

## SECTION VII

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### TESTING REQUIREMENTS

Note: A recognized laboratory, referenced throughout these specifications, means that the laboratory must be accredited by the American Association for Laboratory Accreditation (A2LA) in the field of construction materials testing. Testing costs will be paid by the developer to the county before the subdivision plat is approved by the Commissioners' Court and recorded in the County Clerk's office. These costs will be determined using the testing frequency specified here in by the County plus a 10% contingency.

#### A. General

1. Construction materials and operations shall be under controlled testing and inspection by a recognized laboratory in accordance with provisions set forth herein as well as all other applicable standards. All laboratory personnel shall be NICET approved and certified, Level II minimum for soils & ACI approved & certified for concrete.
2. Upon completion of the work and prior to acceptance of the work by Galveston County, the recognized laboratory shall submit, to the County Engineer, a written, certification sealed by a Professional Engineer registered in the state of Texas, that all construction materials and operations as specified above were under controlled testing and inspection by the laboratory and same complies with all specifications applicable to the project.
3. Testing of materials used for bedding and backfill of storm sewers as well as other utilities, when located underneath or within one (1) foot of subgrade shall be conducted to insure compliance with other provisions contained in Section III "Drainage Design Requirements" (General).

#### B. Testing Requirements for Flexible Base Pavement

Thickness of flexible base pavement shall conform to requirements given in Section IV-C.

1. Subgrade

1.1 Densities shall be made on each three hundred linear feet or less as conditions may require. 95% Modified Proctor density (ASTM 1557) shall be uniformly achieved.

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1.2 In the event of rainwater standing on the subgrade after densities are made, or other conditions beyond contractors's control, additional densities

as specified above will be required prior to progressing with the work.

1.3 In no case shall there be less than three (3) density tests made for each day's activity and there shall be a minimum of three (3) density tests made for each street, unless approved otherwise by resident inspector.

1.4 The Contractor is required to have subgrade density test reports in his/her possession at the construction site at the time of placement of base material. Date of same shall be clearly marked.

2. Base Materials

Approved base material shall be spread and uniformly compacted to 95% Modified Proctor density (ASTM 1557) prior to commencing surfacing. Quantity of test(s) in accordance with above.

3. Surfacing

Surfacing shall be in accordance with Section IV "Paving Design Requirements".

4. Roadway section shall conform to provisions contained in Section IV "Paving Design Requirements".

5. All applicable portions of VII-B 1.2 and 3 contained in this section shall be strictly followed without

exception.

## C. Testing Requirements for Concrete Pavement

### 1. Subgrade

1.1 Densities shall be made on each three hundred (300) linear feet or less as conditions may require. Preparation of the subgrade shall be in accordance with applicable County and TxDOT specification item 260 or item 275. A minimum of 95% Modified Proctor density (ASTM 1557) shall be uniformly achieved. Gradation shall be 1 $\frac{3}{4}$ "-100%,  $\frac{3}{4}$ "-85%, No.4-60%.

1.2 In the event of excessive rain water standing on the subgrade after densities are made and before

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concrete is placed on the prepared subgrade, or other conditions beyond Contractor's control, additional densities as specified above will be required prior to placement of the concrete.

1.3 In no case shall there be less than three (3) density tests made for each day's activity and there shall be a minimum of three (3) density tests made for each street, unless otherwise approved by the resident inspector.

1.4 The Contractor is required to have density test reports in his/her possession at the construction site prior to placement of concrete. Date of same shall be clearly marked.

### 2. Concrete Test Requirements (General)

2.1 The testing laboratory shall review the mix design for each project utilizing criteria regarding cement content set forth in Section IV "Paving Design Requirements". Proportioning of concrete shall be in accordance with all applicable portions of the TxDOT Item "Concrete Pavement" Item 360.

2.2 Unless otherwise permitted, the concrete mix design shall be proportioned to provide a slump of 4"±1", when tested. A slump test will be made for each new concrete load or when consistency of the mix changes, at the point of discharge.

- 2.3 The laboratory shall inspect and confirm batch design proportions at the plant site each day prior to placement of that day's concrete.
- 2.4 Pavement mix designs shall meet compressive strength requirements of four thousand (4000) psi at twenty eight (28) days.
- 2.5 Traffic will not be allowed until 3500 psi is achieved.

3. Testing Requirements (Cylinders)

- 3.1 A minimum of four (4) cylinders shall be made for each seven hundred fifty (750) square yards, or less, of pavement placed each day. Samples to be taken in accordance with TxDOT STDS and molded and cured in accordance with TxDOT STDS. Any deviations from these requirements shall be recorded on the test report.

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- 3.2 Test specimens in accordance with TxDOT STDS. One specimen shall be tested at 7 days and two shall be tested at 28 days. The acceptance test results shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, handling, molding or testing, it shall be discarded and the strength of the remaining specimens shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded and cores from the area in question may be required by Galveston County in accordance with "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete" (ASTM C42). These cores & tests will be at no expense to Galveston County. If the average seven day break and the twenty eight (28) day breaks do not meet minimum requirement, even though evidence of improper procedures as outlined above are not apparent, the County Engineer may, again, require cores from area in question in accordance with ASTM C42.
- 3.3 In the event low strength concrete is confirmed, pavement in the area in question will not be

accepted.

- 3.4 Additional cylinders may be required due to concrete placing conditions, or for adequately determining the strength of concrete when the early opening of the pavement to traffic is necessary and/or desirable. See TxDOT specification item 360, "Concrete Pavement".

#### 4. Concrete Test Requirements (Cores)

- 4.1 After the pavement has been in place for a minimum of fourteen days, one (1) core shall be taken for each 1000 square yards of pavement, or portions thereof, except that not less than one (1) core shall be taken on each street. Cores shall be taken alternately in each one-half section of the pavement in order to obtain a representative sample for thickness. Location of cores shall be selected by the Resident Inspector.

Paving Thickness: Pavement thicknesses contained herein and in the Pavement Design Section (Section IV-B, 1, 2, 3 and 5) are minimums. Therefore, there should not be a need for any tolerance for pavement that is too thin, or less than plan requirements. However, in the event pavement the

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thickness of which is less than plan requirements is determined, the following shall apply:

The thickness of individual cores shall be determined in accordance with ASTM C174 by averaging no less than three (3) such measurements. Any core, the thickness of which is equal to or greater than one-quarter-inch (1/4") less than the thickness shown on the approved drawings shall be considered one of deficient thickness. Cores drilled for thickness measurements shall be a minimum of four inches (4") in diameter.

If a core is determined to be deficient in thickness, additional cores shall be taken at ten-foot (10') intervals on either side of the deficient core to establish the length of the deficient section. The length of the deficient section shall be the distance between the nearest

cores of satisfactory thickness, and the width shall be the entire width of the pavement. That pavement shall be removed and replaced with concrete that meets or exceeds requirements. This shall be done at no cost to Galveston County.

Other testing requirements and procedures will be given under the Section titled "Testing Requirements".

Defective Concrete. Any defective concrete discovered, after the forms have been removed, shall be removed immediately and replaced. If the surface of the concrete is bulged, uneven or shows excessive honeycombing or form marks, which in the opinion of the Engineer and the County Engineer cannot be repaired satisfactorily, the entire section shall be removed or renewed in a manner which is satisfactory to Galveston County.

- 4.2 Cores shall be broken at minimum 28 days in accordance with ASTM C42. A minimum compressive strength of 4000 psi is required.

Thickness shall conform to minimum requirements contained in Section IV-B, subsection 1, 2, 3 and 5.

- 4.3 If a core fails to meet minimum strength requirements, additional cores may be required by the County Engineer and tested in accordance with procedures outlined above (ASTM C42).

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In the event low strength concrete is confirmed, pavement in the area in question will not be accepted.

In the event minimum thickness is not attained, pavement will not be accepted.

D. Testing Requirements (Structures)

1. Bridges and box culvert testing shall be in accordance with TxDOT Specification Item 421 "Portland Cement Concrete", and others as they apply.

E. Copies of all test reports to be submitted to the County

Engineer in an expeditious manner