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SECTIONS 13
ROADS AND STREETS - TECHNICAL REQUIREMENTS

13.1 STREETS AND ROADWAYS

13.1.1 Design Criteria

13.1.1.1 Design Standards

As a minimum, roads and/or streets and related facilities shall be designed in accordance with the latest editions of the "Manual of Minimum Standards for Design, Construction and Maintenance for Streets & Highways" (Green Book), "Flexible Pavement Design Manual", "Standard Specifications for Road and Bridge Construction," "Roadway and Traffic Design Standards" and the Utility Accommodation Guide, as published by the State of Florida Department of Transportation, except as modified herein.

13.1.2 Construction Criteria

Construction materials and methods shall meet the requirements of the latest edition of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" and supplements, except as modified herein, and other provisions of this document.

13.1.2.1 Temporary Facilities

Temporary facilities, unrelated to any ongoing construction in a right-of-way, and intended to provide an essential service for a period of time not to exceed one year, may be constructed in a right-of-way, contingent upon Public Works Department approval of project plans and specifications, and issuance of a Public Works Department Right-of-Way Permit. There will be no relaxation of safety requirements, but lighter duty construction will be allowed, where public interests will not suffer.

In cases where temporary facilities must be constructed to provide or maintain an essential feature around portions of a public right-of-way for public safety or convenience during construction, such temporary facility must be clearly drawn in sufficient detail on standard size drafting sheets, and submitted to the Public Works Department for review and approval prior to implementation.

13.1.3 Typical Sections

Sketches of proposed typical sections, indicating design speed, shall be submitted to the Public Works Department for approval prior to beginning the preparation of plans, and shall show or note all existing conditions or facilities that might influence a proper engineering evaluation of the proposed project.

13.1.4 Safety Criteria

Minimum safety criteria for design of roads and streets in the City of Groveland shall be in accordance with FDOT requirements.

13.1.5 Roadways Adjacent and Parallel to Waterways

The following policy is to be implemented in the design of all roadway construction involving lakes and canals when it is necessary for such waterways to exist adjacent and parallel to the roadway.

For purposes of the policy, a canal is considered to be an open ditch with the side slope adjacent to the roadway 4:1 or steeper and/or with a seasonal water depth in excess of three feet for extended periods of time (24 hours or more). When the roadway slope and the canal side slope adjacent to the roadway is 6:1 or flatter, the minimum distance to the canal may be measured from the edge of the through travel lane to the water surface at the point where the depth is in excess of three feet for 24 hours or more. The berm between the roadway front slope and canal slope is not required for this condition.

13.1.5.1 Minimum Distance to Lakes/Canals

The distance from the outside edge of the through travel lane to the top of the lake/canal side slope nearest the road, will be no less than 60 feet for highways with design speeds of 50 miles per hour (MPH) or greater. For highways with design speeds less than 50 MPH, this minimum distance may be reduced to 50 feet for rural highways or 40 feet for urban (curb and gutter) highways. When a new lake/canal or roadway alignment is required, at less than the ultimate cross-section, distances greater than these above should be provided, if possible, to accommodate possible future improvements to roadway (widening, etc.).

13.1.5.2 Roadways on Fill Sections

A flat berm (maximum 10:1 slope) of width no less than 20 feet will be provided between the toe of the roadway front slope and the top of the lake/canal side slope nearest the roadway. This minimum berm width applies to all types of highways, both rural and urban (curb and gutter) construction, regardless of the distance from roadway front slope to the top of the lake/canal side slope.

13.1.5.3 Roadways in Cut Sections or with Adjacent Ditches

A minimum of 15 feet will be provided between the inside edge of the roadside ditch bottom and the top of the lake/canal side slope nearest the road.

13.1.5.4 Installation of Protection

Installation of guardrail, or other approved protective devices, is recommended throughout all areas where it is impracticable (by the determination of the Public Works Director) to meet the above minimum criteria. For canals located on the outside of curves sharper than 2 degrees, greater offset widths or construction of guardrail should be considered.

When guardrail is required for canal protection, it will normally be placed at or near the edge of the clear recovery area. The distance from the outside edge of the shoulder to the face of guardrail should, in all cases, be greater than 12 feet when guardrail is not constructed at the edge of the shoulder. The roadway front slope back of guardrail may be steepened to 2:1.

13.1.5.5 Guardrail

Guardrail materials and installation shall be in accordance with "Florida Department of Transportation Roadway and Traffic Design Standards, " Index No 400.

13.1.5.6 Handrail

Handrail shall be painted dark green. Materials and installation shall be in accordance with "Florida Department of Transportation Roadway and Traffic Design Standards, " Index No 520.

13.1.6 Flexible Pavement Design

Flexible pavement design shall be in accordance with the criteria established in the "FDOT Flexible Pavement Design Manual for New Construction and Pavement Rehabilitation", latest edition. Road design by this method requires calculation of a structural number, which is obtained by multiplying the FDOT (AASHTO) structural coefficient by the thickness of each layer of material, then adding the resultants in accordance with the FDOT Flexible Pavement Design Manual: $(SN = a_1D_1 + a_2D_2 + \dots + a_nD_n)$. However, in no case shall the thickness of any layer be less than the minimum outlined in the following paragraphs.

Any deviations or deficiencies from the design which may occur in the construction of the road shall be corrected by construction or re-construction to obtain the minimum structural number (i.e.: additional asphaltic concrete surface course, etc.), equivalent to the design structural number or the structural number calculated from using the minimum layer depths contained in these specifications, whichever is greater, and only as approved by the Public Works Director after submittal of the measurements of the actual constructed road section, along with calculations of the structural number of the proposed remedial work.

13.1.6.1 Stabilized Subgrade

The entire width of the right-of-way shall be demucked before construction of the roadbed begins, to a minimum depth of 12 inches. No material of FDOT Class A-5, A-7 or A-8 will be allowed. All material

supporting the roadway and shoulders shall have a minimum LBR of 40, unless otherwise approved by the Public Works Director, and alternate materials/layer depths are provided to obtain the required minimum structural number. The subgrade shall be compacted to 98% of maximum dry density as determined by AASHTO T-180 (Modified Proctor), to the below listed minimum depths. Stabilization and subgrade treatment materials and construction shall be in compliance with FDOT Standard Specifications for Road and Bridge Construction, latest edition.

<u>Residential</u>	<u>Minimum Depth (Inches)</u>
Arterial	16
Collector	12
Local	12
<u>Industrial</u>	12
<u>Commercial</u>	12

Testing for the subgrade bearing capacity and compaction shall be conducted at intervals no greater than five hundred feet and shall be staggered to the left, right and on the centerline of the roadway. There shall also be no less than one test on each street. Tests shall be reviewed by the Engineer of Record.

13.1.6.2 Base Course

Subject to the approval of the Public Works Department, base material may be either soil cement, crushed concrete or limerock. Where a new base is to be constructed over an existing roadway, the existing pavement shall be removed. The material may be re-used in the bottom 4 inches of the new base after crushing, so as to pass through a 3-1/2 inch sieve. All base shall be primed, as required elsewhere in these specifications. Minimum depth of base shall be as follows:

<u>Residential</u>	<u>Minimum Depth (Inches)</u>
Arterial	12
Collector	8
Local	8
<u>Industrial</u>	10
<u>Commercial</u>	8

13.1.6.3 Soil Cement

Soil cement base, where approved by the Public Works Department shall be installed with materials and constructed in accordance with

FDOT Standard Specifications for Road and Bridge Construction, latest edition. Soil cement shall have a minimum seven day compressive strength of 300 pounds per square inch (psi) for mixed in place base or 500 psi for plant mix or when intended for use as a layer coefficient of 0.20 for flexible pavement base. The design mix shall be prepared by a testing laboratory and submitted to the Public Works Department after review by the Engineer of Record.

Soil cement shall be compacted to a density of not less than 98% of maximum dry density as determined by AASHTO T-134 under all paved areas within the traveled roadway. Outside the traveled roadway, compaction shall be not less than 95% as determined by AASHTO T-134. Soil cement base shall have test cores taken after seven days to verify thickness and compressive strength. Average core thickness shall not deviate from the design thickness by more than one inch in excess, nor more than one half inch deficiency. Cores shall be taken at locations of anticipated high water table and other locations deemed necessary by the Engineer of Record. Soil cement base shall be cured as long as practicable prior to paving, but no less than a minimum of fourteen days, unless a geotextile membrane is utilized, in which case a minimum cure time of seven days is required.

13.1.6.4 Limerock

Limerock used in base construction shall have an average Limerock Bearing Ratio (LBR) of not less than 100. Materials and construction shall be in accordance with FDOT Standard Specifications for Road and Bridge Construction, latest edition.

Limerock base shall be compacted to a density of not less than 98% of maximum dry density as determined by AASHTO T-180 (Modified Proctor) under all paved areas within the traveled roadway. Outside the traveled roadway, compaction shall be not less than 95% as determined by AASHTO T-180.

13.1.6.5 Surface Course

Surface courses for flexible pavements shall be Type S asphaltic concrete, unless otherwise approved by the City. Prime coats or tack coats shall be applied as outlined elsewhere in this document, prior to applying the surface course. Asphaltic concrete shall comply with the FDOT Standard Specifications for Road and Bridge Construction, latest edition, for materials and construction. Design of the mix shall be prepared by a testing laboratory. The design mix shall be submitted to the Public Works Department after review by the Engineer of Record. Plant mix certification shall be submitted to the Public Works Department after review by the Engineer of Record for inclusion with record drawings. Cores shall be taken at intervals of not more than 500 feet, but at least one core shall be taken on every street. Reports of test cores shall be forwarded to the Public Works Department after review by the Engineer of Record for inclusion with the record

drawings. Visual inspection of asphaltic concrete thickness at the time of lay down may be substituted, only if approved by the Public Works Director. Minimum thickness of surface course shall be as follows:

<u>Residential</u>	<u>Minimum Depth (Inches)</u>
Arterial	2-1/4
Collector	2
Local	1-1/2
<u>Industrial</u>	2
<u>Commercial</u>	2

13.1.7 Portland Cement Concrete Pavement Design

Portland cement concrete pavement may be constructed where indicated on City approved construction plans. Lines, grades, thickness and typical cross sections shall be shown on the plans. Design shall be in accordance with the FDOT "Standard Specifications for Road and Bridge Construction," latest edition, and recommendations of the Portland Cement Association. Design mix shall be prepared by a testing laboratory, and shall be reviewed by the Engineer of Record prior to forwarding to the Public Works Department for inclusion with record drawings. Concrete pavement shall be designed for a minimum 28 day compressive strength of 3000 psi. Concrete cylinders shall be made for every 50 cubic yards, but no less frequent than one set for each day's placement. Construction, including placement, jointing and curing shall be carried out in accordance with the FDOT standard specifications. Minimum thickness of concrete pavement shall be as follows:

<u>Residential</u>	<u>Minimum Concrete Thickness (Inches)</u>
Arterial	7
Collector	6
Local	6
<u>Industrial</u>	7
<u>Commercial</u>	6

13.1.8 Shoulders

All shoulders shall have an eight feet width stabilized to an LBR value of at least 40. The minimum depth of the stabilized shoulder shall be eight inches. All shoulders shall be compacted to 98% of maximum density as determined by AASHTO T-180.

13.1.9 Curb/Gutter

Curb and gutter shall be constructed of portland cement concrete and shall conform to the FDOT Standard Index for the type selected. Sections shall be shown on the construction plans and are subject to the approval of the Public Works Department. Materials and construction shall be in compliance with the FDOT Standard Specifications.

All curbs and gutters shall be installed on a foundation of stabilized subgrade having a minimum LBR ratio of 40, which has been compacted to a minimum density of 98% of maximum density as determined by AASHTO T-180 and extending 6 inches (min.) beyond the edges of the concrete.

13.1.10 Medians

Medians where required, shall be constructed of portland cement, patterned concrete, or with brick pavers, with planting beds, landscaping and irrigation systems, in accordance with the Public Works Manual, or as modified by any access management agreements between the City of Groveland and FDOT or Lake County. Plans and sections, along with materials, colors and patterns of the concrete, shall be shown on construction plans and submitted to the City for approval by the Public Works Director.

13.1.11 Swales

Bottoms of swales, measured from top of turf, shall be at least 4 inches below the edge of adjoining pavement, and shall be adequately sized to carry the volume of runoff when designed in accordance with approved storm drainage criteria.

13.1.12 Drainage

All drainage work within public right-of-ways shall be in accordance with City of Groveland Public Works Department requirements, and State of Florida Department of Transportation "Utility Accommodation Guide", except as modified herein, and in elsewhere in this document.

13.1.12.1 Unless otherwise approved by the Public Works Director, drainage pipe installations under roadways, in present or planned paved areas shall be of reinforced concrete, conforming to ASTM Standard C-301. The minimum size pipe to be used shall be 15 inches diameter. Mitered or flared end sections shall be provided, designed and constructed in accordance with the appropriate FDOT Standard Index.

13.1.12.2 Drainage pipe for unpaved areas or for crossing under roadways may be of reinforced concrete, or other materials as approved by the Public Works Department.

13.1.12.3 All drainage pipe in the public right-of-way shall have a minimum of 30 inches of cover, unless otherwise approved by the Public Works Director.

- 13.1.12.4 No swaled driveways will be permitted within City right-of-ways. Driveways shall be provided with drainage pipe, constructed with mitred end sections or concrete headwalls.
- 13.1.12.5 Drainage manholes shall be not less than four feet inside dimension between opposing walls and shall meet the requirements of ASTM Standard C-478. Walls shall be not less than 6 inches thick.
- 13.1.12.6 All other drainage structures including inlets, endwalls, culverts, flumes, etc. shall be provided, designed and constructed in accordance with the appropriate FDOT standard index.
- 13.1.12.7 Fencing for retention ponds shall be black, vinyl coated, chain link, except as otherwise required by the City's Land Development Code.

13.1.13 Sidewalks

Sidewalks shall be portland cement concrete, a minimum of 4 inches thick, and 5 feet wide, minimum. Where extending across driveways, sidewalks shall have a minimum thickness of 6 inches. Sawed contraction joints shall be a minimum of 1-1/2 inches deep. Expansion joints shall be provided between the sidewalk and curbing, driveways and all other fixed objects. Sidewalks shall have a transverse slope of 1/4" per foot toward the swale or gutter and shall be given a transverse broom finish. Handicapped ramps shall be installed wherever sidewalks meet upright curbs, and as otherwise required by the Americans With Disabilities Act (ADA). Any necessary obstruction shall be placed so as to maintain the maximum clear width. Sidewalks shall be maintained by the owners of the abutting properties. Alternate materials and methods of construction may be considered by the Public Works Department for temporary installations. Special surface treatments such as pavers, tile, etc., may be considered by the Public Works Department upon request of the Developer or Engineer of Record.

Sidewalks shall be constructed on at least one side of internal subdivisions. Where sidewalk is to be constructed on only one side of the street, the City will designate the side. At intersections with existing streets, sidewalks shall be extended to the right of way at rural roadway sections, or to the back of curb of existing roadways at urban sections. Curb cuts and handicap ramps shall be provided when connecting to existing urban sections.

In situations where improvements are planned for existing roadways which would result in damage or require removal of sidewalks; or where it can be demonstrated that significant damage is likely to occur due to subsequent building construction on the project for which the sidewalk is to be installed, at the discretion of and with the prior approval of the Public Works Director, installation may be deferred, subject to the Developer posting with the City, a "Sidewalk Performance Bond" in a format acceptable to the City.

13.1.14 Grassing/Seeding/Mulching/Sodding/Fertilizing

Whenever a suitable length of roadway or adjacent areas have been graded, they shall be grassed and mulched across the full right-of-way, outside the limits of pavement, at the earliest practical time, and in all cases, before the final paving course. Except for areas adjacent to established turf, grass seed may be used, unless otherwise agreed between the Developer and the Public Works Department. In the areas adjacent to established turf, sod of the same type of grass shall be installed. In areas where erosion and/or growing conditions may be a problem and for a minimum of 2 feet around all structures and the back of all curbs, solid sod of the same type as the adjacent turf areas shall also be installed.

The Developer shall maintain the grass, including watering and mowing until a good stand of grass is established and the project is accepted. It is the intent of this document that areas to be grassed have a growing stand of grass for a period of at least one year after completion/acceptance of the project. All grassed areas shall be mowed at least once prior to acceptance of the project.

13.1.15 Restoration

The entire work area utilized for the performance of any permitted work shall be restored by the permittee as described elsewhere.

13.1.16 Record Drawings & Certifications

One reproducible set, two blue line copies and one electronic copy, in a format acceptable to the City, of complete record drawings ("as-builts") shall be submitted to the Public Works Department prior to final acceptance by the City. Each individual sheet shall be clearly marked "Record Drawing", dated and signed and sealed by the Engineer of Record. These drawings must show all changes from the approved construction plans, including, but not limited to invert elevations, grade changes, as well as finished base elevations and offsets at centerline, edge of median and edge of pavement, plus elevations of bottom of swale or flow line of gutter, top of curb and right-of-way line, at high and low points, intersections and breaks in grade. Elevations shall be verified and shown at intervals not to exceed 300 feet measured along the profile grade line. All high point and low point elevations shall be shown.

Compaction must be verified by an independent certified engineering testing laboratory by making field density tests of each layer of compacted material at prescribed intervals before the succeeding layer is placed. Test reports and record drawings must be submitted to the Public Works Department before final acceptance.

13.1.17 Final Inspection and Acceptance

After construction is completed and all certifications, record drawings and other required documents have been submitted to, and accepted by, the Public Works Department, but before the one-year bonded maintenance period begins, the permittee shall request a final inspection of the project. The Public Works Department, the Engineer of Record and all other interested parties shall jointly perform such inspections as necessary for the Public Works Department to determine the acceptability of the project for maintenance by the City. Following the inspection, any noted defects shall be corrected by the permittee, after which

the Public Works Department and other maintaining agencies, will issue a notice of acceptance. This will mark the start of the one-year warrantee period.

13.2 PAVEMENT MARKING/SIGNING/SIGNALIZATION

13.2.1 Pavement Markings - General

The design and construction of pavement marking systems shall be in accordance with the following standards:

U.S. Department of Transportation, Federal Highway Administration - Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.

Florida DOT - Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, latest edition.

Florida DOT - Standard Specifications for Road and Bridge Construction, latest edition.

Florida DOT - Roadway and Traffic Design Standards.

American Association of State Highway and Transportation Officials (AASHTO) - A Policy on Geometric Design of Highways and Streets.

13.2.1.1 Pavement Marking Plan

Pavement marking and signing plans shall be submitted to the Public Works Department for review and approval as part of the construction plans for development where street or road construction is included. These plans shall show all new markings including tie-ins to existing markings. Removals of existing markings shall also be shown. Materials shall be specified and shall be in compliance with FDOT Standard Specifications. The location of raised reflective pavement markers shall be identified.

13.2.1.2 Permanent Pavement Markings

Permanent pavement markings shall be thermoplastic and shall meet the requirements of FDOT Standard Specifications for thermoplastic traffic stripes and markings. Paint shall not be used for permanent pavement markings unless prior approval has been granted by the Public Works Director.

13.2.1.3 Temporary Pavement Markings

Temporary pavement markings may be used during intermediate phases of road construction or where overlayment or further construction of the road is imminent (generally within 2 years). Temporary markings shall consist of paint meeting the requirements of FDOT Standard Specifications. Thermoplastic or inlaid preformed

plastic material shall not be used except with the prior approval of the Public Works Director.

13.2.1.4 Removal of Old Pavement Markings

Old pavement markings shall be covered by a pavement overlay prior to installing new markings. Old markings can be removed by grinding, provided residual scarring does not occur which will interfere with the new markings. Old markings can be painted over with black paint as a temporary measure only.

13.2.1.5 Construction/Resurfacing

Pavement markings (either permanent or temporary) shall be installed on the project as soon as practicable following paving. In the event a road is placed in service, the temporary or permanent pavement striping shall be applied by the end of each day's operation unless precluded by inclement weather, in which case it shall be striped during the next daylight period. Any road placed in service without striping shall have the traffic lanes delineated by temporary tape or markers, in accordance with Section 6D of the "United States Department of Transportation Manual of Uniform Traffic Control Devices for Streets and Highways", latest edition.

13.2.2 Signs - General

Traffic signs shall be installed and paid for by the developer. The City will provide the maintenance for signs, which are the City standard. For non-standard signs, the developer or appropriate homeowners association shall pay for maintenance.

The developer or the appropriate homeowners association shall also pay the costs for the subsequent conversion of non-standard signs to the City standard.

Design and construction of traffic signs shall be in accordance with the "FDOT Standard Specifications" and "FDOT Roadway and Traffic Design standards Manual on Uniform Traffic Control Devices".

13.2.2.1 Signing Plans

Signing plans shall be submitted, with paving marking plans, to the Public Works Department for review, as part of the construction plans for development where street or road construction is included. These plans shall show all new signs and all existing signs, which are designated to remain.

13.2.2.2 Materials

All "STOP", "YIELD", "DO NOT ENTER", and "WRONG WAY" signs and street name signs shall be fabricated entirely with high intensity

reflective sheeting. Other signs shall be fabricated using engineering grade materials.

13.2.2.3 Maintenance of Signs During Construction

"STOP" and "YIELD" signs shall be maintained during construction. All temporary signs shall conform to the same specifications as permanent signs.

13.2.2.4 Design of Supports

Shop drawings and quantities for overhead sign structures, special designs for ground sign structures, and large guide sign panels, shall be submitted to the Department or Public Works after review by the Engineer of Record.

Minimum vertical clearances for overhead signs shall be as detailed in Florida Department of Transportation's "Traffic Operations Standards".

13.2.3 Traffic signals

13.2.3.1 Materials

All materials and workmanship shall meet the requirements of the "USDOT Manual on Uniform Traffic Control Devices for Streets and Highways", "Institute of Transportation Engineers", the "National Electrical Code", "Underwriters Laboratories, Inc.", "Industrial Control Standards of National Electrical Manufacturers Association", "International Municipal Signal Association" and applicable FDOT standards and specifications.

13.2.3.2 Signal Poles

Except where otherwise approved by the City of Groveland, traffic signals shall be mounted on mast arms meeting the requirements of FDOT Series 1700 and shall be dark green in color.

13.2.3.3 Pole Foundations

Foundation installations shall be back-filled and compacted to a firm, stable condition equal to or greater than that of the surrounding soil. Where applicable, the pole base shall be finished flush with the adjoining sidewalk so as to allow an obstruction free walking surface.

13.2.3.4 Pole Locations

Poles, generally, shall be located at the right-of-way lines (back of the sidewalk).

13.2.3.5 Pole Position Adjustments

Pole positions and conduit routing may be adjusted as approved by the Public Works Department to prevent conflicts with utility and drainage structures not indicated on plans.

13.2.3.6 Minimum Pole Heights

All signal poles shall have a minimum height adequate to provide a 17 foot Low Point Center for bottom of signal head, and not more than 19 feet.

13.2.3.7 Grounding

All poles, controllers, detector cabinets and pull boxes, and other elements of the installation shall be grounded by installing either a ground rod assembly or a ground rod array.

13.2.3.9 Signal Heads

A minimum of two signal heads for each approach for vehicular traffic shall be provided. Pedestrian signals, push buttons, and signs shall be provided on all corners. Vehicular signals shall be installed with drop pipes and disconnect hangers.

13.2.3.10 Controller and BC4T Cabinet

All "T" intersections shall have a four phase full actuated controller in a BC4T cabinet and all 4-way intersections shall have an eight-phase full actuated controller in a BC4T cabinet, unless otherwise specified by the Public Works Department.

13.2.3.11 Vehicle Inductive Loop Detectors

Vehicle inductive loop detectors shall be 5 feet wide by 40 feet long, with 10 feet extending in front of STOP bar in a quadrapole pattern of 1-2-1 winding, unless otherwise specified by the Public Works Department.

13.2.3.12 Shop Drawings

Manufacturer's descriptive literature and technical data which fully describes the types of signal equipment proposed for use, shall be

forwarded to the Public Works Department after review by the Engineer of Record.

13.2.3.13 Record Drawings

Record drawings shall be submitted for all traffic control devices, indicating deviations from the approved construction plans. Drawings shall be submitted to the Public Works Department after review, dating, signing and sealing by the Engineer of Record.

13.3. BIKE PATHS/LANES

13.3.1 Design Criteria

Design of bike paths/bike lanes shall comply with the requirements/guidelines of the Federal Highway Administration, the Florida Department of Transportation, and the "Manual on Uniform Traffic Control Devices" (MUTCD). Alternate materials and methods of construction will be considered for temporary installations. Striping and signage shall be as set forth in the MUTCD and FDOT Standard Specifications. Paths shall be painted with paint meeting the requirements of FDOT Standard Specifications for traffic paint or fast dry traffic paint. Paint color shall be approved by the City of Groveland.

13.4. BRIDGES AND BOX CULVERTS

13.4.1 Design Criteria

Design of bridges and box culverts associated with City of Groveland streets and roads shall be carried out by a Florida Licensed structural engineer qualified to provide professional engineering services in this area of expertise. Bridges and box culverts shall be designed in accordance with the requirements/guidelines of the Federal Highway Administration, the Florida Department of Transportation and other applicable codes and standards. The structures shall be designed and constructed to be consistent with the streets to which these structures are connecting, in terms of the number of lane widths and street section and traffic loadings. These structures shall carry pedestrian and bike travel, if these features are provided by the adjoining streets/roads. Appropriate safety measures, such as handrails, guard rails, etc. shall be provided. Sidewalks shall be elevated six inches above the bridge/box culvert driving surface by use of an upright (Type D or Type F) curb.

Appropriate and complete soils investigations shall be conducted prior to the design. The information shall be evaluated and the foundations shall be designed by a Florida Licensed structural and/or geotechnical engineer qualified to perform these services.

13.4.2 Construction

Pre-cast, pre-fabricated or pre-engineered structures may be used, if the design is signed and sealed by a qualified Florida licensed engineer. Construction of such

structures shall be in strict compliance with the manufacturer's recommendations and in compliance with all applicable codes and standards.

Conventional construction shall be done only by qualified construction contractors with sufficient experience in similar construction, as determined by the City.

13.4.3 Utilities Crossings

The use of bridges and box culverts for supporting pipe and utilities crossings is discouraged. However, the City may accept these on a case by case basis, if the Engineer of Record provides sufficient design and supporting information to satisfy the Public Works Director as to the need, appropriateness and safety of said crossings. Proper pipe supports and protection of the pipe and/or utility shall be provided, without impeding of the stream flow.
