that the material being used and the maximum lift thickness comply with the approved report, as specified in Section 1803.5.

**1704.7.3 Evaluation of in-place density.** The special inspector shall determine, at the approved frequency, that the in-place dry density of the compacted fill complies with the approved report.

### SOILS REPORTS

**1802.6 Reports.** The soil classification and design load-bearing capacity shall be shown on the construction document.

Where required by the building official, a written report of the investigation shall be submitted that includes, but need not be limited to, the following information:

1. A plot showing the location of test borings and/or excavations.
2. A complete record of the soil samples.
3. A record of the soil profile.
4. Elevation of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.
7. Pile and pier foundation information in accordance with Section 1808.2.2.
8. Special design and construction provisions for footings or foundations founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803.5.

\*\*\*\*\*

### City of Kingman FINAL GRADING INSPECTION & APPROVAL

1. A Final Report from the Special Inspection Agency certifying that all soil classifications, soil densities, final grade elevations and the actual drainage conform to the Approved Plan and soils report.
2. All Parcel monuments are in place pursuant to the:
  - Boundary Survey
  - Final Approved Plat
3. All required Retaining Walls, Fences and other Drainage Structures are complete and associated permits are Finalized.
4. For New Subdivisions or Replatted Subdivisions: – An As-Built recordable Final Plat shall be submitted for approval; 3 copies on Mylar, and one electronic data file in a format agreeable to the city engineer, which will be used in the building of a City-wide data base.