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MEMO

TO: Marvin E. Carter, Michael O'Haire and David Gunter

FROM: George A. Simons, P.E.

THROUGH: Dean F. Luethje, P.E.

RE: IRFWCD – Policies Regarding:
Requirements for the Conversion of Sub-lateral Open Ditch Sections to Culverted Sections

DATE: August 15, 2005 (revised)

The recent development boom within the lands being served by the I.R.F.W.C.D. drainage system is resulting in the more frequent requests by developers to replace open sub-lateral ditch sections with culvert sections. Construction of additional roadway width and/or turn lanes to serve the new developments is facilitated with the replacement of open ditch sub-lateral sections with culverted sub-lateral sections. Impacts to the I.R.F.W.C.D. drainage system which should be mitigated as a condition of approval include;

1. The reduction of runoff storage capacity in the ditch
2. The loss of water storage capacity in the soil horizon next to the ditch
3. The increased cost of maintenance of culverts vs. open ditch sections
4. Maintaining flow of stormwater during construction
5. End treatments
6. Pipe size
7. Exemptions

CAI requests that the supervisors formally accept the permit conditions noted below. The permit condition policies are based on the results of previous correspondence on the issues and recent meetings with David Gunter. The policy clarifications will assist all stormwater design engineers working within the district as well as the city and county engineers reviewing plans as to the appropriate design methodology for converting open ditch sub-lateral sections to culverted sub-lateral sections.

1. Storage Volume Calculations and Compensation for 25 Year and 100 Year Storm Events

A. Within the ditch section to be replaced with a culvert, all flood storage must be maintained from pre to post development. Predevelopment storage volume calculations shall be based on

the existing canal cross section up to the 25 year peak stage and the length of the sub-lateral canal to be filled. The cross section area will be based on enough cross sections to obtain a reasonable approximation of existing conditions as determined by a Florida Registered Land Surveyor and shall be based on (1929 NGVD). The design engineer must estimate the 25 and 100 year flood elevation from the FIRM maps or on the results of the IRFWCD study.

B. The post development storage volume reduction is the difference between the pre-development volume found in Part A above less the volume of storage in the culvert system voids.

C. The storage volume reduction must be compensated within the subject sub-lateral's drainage basin. Typically, the development associated with the sub-lateral culverting will include an onsite stormwater management system. The volume needed to fully compensate the volume lost due to the culverting of the sub-lateral must be in addition to that which is needed for the compensating storage for the onsite improvements. The volume must be available between the control elevation of the stormwater system and the 25 year peak stage elevation for the 25 year storm event analysis. If no development is available, the compensation shall be within the sub-lateral or acceptable alternative.

D. Similar to the Sub-section C above, the 100 year event analysis shall demonstrate that the volume lost due to the culverting will be fully compensated. However, this additional volume to meet the 100 year event (above the 25 year event) may be provided between the 25 and 100 year elevations.

2. Soil Storage and Adjacent Water Table Levels

A. The existing sub-lateral open ditch section lowers the adjacent water table by seepage into the ditch. When the ditch section is replaced with a culvert, the soil storage must be maintained.

B. A slotted or perforated pipe to allow seepage will mimic an open section. The slotted/perforated pipe should be installed within a gravel layer and wrapped with filter cloth.

C. As an option, the design may include a smaller perforated pipe installed parallel to the main culvert. The smaller pipe invert must be installed at the elevation of the flow line of the existing ditch. The pipe shall be wrapped in gravel (6" min. thickness) and filter cloth. The minimum pipe size shall be 18". Connections to the main culvert section shall be at 200 ft. centers (max.).

3. Increased Cost of Maintenance

A. The I.R.F.W.C.D. does not assume ownership of any culverts placed in the district sub-laterals.

B. The existing sub-lateral open ditch sections are routinely maintained by the I.R.F.W.C.D. using a herbicide treatment program and mechanical cleaning with a backhoe. Siltation of a culverted ditch section will require maintenance by much more expensive methods, such as vacuum trucks which the district currently does not own.

C. The expected life span of pipe sections varies by pipe material, soil chemistry, quality of installation, traffic loads, oxidation, and other factors. All pipes will eventually wear out and need to be replaced.

D. The applicant, subsequent owner or assignee must provide and bear the cost of any required maintenance or replacement. If the culvert owner fails to maintain the culvert, the District shall sub-contract for the maintenance and charge the owner for all cost including administration.

4. Maintaining Flow of Stormwater During Construction

Flow of stormwater must be maintained in sub-lateral canals throughout the construction phase of such culverted section of the canal. To prevent elevated water stages in the upstream canal sub-basin, any temporary blockage of a canal for such culvert installation will require the provision on site, of a pump or other by-pass method, and/or capability to immediately remove any temporary dam, and any other construction related impediments, to provide the full capacity and flow conditions of the canal in the event of a storm event. All such proposed temporary blockages and by-pass methods shall be approved in advance, and coordinated throughout the construction phase, by/with the District.

5. End Treatments

End treatments to prevent trash from entering pipe may be required on a case by case basis.

6. Pipe Size

The entire flow channel of the culvert including the top, bottom, and sides shall be smooth with no rough corners to catch trash. Also, reduction or change of the cross section is not allowed in the direction of flow. If the sub-lateral can flow both ways, then the culvert must be a uniform cross section through the length.

7. Exemptions

Culverted ditch sections less than 100 feet long are exempt from the mitigation policies noted in Parts 1 and 2 above.