

**DIVISION OF HIGHWAYS
DEPARTMENT OF TRANSPORTATION**

**MUNICIPAL / DEVELOPER
SUBMITTALS GUIDELINES**

FOR PLAN REVIEWS AND ENCROACHMENTS

January 2000



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Purpose and Use of these Guidelines

These guidelines were developed by a CPI Team to assist in reducing the time required for review of Municipal/Developer plans by the DOT Design Units in Raleigh. The intent is to streamline DOT plan reviews by providing guidelines and by revealing the review process to cities, developers, and consultants who prepare plans that require review by the Design Units in Raleigh. These Guidelines will be updated periodically as required and at a later date may become a part of the DOT Policy and Procedures.

The District Engineer should be the first contact for the review of any plan submittals or encroachment request. The District Engineer will determine the procedure to follow for each submittal. Some submittals may only need to be reviewed at the District or Division level. The flow chart attached to this manual will give a brief overview of the logical steps to follow for obtaining an expedited review when one is required by the Design Units in Raleigh.

ALL SUBMITTALS WILL REQUIRE COMPLETION OF THE PLAN REVIEW / ENCROACHMENT AGREEMENT APPLICATION contained in this manual. A completed copy shall be transmitted to Raleigh with each set of plans and the District Engineer will retain the original on file.

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NCDOT DIVISION & DISTRICT ENGINEER LISTING, (Revised 2/2/2000)

SEE web site http://www.doh.dot.state.nc.us/operations/DOT_english/default.pdf for latest update.

DIV	Title	Name	Address / C.S.No. / Telephone	DIST	District Engineer	Address	C.S. No.	Telephone
1	Division Engineer	D.R. Conner, PE	PO Box 850	1	G.A. Byrum, PE	PO Box 1405 Elizabeth City 27909	10-31-04	252-331-4737
	Div. Maint. Engr.	A.W. Roper, PE	Edenton 27932	2	R.D. Smith	PO Box 748 Ahoskie 27910	10-12-05	252-332-4021
	Div. Constr. Engr.	R.E. Capehart, PE	10-62-26	3	S.D. Baker	PO Box 928 Plymouth 27962	16-15-01	252-793-4568
2	Division Engineer	C.E. Lassiter, PE	PO Box 1587	1	D.R. Taylor, PE	1701 W. 5th St. Suite Washington 27889	16-05-01	252-946-3689
	Di. Maint. Engr.	D.A. Alligood, PE	Greenville 27835	2	A.C. Everett	209 S. Glenburnie Rd. New Bern 28560	16-60-04	252-514-4716
	Div. Constr. Engr.	B.E. Eatmon, PE	01-44-25	3	R.E. Davenport, PE	1629 Hwy 258 S. Kinston 28504	01-23-26	252-527-0053
3	Division Engineer	D.J. Bowers, PE	124 Division Dr.	1	D.R. Huffman	410 New Bridge St. Suite 7A	11-03-31	910-346-2040
	Div. Maint. Engr.	R.W. Cates, PE	Wilmington 28401	2	K.E. Fussell, PE	220 N. Blvd. Clinton 28328	11-31-04	910-592-6174
	Div. Constr. Engr.	J.E. Blair, PE	04-11-03	3	D.L. Thomas, PE	300 Div. Dr. Wilmington 28401	04-11-03	910-251-2655
4	Division Engineer	D.R. Dupree	PO Box 3165	1	B.A. Mills	PO Box 98 Halifax 27839	07-43-10	252-583-5861
	Div. Maint. Engr.	J.H. Trogdon, III, PE	Wilson 27893	2	L.R. Ward, PE	3013 US 64A Nashville 27866	07-73-07	252-459-2128
	Div. Constr. Engr.	W.L. Oglesby, PE	01-53-26	3	R.B. Bunn, 111, PE	2671 US 70W Goldsboro 27530	01-10-01	919-731-7938
5	Division Engineer	J.G. Nance, PE	2612 N. Duke St.	1	T.B. Dover., PE	4009 District Dr. Raleigh 27607	51-31-00	919-733-2814
	Deputy Div. Engr.	J.W. Bowman, PE	Durham 27704	2	R.H. CooperE	815 Stadium Dr. Durham 27704	17-27-03	919-560-6854
	Div. Maint. Engr.	R.E. Greene, PE	17-27-03	3	S.G. Capps, PE	PO Box 205 Henderson 27536	07-23-13	252-492-0111
6	Division Engineer	T.R. Gibson, PE	PO Box 1150	1	R.J. Nelson, PE	PO Box 2157 Lumberton 28359	14-92-03	910-618-5546
	Div. Maint. Engr.	R.K. Murphy, Jr., PE	Fayetteville 28302	2	R.R. Stone, PE	PO Box 1150 Fayetteville 28302	14-55-24	910-486-1496
	Div. Constr. Engr.	T.C. Pittman, PE	14-55-24	3	R.E. Crumpler, PE	PO Box 27 Whiteville 28472	04-21-04	910-642-3760
7	Division Engineer	J.M. Mills, PE	PO Box 14996	1	Vacant	PO Box 766 Graham 27253-0766	17-40-02	336-570-6833
	Deputy Div. Engr.	Vacant	Greensboro	2	S.L. Hall	PO Box 14996 Greensboro	02-16-44	336-334-3161
	Div. Maint. Engr.	T.J. Dyer, PE	27415-4996	3	J.B. Hunsinger	PO Box 2513 Reidsville 27323	02-29-27	336-634-5644
8	Division Engineer	W. F. Rosser, PE	PO Box 1067	1	J.L. Picklesimer, PE	PO Box 1164 Asheboro 27203	13-62-07	336-629-1423
	Div. Maint. Engr.	R.W. Hancock, PE	Aberdeen 28315	2	J.A. Clendenin	PO Box 1067 Aberdeen 28315	03-51-05	910-944-7621
	Div. Constr. Engr.	T. Johnson, PE	03-51-05	3	W.T. Campbell, PE	219 Clemmer Road Rockingham	03-80-04	910-582-7075
9	Division Engineer	D.B. Waters	2125 Cloverdale	1	C.T. Corriher, PE	4770 S. Main St. Salisbury 28147	05-31-01	704-639-7560
	Div. Maint. Engr.	M.T. Patton, PE	Winston-Salem 27103	2	M.C. Shaffner	2135 Cloverdale Ave.	13-12-04	336-761-2410
	Div. Constr. Engr.	M.L. Holder, PE	13-12-04			Winston-Salem 27103		
10	Division Engineer	B.G. Payne, PE	716 W. Main St.	1	J. Wilson, 111	615 Concord Rd. Albemarle 28001	03-21-01	704-982-0104
	Deputy Div. Engr.	B.S. Moose, PE	Albemarle 28001	2	Vacant	PO Box 190 Newell 28126	05-13-10	704-596-6900
	Div. Maint. Engr.	P.T. Moxley, PE	03-21-01	3	Vacant	130 S. Sutherland Ave.	03-05-02	704-289-1397
11	Division Engineer	R.C. McCann, PE	PO Box 250	1	M.A. Pettyjohn, PE	PO Box 558 Elkin 28621	09-80-02	336-835-4241
	Div. Maint. Engr.	T.L. Absher	N. Wilkesboro 28659	2	M.L. Bolick	PO Box 1460 Boone 28607	15-91-02	828-265-5380
	Div. Constr. Engr.	Vacant	15-13-32	3	D.J. Tetzlaff	PO Box 250 N. Wilkesboro 286-99	15-13-32	336-667-9117
12	Division Engineer	R.W. Spangler	PO Box 47	1	D.D. Reece	PO Box 47 Shelby 28150-0047	06-53-02	704-480-5402
	Div. Maint. Engr.	J.C. Lamb, Jr., PE	Shelby 28150-0047	2	J.W. Rand	124 Prison Camp Rd. Statesville	09-33-19	704-876-3947
	Div. Constr. Engr.	D.C. Grissom, PE	06-53-03			28687		
13	Division Engineer	W.D. Smart, PE	PO Box 3279	1	S.A. Moore, PE	Rt. 1, Box 169C Marion 28752	12-91-02	828-652-3344
	Div. Maint. Engr.	R.M. Crisp, PE	Asheville 28802	2	K.A. Wilson, PE	PO Box 3279 Asheville 28802	12-60-02	828-298-2741
	Div. Constr. Engr.	M.R. Phillips, PE	12-60-02					
14	Division Engineer	F.D. Martin, PE	PO Box 37	1	E.A. Green, PE	4142 Haywood Rd.	06-98-20	828-891-7911
	Div. Maint. Engr.	J. J. Swain, Jr., PE	Sylva 28779	2	C.R. Styles, PE	Horse Shoe 28742	08-30-03	828-488-2131
	Div. Constr. Engr.	R.G. Watson, PE	08-23-15	3	J.B. Setzer, PE	PO Box 250 Bryson City 28713	08-54-01	828-321-4105
J.D. Goins, PE, Chief Engineer – Operations D.A. Allsbrook, Jr., PE, Deputy Chief Engineer – Operations W.S. Varnedoe, PE, State Maintenance & Equipment Engineer R. Canales, PE, State Construction & Materials Engineer						PO Box 25201 Raleigh 27611	51-31 00	919-733-7621 919-731-2330 919-715-5662 919-715-5662



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Types of Encroachment Agreements

- 16.1 PUBLIC, PRIVATE AND COOPERATIVE UTILITIES** – Public, private and cooperative owned water line, power line, telephone line, gas line, etc. (Installation constructed and maintained by encroacher.)
- 16.1A TWO PARTY, NON-UTILITY** - Items not related to road construction, including fence, signs, monitoring wells, sidewalk only, irrigation system (Installation constructed and maintained by encroacher).
- 16.1B TWO PARTY** - Pavement widening, curb and gutter, storm drainage, pavement markings, ditches and shoulders, sidewalk constructed in conjunction with other roadway improvements. (Installation by encroacher, then owned and maintained by NCDOT [except sidewalk]).
- 16.2 CONTROLLED ACCESS** - Installation on Controlled Access Right of Way (I-40, US 1, etc.)
- 16.3 BLANKET ENCROACHMENT** - Plowed telephone cable installations
- 16.4 BLANKET ENCROACHMENT** - Plowed cablevision installations
- 16.5 BLANKET ENCROACHMENT** - Utility service connections
- 16.6 THREE PARTIES UTILITY** - Water, sewer, etc. installed by second party, and maintained by third party.
- 16.6A THREE PARTY ON CONTROLLED ACCESS RIGHT OF WAY** - Water, sewer, etc. installed by second party, maintained by third party on controlled access right of way.
- First Party:** NCDOT
Second Party: Encroacher, developer, contractor, etc.
Third Party: Municipality
- 16.7 GRADING OR ALTERATION OF DRAINAGE ON INTERSTATE** – Grading or Alteration or Drainage on Interstate or other Controlled Access Highways.

Standard drawings and specifications can be viewed and copied from the Division of Highways homepage located at: http://www.doh.dot.state.nc.us/preconstruct/highway/dsn_srvc/specifications/ and click on (industry links)

Manuals can be acquired from the Value Management Section of the Design Services Unit at 1020 Birch Ridge Drive, Raleigh, N.C. (919) 250-4128.

REQUIREMENTS FOR SUBMITTING ENCROACHMENT AGREEMENTS

- Generally, an encroachment is required for any construction, installation, activity or operation within the NCDOT Right of Way.
- Forms are available from any NCDOT District Office. Encroachments must be submitted on original NCDOT forms.
- We do accept forms off the Internet, provided a statement is placed on the form that it is a true copy of the original.
- All information to be completed on the encroachment (except signatures) should be typed. Original wording in the encroachment shall not be altered. Signatures must be signed in ink by second and third party and witnesses.
- The encroachment must have the correct and complete mailing address in the appropriate space on the encroachment.
- Roads must be identified by State Road Number (i.e. I-40, US 1, NC 55, SR 1005, etc.) Location should be precise and referenced to the nearest intersecting state maintained road when possible.
- The description of work statement should be brief and concise and conclude with “as shown on the attached plans.” (Example: “...construction and/or erection of a 6 inch water line as shown on the attached plans.”)
- If the encroaching party is incorporated, the corporate seal must be affixed, and the person signing the encroachment shall be an officer of the corporation.
- The municipal seal must be affixed if the second or third party is a municipality.
- Encroachments involving roadway widening or modifications must have a pavement-marking plan submitted with the encroachment.
- Projects with one acre or more of disturbed area for the project must have an approved erosion control plan submitted with the project and documentation of approval by local regulatory unit. A statement of responsibility for erosion control is required for projects of less than one acre.
- Submit (6 copies)* of the appropriate encroachment agreement, with six copies of the plans to the respective District Engineer for your area. (please refer to the contact list). Allow a **minimum** of two weeks for review and approval of utility encroachments. Encroachments involving roadway improvements, storm drainage, controlled access right of way, etc.-requiring review by other units within NCDOT will require more time (in some cases, substantially more) before final approval is given. Review time in all situations is dependent upon current workloads.

Municipal Agreements

When the Department of Transportation participates with a municipality through funding and/or work being accomplished, a municipal agreement is required. The terms of the agreement will vary depending on the nature of the project. Contact the District Engineer’s office responsible for your area for further details

ENCROACHMENT AGREEMENT APPLICATION

Roadway Plan Review Request

- Encroachment review Review for future addition

Date: _____

Division: _____

District: _____

AGENCY/DESIGN FIRM INFORMATION

(Person to contact regarding design review comments and plan revisions)

Contact Person: _____ Telephone Number: _____

Address: _____ Zip: _____

E-Mail Address: _____ Fax Number: _____

Project Name: _____ Municipality: _____

Route: _____ Road Name: _____

Project Location: _____

(distance and direction from nearest intersecting state maintained road including road name and number)

Project Description: _____

To Be Filled out by NCDOT Staff

Type of Review Requested:

- | | |
|---|---|
| <input type="checkbox"/> Complete Review (Design Services and all affected units) | |
| <input type="checkbox"/> Traffic Review | <input type="checkbox"/> Roadway Design Review |
| <input type="checkbox"/> Hydraulics Review | <input type="checkbox"/> Pavement Design Review |
| <input type="checkbox"/> Structure Design Review | <input type="checkbox"/> Utility Design Review |

Driveway permit required: ____ Yes ____ No

Encroachment agreement required: ____ Yes ____ No



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Plan Submittal Checklist for Municipal/Developer Submittals (Preliminary Plan Design)

- Horizontal and vertical design
- Horizontal & vertical alignment plans (based on design speed from AASHTO Guidelines)
- Sight distance requirements at intersections
- Turn lane and taper lengths based on traffic volumes and design speed
- Preliminary pavement design
- Cross-Sections (2 sets)
- Structure design plans and calculations
- Traffic control plans
- Drainage design and hydraulic design calculations (Based on NCDOT Guidelines for Drainage Studies and Hydraulic Design)
- Utility installation design (In accordance with the Utility Manual)
- Environmental review plans and documents (when applicable)
- Identify applicable encroachment agreements
- Six (6) sets of plans
- Design year traffic forecast
- Proposed typical section (pavement width, shoulder width and slopes and ditch width and slopes, etc.)

Note: Roadway plans being submitted for approval for future addition to the State Maintenance System are subject to the same guidelines as encroachment submittals. It will not be necessary to complete encroachment agreements for non-system plan approvals. Encroachment agreements and/or driveway permits are required at intersecting state maintained roads for roadway improvements and any utility installations or modifications.

MUNICIPAL / DEVELOPER SUBMITTAL GUIDELINES

ROADWAY

I. SCOPING MEETING STAGE

A. Notice

1. The applicant shall arrange a scoping meeting as directed by the District Engineer at the beginning of the planning process. This meeting will discuss preliminary alignments for the project, monetary issues, and other concerns at this stage of the project.
2. Where applicable the District Engineer shall contact the Special Design Engineering Supervisor of Design Services [(919)-250-4128].

B. Intent

1. The attendance of the Project applicant and other D.O.T. personnel at the scoping meeting will insure that all parties understand the general plan of the project. It also enables D.O.T. personnel the chance to make comments on conflicting elements of the project before much time has been spent developing the project.
2. The scoping meeting also allows discussion on financial topics that may affect the project design.
3. The scoping meeting allows all the main personnel involved with the project to meet and discuss the project face to face.

C. Requirements

1. The applicant is expected to have mapping of some sort (aerial or otherwise) with an illustration of the proposed alignment relative to existing roadways. This should preferably be of large scale to facilitate viewing by all attendees. A handout of known project information for each attendee is recommended.
2. **Prior to beginning this design, the applicant should submit all Design Assumptions for approval.** The appropriate plan sheet size (work area of 20"x30") and the scale for final plans shall be determined. The State will furnish an example that should be used as a guide. Any design criterion used that is not in compliance with AASHTO should be brought to the State's attention for evaluation of a design exception.
3. Prior to beginning of hydrological studies, the applicant should review the Guidelines for Drainage Studies and Hydraulic Design at web site (www.doh.dot.state.nc.us./preconstruct/highway/hydro). Upon completion of hydrologic/hydraulic studies, the applicant shall submit one (1) copy of Bridge and/or R.C. Box Culvert Survey Report(s), all hydraulic calculations, and one (1) copy of Plan & Profile Sheets to the Hydraulic Unit for review.

II. PRELIMINARY REVIEW PLANS (25% PLANS)

- A. The applicant shall prepare preliminary review plans which include but are not limited to the following:
 1. Proposed preliminary design for the roadway including intersection layout. These concepts should include superelevation on cross-sections and plan view, sight distance calculations, capacity analysis recommendations and any other such related factors that could influence the vertical and horizontal geometrics of the intersection.
 2. Ground surface profiles and preliminary grade profiles for the mainline and intersecting roads should be completed. If project requires a resurfacing grade, this should be submitted along with control points for review. All -Y- line grades should have mainline pavement cross-slope and edge of pavement elevation shown at tie-in point.
 3. Preliminary typical sections defining overall dimensions of proposed design.
 4. Preliminary cross-sections for proposed construction in critical areas that could influence design. This includes showing temporary slopes for traffic control, if applicable.
- C. The applicant shall submit the preliminary hydraulic design of all major drainage structures; i.e. bridges and/or box culverts.
- D. The applicant shall submit for review six (6) sets of preliminary plans and two (2) sets of cross-sections in select critical areas at the beginning of this stage.
- E. When submitting 25% plans, the following should be submitted:

1. Title Sheet.
 2. Typical Sections.
 3. Plan / Profiles with preliminary grades.
 4. Capacity Analysis. (See the latest edition of the HCM, See Congestion Management Guidelines)
 5. Copies of approved R.C. Box or Bridge Survey Report(s) if roadway grades are controlled by these reports.
 6. Cross-sections in critical areas that could affect the alignment.
- F. Prior to this submittal, a responsible engineer should carefully check all designs and computations.
- G. Following the preliminary review the applicant shall design all cross-drains, ditches, storm systems etc. as explained in the Hydraulic Design Guidelines.
- H. After approval of the preliminary (25%) review plans and upon completion of all cross-sections and approval of the bridge survey report (if applicable), the applicant shall provide the State with one (1) set of full-size white bond preliminary roadway plans and one (1) set of full-size cross-sections.

III. RIGHT-OF-WAY PLANS (75% PLANS)

- A. The applicant shall coordinate with NCDOT to schedule a date for the Preliminary or Combined Field Inspection and notify everyone involved. Applicant shall submit 75% plans to NCDOT a minimum of 4 weeks prior to scheduling the Preliminary or Combined Inspection. Following the field inspection, the applicant shall make all changes resulting from the field inspection. After the field inspection, the Design Branch will send the applicant a field inspection recommendation letter addressing all items requiring revision, prior to completing right-of-way plans.
- B. The applicant shall prepare Right of Way / 75% Plans to include, but not limited to, the following:
1. Proposed design for the roadway, including intersections.
 2. Ground surface profiles and project grade profiles for the mainline and intersecting roads (including resurfacing grades).
 3. Proposed guardrail.
 4. The location and size of all drainage structures and systems required for complete drainage of the project.
 5. The location of slope stake limits or construction limits, including berm or lateral ditches and channel changes.
 6. All property lines within the right of way limits and immediately adjacent to the proposed right of way, along with all bearings, curve data, distances and corners of such property lines obtained from field survey notes and deed descriptions. All affected parcels must show name of property owner. Parcel numbers for all properties from which right of way or easements will be acquired.
 7. The existing right of way lines of public roads shall be shown within the project limits.
 8. Proposed right of way and easement requirements: All temporary construction easements shall be enclosed and labeled "E". Temporary and permanent drainage easements are to be appropriately labeled on the plans as "TDE" and "PDE" respectively. All right of way and easement points will be flagged with an offset station and a distance. All property lines will be tied to the proposed alignment with a tie station and distance along the projected line from the proposed right-of-way line to the design centerline.
 9. All typical sections required for construction of the project.
 10. Cross-sections for all proposed construction. The cross-sections shall be drawn with the vertical scale the same as the horizontal scale, preferably 1"=10'. A scale shall be shown on all sheets.

11. Location of any proposed service roads (if required).
12. Construction phasing plan (if applicable).
13. Any detour construction needed will be shown in the Roadway Plans.

These and other items are listed in the Preliminary Plan Checklist, which should be obtained through Design Services. The plans should be carefully checked by a responsible engineer prior to submitting to NCDOT.

- C. The applicant shall provide the State with six (6) sets of full-size reproducible paper right of way plans and Cross-sections.
- D. The applicant will be required to make all plan revisions, including, but not limited to, right of way, easements, property lines, owners names, areas, etc. as requested by the State.
- E. Prior to submitting right of way plans, all designs and quantities should be carefully checked by a responsible engineer.

IV. FINAL ROADWAY CONSTRUCTION PLANS (100% PLANS)

The applicant shall prepare final construction plans and special provisions.

- A. General Requirements for final construction plans, in addition to the completion of all proposed design, to include, but not be limited to, the following:
 1. Final Plan Checklist.
 2. List of Standard Details if using NCDOT Standard Drawings (Request current list from Design Services).
 3. Any required Special Details.
 4. Summary of Quantities.
 5. Lists of Drainage Quantities (includes pipe removal).
 6. Summary of Guardrail.
 7. Summary of Pavement Removal.
 8. Summary of Earthwork.
 9. Quantity Breakdown Summary Sheet.
- B. Checklist for final plans will be provided by Design Services. Prior to turning in final plans, all designs and quantities should be carefully checked by a responsible engineer.
- C. The applicant shall provide the State with six (6) sets of checked prints of roadway construction plans, including six (6) sets of cross sections, and one (1) copy of computations including copies of any correspondence to support any quantity or pay item where calculations are not made, for final review prior to acceptance.
- D. Prior to turning in original plans and calculations, the applicant(s) responsible for the Roadway and Hydraulic Design shall seal the title sheet and all plan & profile and detail sheets (to include name of design group and current address).

V. OTHER PROJECT REQUIREMENTS (These should be addressed prior to submittal of 25% Plans)

- A. Subsurface Data For Structure and Roadway
 1. The applicant will provide geotechnical inventory data and recommendations for structures and roadway portions of the project. The applicant will also prepare all subsurface profiles for the construction plans on reproducible copies of the applicant's Preliminary Plan and Profile. The

applicant will be responsible for all changes to these drawings and furnish the NCDOT the final plans.

2. Subsurface recommendations are necessary for the design phase of project plan preparation. These recommendations may affect the following:

a) Project Grade Line:

- 1) In fill conditions, the position of the grade line may be determined by the underlying material and position of the water table.
- 2) In cut conditions, the grade line may be affected by the position of the water table and the usability of the excavated material. Often the excavation of unsuitable material can be avoided by adjustment of the grade line. Sag vertical curves with the low point in a cut should be avoided.

b) Slopes:

Slope stability will determine the maximum cut, fill, and end bent slopes to be used on the project. Cut slopes east of I-95 are generally 3:1 maximum.

c) Alignment:

- 1) Since areas with extremely poor subsurface conditions should be avoided, preliminary subsurface reviews should be made during preliminary design.
- 2) Alternate construction methods are to be considered for poor subsurface conditions during the design of the project: for example, the use of boulevard (extra wide and deep) ditches to lower existing water table, or construction fabric in place of undercut and backfill.

d) Other items for consideration should be underdrain systems, stone embankment in standing water, select backfill in undercut areas which cannot be drained and settlement times and gauges and/or surcharges in areas with underlying deformable strata.

e) Undercut (If the project has any specific areas requiring undercut):

- 1) A detail of the typical section showing the limits of undercut is to be shown in the plans.
- 2) The limits of undercut shall be shown by cross-hatching in the profile view and on the cross-sections. The approximate depth of undercut shall be indicated by the lower edge of the cross-hatching.
- 3) Quantities of undercut shall be computed and shown in the summaries and pay item list as "undercut excavation".
- 4) Replacement backfill for undercut shall be computed and added to the embankment plus % column in the Earthwork Summary.
- 5) Subsurface recommendations may require select backfill material be used in some undercut areas. This quantity shall be computed and added to the pay item list.
- 6) Under some conditions, fabric for soil stabilization may be used in lieu of undercutting. The quantity of fabric shall be computed and added to the pay item list.

VI. PLAN CONTROL AND STANDARDS

A. All plans and design shall conform to the State's standard practices for highway construction which are based on the latest edition of the following publications published by the American Association of State Highway and Transportation Officials (AASHTO): A Policy on Geometric Design of Highways and Streets, "Geometric Design Standards for Highways Other Than Freeways" as amended, and Roadside Design Guide. All plans and designs shall also conform to the standards set forth in the latest edition of the following publications published by the North Carolina Department of Transportation: "Policy and Procedure Manual for Roadway Design", "Design Manual for Roadway Design", "Roadway Standards". The most recent edition of the "Highway Capacity Manual" published by the Transportation Research Board, including associated software, should be used as a reference, including such modifications as may be directed by the State during

the life of the project. Where alternate designs may be feasible, the applicant shall prepare material necessary to reach a decision as to the appearance, economy, safety, and capacities of the design to be used.

- B. All plans and specifications shall be in conformance with the latest Standard Specifications for Roads and Structures and amendments thereto.

VII.POINT OF CONTACT - PROJECT CONTROL

After the project has been submitted to the Design Services Unit in Raleigh all requests for project information, questions concerning scope of work changes or inquiries concerning the project in general should be directed to the Special Design Engineering Supervisor of Design Services Unit. No correspondence or submittals should go directly to internal units of NCDOT unless directed specifically to do so by the Project Engineer or Squad Leader. This policy is effective throughout the life of the project.

VIII.DATA AND SERVICES TO BE FURNISHED

- A. For the latest information, please visit our web site at: www.doh.dot.state.nc.us
- B. The applicant shall furnish the following information and services to the State:
 - 1. Detailed design assumptions for alignments, typicals, drainage, etc.
 - 2. Schedule of all critical items required to meet the dates for the completion of the right of way plans and the 100% plans.
 - 3. A full-size hard copy of final plans (100%) printed on reproducible bond paper.
 - 4. Name, address and phone number of the applicant on all plan sheets.
 - 5. The applicant will attend all meetings, consultations, and field inspections deemed necessary

TRAFFIC

TRAFFIC CONTROL AND PAVEMENT MARKING PLAN

I. DESCRIPTION OF WORK REQUIRED

A. 25% Submittal - Construction Staging

1. Overview Drawings
 - a) Show where the construction is occurring and where traffic is maintained.
 - b) Overviews shall be on standard plan sheets (22"x34") or ½ size (11"x 17").
 - c) Cut section views to show the relationship of travel lanes with construction phasing.
 - d) Only proposed work that is started, under construction or completed should be shown for each stage of construction.
 - e) Each phase of work should be on a separate drawing. (Location of temporary shoring shall be shown of drawings).
 - f) Show traffic flow arrows, North arrows road names and other features.
 - g) Typical scale is 1" = 100' or 1" = 200'
2. A brief written description of the construction operations and maintenance of traffic shall be shown on the overview drawings.
3. Responsible to attend all meetings deemed necessary to present the proposed construction staging.

The approval of this submittal shall complete 25% of the TCP work.

B. 75% Submittal – Preliminary Traffic Control Plan and Pavement Marking Plan.

1. Traffic Control Details
 - a) Consisting of detailed plan views, typical and cross sections that depict where construction is occurring and how traffic is maintained.
 - b) Only proposed work that is started, under construction or completed should be shown for each stage of construction. Work under construction is shaded. Completed work is shown with solid lines and not shaded.
 - c) Each phase of work should be shown on a separate drawing(s). Label all roads and other features. Show traffic flow arrows and North arrows. Typical scale is 1" = 50'
 - d) All necessary traffic control devices, required signing and temporary pavement markings shall be shown.
 - e) All sheets shall be numbered.
 - f) All applicable temporary pavement marking and delineation details and typical for each phase or step of the traffic control plans shall be included.
 - g) Details shall be on standard plan sheets (22"x34") or ½ size(11"x17").
2. Pavement Marking Plan - Final pavement marking and delineation plan for the final alignment on the final surface course (including pavement marking schedule). This is to be shown on standard plan sheets (22"x34") or ½ size (11"x17").
3. Traffic Control Phasing
 - a) A written description of the work the Contractor shall do and how traffic is maintained during each Phase and Step of construction.
 - b) Detail number shall reference the Traffic Control details and typicals.
 - c) Traffic Shifts are to be stepped out.
 - d) Temporary and final signals are to be addressed.

- e) Applicable pavement marking shall be referenced.
 - f) Intermediate Contract Times shall be identified.
 - g) Sheet numbers shall be added.
4. Project Notes.
 - a) General Notes - A list specific for the project should be on the Project Notes Sheet.
 - b) Local Notes
 - 1) A list should be on the Project Notes Sheet.
 - 2) Local Notes should be referenced in the phasing.
 5. All applicable Roadway Standard Drawings shall be listed on the title sheet.
 6. Identify all time restrictions inherent in the construction phasing and construction contract times and limitations. Appropriate NCDOT contact personnel will be provided upon request.
 7. Responsible to attend all meeting deemed necessary to present the proposed preliminary plan.
- C. 100% Submittal-final approved and sealed Traffic Control and Pavement marking plan.
1. Items I.B.1. to I.B.6 with all necessary revisions from 75% review.
 2. Engineer's quantity estimate for traffic control and pavement marking items.
 3. Identifying a list of the traffic control project special Provisions and Specifications.
 4. Final plans on Standard plan sheets (22"x34").
 5. All supporting documentation of contacts with other units or agencies relating to traffic control and Pavement markings.
 6. Responsible to attend all meetings deemed necessary to present the final plan.
 7. Responsible to attend all meetings deemed necessary to present the proposed preliminary plan.

II. ITEMS TO CONSIDER DURING DEVELOPMENT OF TCP

- A. Are any run-around detours required? These may be needed when constructing culverts, bridges or where fill/cut slopes will conflict with travel lanes etc.
Note: The actual design of detours and run-arounds should be included in the roadway portion manday estimate and on the roadway plan sheets.
- B. Are any road closures requiring off site detours? May be needed when construction procedures require the closure of existing roadways. Appropriate Division personnel (provided upon request) must be contacted to confirm recommendations.
- C. Is temporary pavement needed? Example: Portable concrete barrier on existing travelway would require some widening on opposite side to maintain sufficient lane widths.
- D. Is there a reduction in the number of existing travel lanes for extended periods of time (more than one day)? Example: A four-lane section where one direction will be shifted onto a lane in the opposite direction causing two way, two lane traffic operation.
- E. Check for any structure staging needs. Example: Construction of a proposed four lane structure in place of an existing two lane structure where only two lanes of the structure can be built, shift traffic to first stage, remove existing structure and complete proposed structure. Check for utility conflicts such as utilities that may be attached to the structure. Appropriate NCDOT contact personnel will be provided upon request.
- F. Check tie-in grades. Will grades be close enough to maintain a smooth transition when switching traffic, etc.? Make sure grades are close enough so traffic switches can be done in a day or less. If too much construction is required, tie-in cannot be completed within one workday.
- G. Will any special construction techniques be required that could cause a traffic conflict? Example: Large drainage pipes cannot be placed in half sections and work may need to be done on weekends. We need to

know this. Also, in the case of a cement or lime treated soil base next to a travelway , problems can occur when traffic is to be maintained adjacent to a drop-off.

H. Is night work required?

**Congestion Management Issues that need to be considered
when preparing project plans for NCDOT review**

- Current and design year volumes:
Traffic projections (current and design year) should be provided in the early stage of project plan development. The projections should be provided for both AM and PM peak hours for all signalized as well as major unsignalized intersections. The volumes should be broken down into peak hour turning movement format and include a directional split (D) as well as a peak hour factor (DHF). Truck percentages should also be included as part of the volume projection submittal.
- Capacity Analyses:
A detailed analysis should be performed and provided on all signalized intersections as well as for all major unsignalized intersections. The analysis should be performed for both the am and pm peak hours. Where signals are few or are spaced a mile or more apart an isolated signal analysis can be consider. Where signal spacing is more frequent, less than one mile, a system type analysis should be provided. All analyses should be conducted utilizing Highway Capacity Manual procedures and associated software. Where system analyses are needed a system modeling program(s) approved by the Department will be required.
- Signalization Issues:
New Signal(s), Upgrading existing signals, Coordinated Signal Systems, etc. will require detailed analysis and coordination with the Department. Coordination with the Departments' Traffic Engineering Branch as well as with the appropriate Division office in the early stages of project design is critical. If any Rail Road crossing(s) is involved, coordination with the Departments Rail Road Unit as well as with the Division Office and Traffic Engineering Branch to determine if Rail Road preemption will be required will also be necessary.
- Geometric Design:
Turn lanes, lane marking/assignment, lane widths and storage needs should be determined and addressed as early as possible in the design stage. The geometric design should be based on the predominant type vehicle expected to utilize the facility, with special attention given to heavy (truck) vehicles. Cross-sectional needs should be determined and proposed as early as possible in the design stage of the project. Consideration should be given to multi-lane cross-sections where the design year volume projections indicate a need. This issue should be discussed very early in the preliminary design stage of project development. The vertical and horizontal tie in of all adjacent - Y- lines should be evaluated closely, taking into consideration that the intersection may become signalized, if anticipated.
- Right-of-Way Needs:
Main line, -Y-line, and sight-distance right-of-way should also be considered in the very early stages of project development. Consideration should be given to providing adequate right-of-way to accommodate pedestrian facilities (if needed), utilities (underground and overhead), drainage needs (temporary and permanent easements), signal poles and associated cabinets and guy wires. Cut and fill slope right-of-way or easements should also be considered early in the design process.
- Access Issues:
Driveways, street connections, medians, cross-overs and limited movement cross-overs should be considered and addressed in the early stages of project design. Conformance with the Departments median cross-over policy/guide lines, as well as the driveway manual, is expected.

All design projects should consider Intelligent Transportation Systems during the initial scoping/design stages. The need for cameras, variable message boards and other electronic devices to aid in the detection, response and congestion reduction efforts along major facilities should be considered in the design process.

- Transit / Multi modal:

During the initial design /scoping process, consideration should be given to other modes of transportation such as; pedestrian, bicycle, bus or other modes of travel. Amenities such as bike lanes, sidewalks, combined use facilities and special use lanes (HOV lanes only etc.) should be considered where appropriate and justifiable.

TRAFFIC SIGNALS AND SIGNAL SYSTEMS

I. General Requirements.

(A) Point-of-Contact:

All requests for project information, questions concerning scope of works or inquiries concerning the project in general should be directed to the Division Traffic Engineer. No correspondence or submittals should go directly to the internal units of the Department unless directed specifically to do so by the Division Traffic Engineer or their representative. This policy is in effect for the life of the project.

(B) Review Time Frame:

The Division Traffic Engineer will not submit the project for review until an agreement is executed. Once the agreement is executed, a minimum of two weeks should be allowed for the review of the project. More complex designs such as those involving strain poles, metal poles with mast arms, or railroad preemption may require a substantially longer review period. Review time in all situations is dependent upon current workloads. The project should be carefully checked by a responsible engineer prior to submittal to the Department. Project submittals requiring corrections should allow for an additional review period.

(C) Design Standards:

The applicant will be responsible for all information contained in the project and will justify all design decisions contained in the project. The applicant will be responsible for providing a safe and economical design for the welfare of the public. The applicant will be responsible for insuring that all plans and designs conform to the current edition of the following publications:

- *A Policy on Geometric Design of Highways and Streets (AASHTO)*
- *Geometric Design Standards for Highways Other Than Freeways,*
- *Manual on Uniform Traffic Control Devices for Streets and Highways*
- *North Carolina Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways*
- *NCDOT Standard Specifications for Roads and Structures*
- *NCDOT Traffic Signal Specifications and all addenda*
- *NCDOT Signals and Geometrics Section Design Manual*
- *National Electrical Safety Code*
- *National Electric Code*

Final plans, analysis, and reports must be sealed by a responsible engineer. The responsible engineer must be duly registered to practice engineering in North Carolina.

II. Description of Work.

(A) Prepare traffic signal investigation reports:

Prepare traffic signal investigation reports. The report will include on-site project inspection, evaluation of area growth and potential for future growth, identification of types of vehicle and pedestrian traffic, and identification of traffic generators. The report will include an analysis of all intersections within the project limits to determine the warrants for possible traffic signal upgrades (operational and equipment changes), new traffic signals (temporary and permanent), and traffic signal systems. Where there is a signal system, the analysis will identify the impact of the new traffic signals on the through band widths established by the

existing system timing data.

The traffic signal investigation report will identify all railroad/highway at-grade crossings which may require railroad crossing signals and all traffic signals which may require railroad preemption or emergency vehicle preemption.

(B) Prepare traffic signal submittals:

Prepare traffic signal submittals composed of traffic signal plans, and electrical and programming detail plans.

Prepare traffic signal plans that comply with the *NCDOT Signals and Geometrics Section Design Manual*. Coordinate the traffic signal plans with the construction staging to determine whether interim traffic signal treatment will be necessary to maintain traffic during construction phasing. Prepare final traffic signal plans and temporary traffic signal plans (plan does not show the installation in the final traffic signal configuration) at traffic signal locations.

Prepare electrical and programming detail plans showing field connection hook-up charts, programming details, jumper and switch settings, controller brand and model number, cabinet type and mounting style (pole-mounted or base-mounted), number of loadbay positions, loadswitches used, phases used, and overlaps used, connection charts for detectors, back-up protection relay wiring details, special detector wiring details, communication interface details, preemption panel wiring details, special cabinet wiring details showing any special wiring needed to the controller cabinet.

(C) Prepare utility make-ready and communications cable routing plans:

Prepare communications cable routing plans. Perform field inspections and prepare cable routing plans. Prepare a draft set of the final utility make-ready plans for review by the Department. Following receipt of the Department's comments, submit a final set of utility make-ready plans. Utility make-ready plans will not require an Engineer's seal.

Upon completion of the utility make-ready plans, develop and submit to the Department a review set of communications cable construction plans for routing and installation of communications cable. Following receipt of the Department's comments, submit a final set of communications cable construction plans.

(D) Prepare project special provisions:

Prepare project special provisions that cover all items of work, material, equipment, and construction of traffic signal not covered in the *NCDOT Standard Specifications for Roads and Structures* or the *NCDOT Traffic Signal Specifications*. The applicant will submit the project special provisions for review at the time the traffic signal plans are submitted.

III. Work Standards.

(A) Review Meetings:

As scheduled by the Department, the applicant will attend review meetings in Raleigh or in the Division during the performance of services. The applicant will provide to the Department all required review material 5 working days prior to a scheduled meeting unless otherwise required by the Department. The meetings will be held to coordinate and review project documentation. The applicant will prepare and

provide to the Department minutes of the meetings within five working days.

(B) Final Submittals:

Final plans and project special provisions will be developed in sufficient form and detail for the Department to let construction contracts. Final plans and project special provisions will be approved by the Department prior to final acceptance. Approval by the Department will not relieve the applicant of liability or the responsibility to correct all applicant-prepared plans or computations. The applicant will correct all errors discovered on applicant-prepared plans.

All plans will be prepared on CADD Microstation format and printed on sheets conforming in sizes and design to the Department's traffic signal plan sheets.

The applicant will be held responsible for all expenses resulting from incorrect or misleading information furnished by the applicant which results in additional costs to the Department.

IV. Submittals.

The applicant will make submittals to the Department as follows:

(A) Traffic Signal Investigation Report:

Two copies of the complete traffic signal investigation report will be provided. The report will be provided prior to any development of plans. **The approval of this submittal shall complete 100% of the traffic signal investigation report milestone.**

(B) Traffic Signal Submittals:

Three sets of review prints of the traffic signal submittals will be provided. **The approval of this submittal shall complete 90% of the traffic signal submittal work milestone.**

One CADD file in Microstation format on 3.5" diskette, and up to twenty-five prints and twenty-five half-size prints of the approved final traffic signal submittals, one quantities estimate with original computations, and all other supporting documentation will be provided for final acceptance. **The approval of this submittal shall complete 100% of the traffic signal submittal work milestone.**

(C) Communications Cable Routing Plans:

Six sets of review prints of the utility make-ready communications cable plans containing all required items will be provided. **The approval of this submittal shall complete 40% of the communications cable routing plan work milestone.**

One CADD file in Microstation format on 3.5" diskette, and six prints of the approved final utility make-ready communications cable plans containing all required items will be provided. **The approval of this submittal shall complete 50% of the communications cable routing plan work milestone.**

Three sets of review prints of the communications cable routing construction plans containing all required items will be provided. **The approval of this submittal shall complete 90% of the communications cable routing plan work milestone.**

One CADD file in Microstation format on 3.5” diskette, and up to twenty-five prints and twenty-five half-size prints of the approved final communications cable construction plans containing all required items and all other supporting documentation will be provided for final acceptance. **The approval of this submittal shall complete 100% of the communications cable routing plan work milestone.**

(D) Project Special Provisions:

Three sets of the project special provisions containing all required items will be provided. **The approval of this submittal shall complete 90% of the project special provisions work milestone.**

Three sets and one Microsoft Word format on 3.5” diskette of the approved final project special provisions with original computations, and all other supporting documentation will be provided for final acceptance. **The approval of this submittal shall complete 100% of the project special provisions work milestone.**

UTILITIES

Adhere to the *Policies and Procedures for Accommodating Utilities on Highway Rights of Way* manual.

STRUCTURES

Structures shall be designed and detailed in accordance with the NCDOT Structure Design Manual and the AASHTO Standard Specifications for Highway Bridges or the appropriate AASHTO Guide Specification.

All structural submittals shall include complete drawings and details and shall be accompanied by complete design computations prepared and sealed by a North Carolina registered Professional Engineer. The computations shall include all information required and assumptions used in the design including:

- Horizontal and Vertical Roadway Alignments
- Required Clearances
- Design Loads
- Assumed or Actual Soil Properties
- Subsurface Investigations if Available
- Elevation of Water Table
- Sequence/Method of Construction
- Copies of Applicable References Other than AASHTO

DRAINAGE - Hydraulics

Submission of hydraulics plans and drainage calculations are required. A copy of U.S. Geodetic Survey or other contour mapping showing site location and drainage areas will help to expedite the review.

All storm drainage shall be adequate so that the road and rights of way can be maintained without excessive cost, and not cause flooding on private property from storm runoff of the design frequency. The minimum design frequency shall be as follows but may be increased at the recommendation of the State Hydraulics Engineer.

1. Storm sewer collector - 10 years
2. Cross drainage on secondary routes will be 25 years
3. Cross drainage on primary and NC routes will be 50 years.
4. Drop inlet/curb inlet spacing and all drainage design shall be consistent with criteria found in NCDOT - *Guidelines for Drainage Studies and Hydraulic Design*. (Contact Special Services Section (919) 250-4128 for a hard copy or the DOT Hydraulic Web Page)

Note: Use of hydraulic data forms found in *Guidelines for Drainage Studies and Hydraulic Design* is not required. However, their use may speed up the review process.

All highway rights of way shall have an acceptable permanent vegetative cover established and other acceptable permanent erosion control measures installed in accordance with Division of Highways' specifications before work will be considered completed. In areas where ditch grades or quantity of flow deem it impracticable to establish and maintain vegetation, an erosive resistant lining such as paving, matting or rip rap may be required.

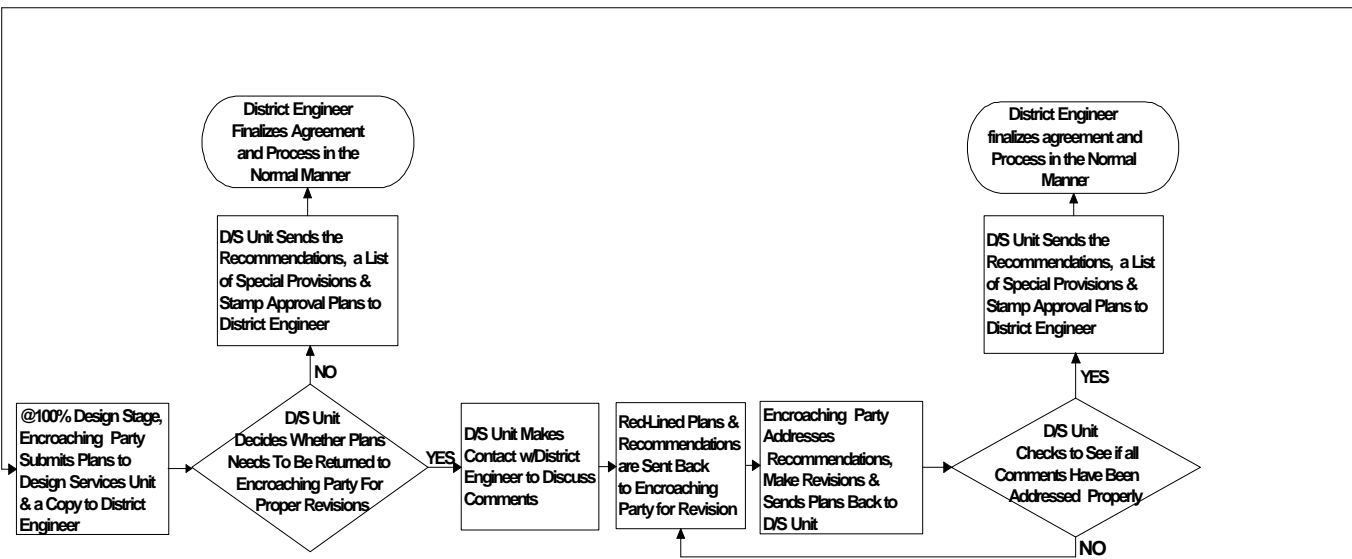
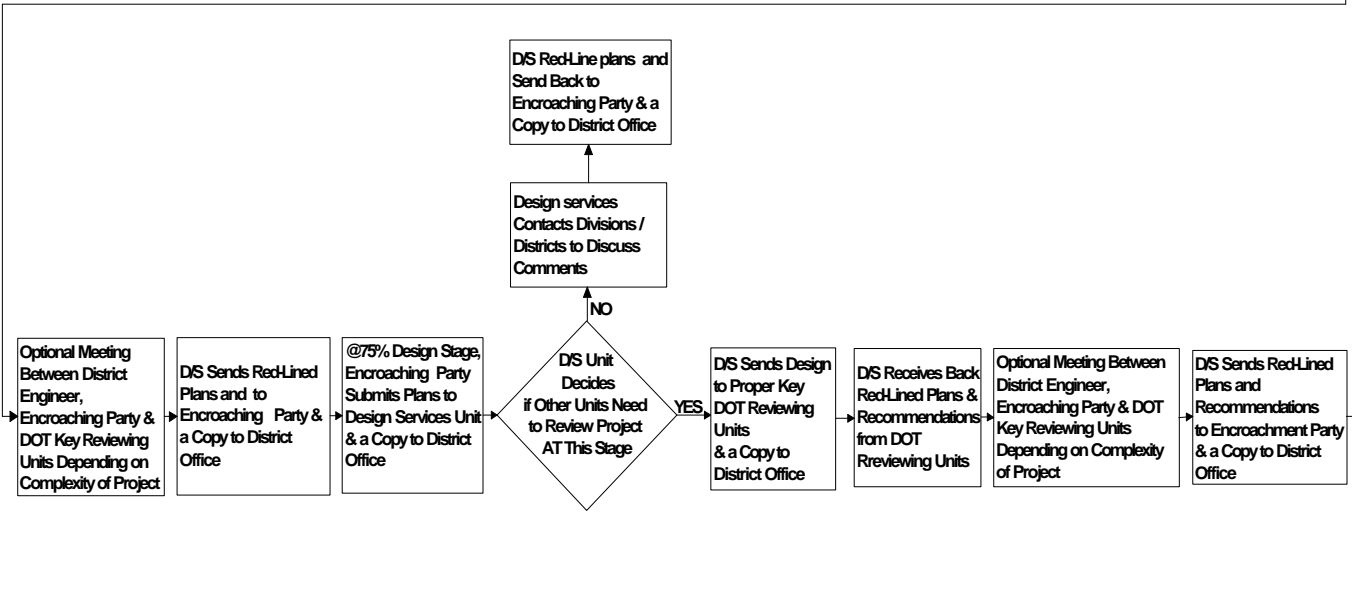
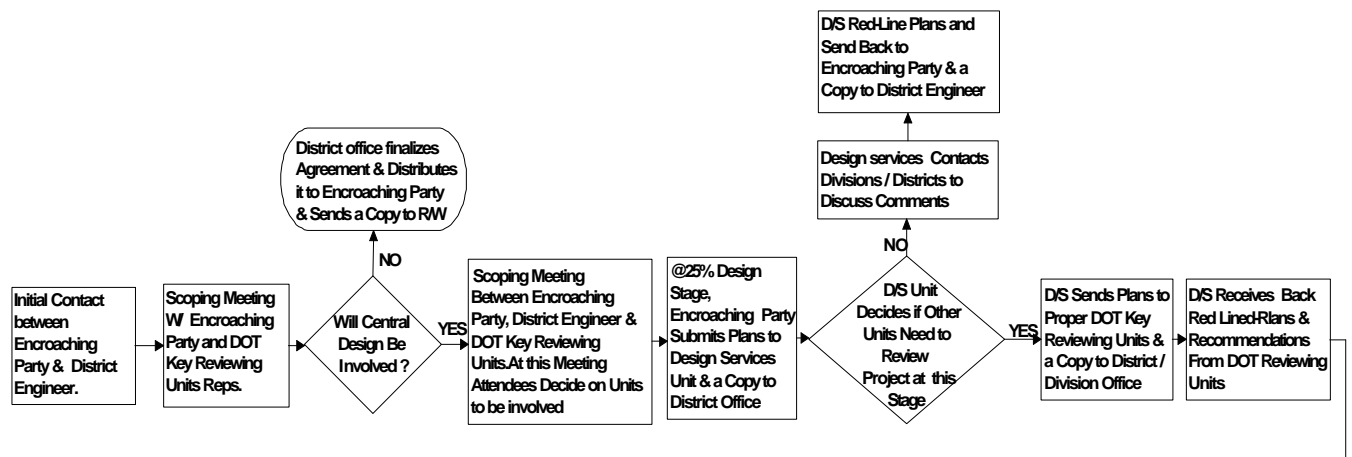
Subsurface drainage shall be adequate to maintain a stable sub-grade.

When road crossings are within FEMA regulated flood hazard areas, the design must be approved by the responsible local governing agency for its consistency with local flood zoning ordinances.

Retention/detention basins shall be located outside highway right of way. The DOT assumes no responsibility for maintenance or liability of the basins.

Impoundment of water on highway right-of-way by ponds or lakes (excluding retention/detention basins) may be allowed under the following conditions.

- A) The impoundment does not adversely affect the right-of-way for highway purpose.
- B) Adjustments as required, flattening slopes, installing rip rap, guardrail, and any others, shall be the responsibility of the encroaching party.
- C) For roads located on dams, see *Guidelines for Drainage Studies and Hydraulic Designs*.



NCDOT CENTRAL DESIGN REVIEW PROCESS FOR CONSTRUCTION & ENCROACHMENT

Flow Chart for Municipal / Developer Project Submittal