CITY OF HILSHIRE VILLAGE
DRAINAGE REQUIREMENTS

IMPORTANT NOTE:
The Drainage Plans needs to be submitted in duplicate, separate from the building plans and they must include a copy of the Site Plan (including non-permeable/impervious lot coverage calculations), Tree Survey, and an Existing Conditions Topographical Survey.

Drainage Plan Check Fee for New Construction and Swimming Pools. Review means review plans or submittal corrections.

$1,000.00 Fee includes: Submittal Review
Resubmittal Review (one)
Final "As Built" Review
Final "As-Built" Resubmittal Review (one) of Final Review
Any additional Reviews $600 per review
A drainage permit is required

PLEASE FOLLOW THESE DIRECTIONS EXACTLY:
(Failure to do so normally results in plan rejection or incomplete plan)

□ **1.** **Grading & Drainage Plan** Refer to Ordinance 588, adopted May 16, 2006, Section 2; Ordinance 602, adopted March 12, 2007, Section 2
Area drainage*: Each Lot shall be finish graded so as to maintain the drainage of such property without adversely affecting the existing drainage pattern of adjacent property and to prevent damage by overflow of water onto adjacent property caused either by direct diversion of water onto the adjoining land or by failure to adequately accommodate new or changed drainage patterns. Prior to the issuance of a building permit, a registered drainage engineer shall supply a drainage plan certifying compliance with this section when the existing drainage pattern is altered in any fashion. By way of example, but without limitation, the existing drainage pattern may be altered by the addition of a pool, driveway, or accessory building.*

1a. An Existing Conditions Topographic Survey shall be prepared and submitted to the City for review and approval, prior to start of demolition and/or construction activities. The topographic survey shall be prepared, signed and sealed by a Registered Professional Land Surveyor (R.P.L.S.) in the State of Texas. In general, the topographic survey shall be tied to an existing benchmark; no assumed elevations will be allowed; and shall indicate property floodplain location status based on the current or latest Flood Insurance Rate Map (FIRM), as published by the Federal Emergency Management Agency (FEMA). The topographic survey

shall show, as a minimum, the location and elevations of existing structures, roadways, driveways, sidewalks, swimming pools, curb/gutter, ditches, trees, shrubs, flower beds, storm and sanitary sewers, and the existing natural ground elevations throughout the site. The topographic survey shall include existing natural ground spot elevations at a maximum of 25-ft spacing covering the lot, including along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (building slabs, sidewalks, patios, driveways, decks, etc.). If significant changes occur in the natural ground contour (i.e. depressed areas) and the 25-ft spacing does not adequately depict the lot surface condition, then spot elevations shall be taken at 10-ft spacing or less, in order to provide a clear profile of the site.

1b. A Drainage Plan shall be submitted to the City for review and approval, prior to start of demolition and/or construction activities. The Drainage Plan shall be prepared, signed and sealed by a Registered/Licensed Professional Engineer (P.E.) in the State of Texas. In general, the Existing Conditions Topographic Survey shall be used in the development of the proposed Drainage Plan.

1c. The Drainage Plan shall also include all aspects of the anticipated development including but not limited to building foundation, patios, decks, swimming pools, driveways, walks, landscaped areas, downspouts, drainage system, etc. The Drainage Plan shall show finished grade elevations of all proposed paving and grading on the site and shall include existing and planned natural ground spot elevations at a maximum of 25-ft spacing covering the lot, including along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (i.e. building, slabs, sidewalks, patios, driveways, decks, etc.) As a minimum, show proposed natural ground elevations throughout the lot to match locations where existing natural ground elevations were previously shot/taken in the Existing Conditions Topographic Survey; and in other areas as necessary to demonstrate proper drainage of the lot.

1d. No elevation changes shall occur around and within 3-ft of the perimeter of the property which could become a physical barrier for the natural flow of water from adjacent properties into the property being developed or redeveloped ***[INCLUDE THIS REQUIREMENT AS A GENERAL NOTE IN THE DRAINAGE PLAN].***

1e. The drainage of the lot shall be such that no person shall divert or impound the natural flow of surface water falling on the lot, in accordance with the Texas Water Code, without producing evidence of appropriate agreements with the affected property owner.

1f. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to ensure that the water falling on the lot upon which construction is planned will drain into the street, ditch, or storm sewer system of the City of Hilshire Village, or any existing drainage easement.

1g. Existing drainage from other properties draining into and through the lot to be developed or re-developed shall be maintained during and after construction activities are completed ***[INCLUDE THIS REQUIREMENT AS A GENERAL NOTE IN THE DRAINAGE PLAN].*** The proposed drainage system shall be designed to handle a City of Houston 2-Year Design Storm of additional flow from these adjacent properties.

1h. For a sub-surface drainage system (i.e. storm sewer pipes), the registered/licensed professional engineer shall design the system to handle a City of Houston 2-Year Design Storm, using 6-inch diameter PVC SDR 35 (minimum slope 0.65%) and/or 8-inch diameter PVC SDR 35 (minimum slope 0.44%) storm sewer pipes. All proposed drainage pipes shall be sloped to achieve a minimum velocity of 2.3 ft/sec.

1i. For a surface drainage system (i.e. swales), the registered/licensed professional engineer shall design the system to handle a City of Houston 2-Year Design Storm. Swales shall have a minimum width of 3-ft, minimum side slope of 3 (horizontal) to 1 (vertical), minimum slope of 0.06%, and a maximum flow velocity of 3.0 ft/s.

1j. Proposed landscaping/planting areas along the property perimeter shall not impede
the storm water flow into and through swales or storm sewer inlets. No raised flower beds will be allowed along the perimeter of the property. No landscaping/planting will be permitted in the drainage swales ***[INCLUDE THIS REQUIREMENT AS A GENERAL NOTE IN THE DRAINAGE PLAN].***

1k. Proposed or existing rain gutter downspouts shall not be tied into existing or proposed underground storm sewer lines that drain directly into the City's ditches on the front and/or side of the owner's property, nor shall they be extended to tie directly into the City's ditches ***[INCLUDE THIS REQUIREMENT AS A GENERAL NOTE IN THE DRAINAGE PLAN, IF DOWNSPOUTS ARE PROPOSED].*** Rain gutter downspouts, however, may be tied into: (a) on-site (below ground) retention features that would allow storm water to percolate into the ground; or (b) on-site (below ground) retention features to re-use storm water runoff for "green" applications such as irrigation.

1l. Outfall flow line elevations and flow line of existing system shall be shown where proposed tie-in occurs (i.e. to ditch and/or storm sewer line), and at every bend, tee, wye, inlet/catch basin, as applicable. Unless an inlet/catch basin is proposed, install clean-outs at locations in the proposed storm sewer system where horizontal alignment changes occur, to facilitate future cleaning and maintenance of the storm sewer system.

1m. Driveway culvert(s) shall be able to convey a City of Houston 2-Year Design Storm for all affected area. The minimum culvert size shall be 18-inches in diameter and shall be reinforced concrete pipe (RCP). The City Engineer will establish the culvert's flow line elevations. Refer to Code of Ordinance Section 9.111 for additional information.

1n. Any change(s) to the approved Drainage Plan shall be submitted to the City for review and approval. Contractor shall allow a minimum of seven (7) calendar days for review of drainage plan submittals and re-submittals, as applicable. (Plan check fee includes two (2) reviews by City Engineer. Any additional reviews will be at cost to the Contractor/Home Owner)

1o. After construction is completed and the grass has been restored/installed, a Final As-Built Drainage Plan Survey, sealed and signed by a Registered Professional Land Surveyor (R.P.L.S.) in the State of Texas, shall be submitted to the Engineer of Record (i.e. Drainage Engineer that prepared the Drainage Plan approved by the City) for review. **This Final As-Built Drainage Plan Survey** shall be tied to the same survey benchmark and include the same information furnished in the approved ("Permit"). As a minimum, show proposed natural ground elevations throughout the lot to match locations where existing natural ground elevations were previously shot/taken in the Existing Conditions Topographic Survey; and in other areas shown in the approved Drainage Plan. If storm sewer lines, inlets/catch basins, and clean-outs are installed, Surveyor shall show storm sewer lines and flow line elevations at inlets/catch basins and clean-outs in the Final As-Built Drainage Plan Survey. The Engineer of Record shall review the As-Built Drainage Plan Survey, inspect and verify the drainage system (i.e. storm sewer lines, inlets/catch basins, clean-outs, and/or swales) were installed in general conformance with the approved Drainage Plan and the City's current Drainage Ordinance and Requirements. Engineer of Record shall prepare and include non-permeable/impervious lot coverage calculations in front and behind the front building line based on as-built conditions and in conformance with City's maximum lot coverage ordinance (as detailed in Section 1a. Maximum lot coverage, of this checklist). Engineer of Record shall prepare a letter in company letterhead, signed and sealed by a Registered Professional Engineer (P.E.) in the State of Texas, certifying the Final As-Built Drainage Plan Survey is in general conformance with the approved Drainage Plans and the City's current Drainage Ordinance and Requirements. Submit Final As-Built Drainage Plan Survey (including non-permeable/impervious lot coverage calculations), and Engineer of Record Certification letter to the City for review, inspection and approval. A Certificate of Occupancy (CO) will not be issued by the Building Official until the Final As-Built Drainage Plan Survey is reviewed and approved by the City Engineer.

An exception or variance may be granted by the City, on a case by case basis, if the drainage in the area could be adversely affected by any of the restrictions or guidelines described above, as determined by the City Engineer upon review of the affected drainage areas.