Site Plan & Subdivision Procedures

"Working toward an attractive & predestrian friendly community"

What projects require site plan approval?

The Pre-Application Conference

Minimum Submission Requirements

Minimum Contents For Site Plan

Site Plan Review Process

Minimum Specifications For Plan Layout

Surveying/ Plat Checklist

Guidelines for a Traffic Impact Study

What Projects require site plan approval?

A site plan is required for any construction, expansion, enlargement, extension, reconstruction, or alteration of a building, structure, use or change of use, including the reconfiguration or re-striping of a parking lot. One and two family dwelling projects are exempt from this review process.

Site Plan review is intended to provide facts and information to the builder, developer, owner or owner's representative & the City regarding a proposed project. The review process is a primary tool in identifying development compliance with the policies, regulations & standards and final by the City of Bedford.

The Pre-Application meeting

Builders, developers, owners, representatives and plan preparers unfamiliar with the applicable requirements and approval procedures of the City are strongly encouraged to meet with the Development Manager (Building Official) prior to submission of the site plan application. The Coordinator may require a pre-application conference with the applicant and appropriate plan review team members for large or complex projects.

Minimum submission requirements

Applicants are advised to familiarize themselves with the application prior to plan preparation. Seven (7) copies of the Site Development Plan Review Application, seven (7) copies the site plans (each page sealed and indicating the last revision date) and three (3) copies of the sealed pre & post drainage and storm water management calculations and their accompanying checklists.

MINIMUM CONTENTS FOR SITE PLAN

1) Title of the project; names of the engineer, architect, landscape architect or surveyor, if any; names of the developer and property owner; and a signature panel for the agent's approval.

2) The north point, scale, date and vicinity map.

3) The boundaries of the property involved, all existing property lines, setback lines, buildings, watercourses, waterways or lakes and other existing physical features in or adjoining the project, including flood hazard areas as identified by the official City flood insurance maps. Physical features such as watercourses, waterways or lakes on adjoining properties need only be shown in approximate scale and proportion. One page of the plans shall contain a copy of an approved plat and indicated the recordation data, unless otherwise approved.

4) The location, dimensions and character of construction of existing and proposed streets, alleys, sidewalks, curbs and gutters and all curb cuts.

5) The location and size of existing and proposed sanitary sewers; water, fiber optic telephone or other communication cables & equipment, electric and other utility lines; culverts and other underground or overhead structures in or affecting the project, including existing and proposed facilities and easements for the facilities. Where existing utilities are not existing on site and will be required for development, they shall be located and shown on with sizes and distances on the applicable utility page.

6) All off-street parking, travel lanes, driveways, loading spaces, ADA compliance structures, walkways and outdoor lighting systems (use of the City candlestick lighting is encouraged), including luminary size indicating type of surfacing, size, angle of stalls, width of aisles and a specific schedule showing the number of parking spaces provided.

7) Existing and proposed storm water management facilities indicating location, size, type and grade of ditches, catch basins, and pipes, including on-site water retention and related requirements and that they will be maintained by the owner.

8) Landscape, screening, etc. plans. Screen fencing is discouraged.

9) Information necessary to demonstrate that all construction or development will be pedestrian friendly and fully comply with applicable federal, state and local requirements for accessibility to the handicapped. City approved thermoplastic crosswalks are encouraged.

10) A temporary traffic control plan and the site distance from all existing and proposed street entrances. Proposed pedestrian friendly sites are recommended.

11) Any additional information as deemed necessary by the agent to provide sufficient information for staff review including soil information, estimated project traffic generation and related project impacts on public facilities and resources.

SITE PLAN REVIEW PROCESS

The application and site plan will be reviewed for completeness at the time of submittal. The Development Manager (Building Official) will notify the applicant of any deficiencies if the submittal is determined to be incomplete. Consequently, the City will take no further steps to process the application until the applicant remedies the deficiencies and files a complete application and site plan.

Applications may be submitted for review at any time during normal business hours to the Development Manager Office or Administrative Assistant (Building Official). The site plan review process will follow the following steps:

1) Review site plan application. A pre-application conference is strongly encouraged with the Site Plan Review Coordinator.

2) Submit site plans (ten complete sets) and E&S, SMW calculations (three sets).

3) Applicants will be notified if application is incomplete or further information is needed. Once plans are determined to be complete the will be reviewed.

4) Site review comments are compiled by the Development Manager (Building Official) and sent to the applicant or plan preparer.

5) If applicant has questions, the applicant should call the Development Manager (Building Official) to discuss or schedule a meeting.

6) Applicant makes revisions and submits revised site plans (10 sets) and E&S, SWM calculations (three sets) to the Development Manager (Building Official).

7) The Site Plan is redistributed.

8) If all required corrections have been made, the site plan is approved and the applicant is notified. The estimated time for the approval process is six to eight weeks from complete application. If all corrections have not been remedied, the applicant will be notified of the remaining deficiencies. Please repeat steps 2-6. A surety approved by the City is generally required.

9) Applications for building permits may be submitted with approved site plan.

The following checklists shall be used in the determination of the adequacy of the site plan:

1) The Erosion and Sediment Control Checklist
2) The Storm Water Design and Plan Review Checklist
3) Minimum Specifications for Plan Layout
4) Surveying/Plat Requirements
5) Guidelines for Traffic Impact Study

SITE DEVELOPMENT PLAN REVIEW APPLICATION

Project Description/Name: _____

Physical Street Address: _____

Tax Parcel ID: _____ **Zoning District:** _____

Proposed Use(s): _____

_____

_____

_____

OWNER OF RECORD: _____

Address _____

City _____ State _____ Zip _____

Daytime Phone ( ) _____ Fax # ( ) _____

Mobile Phone ( ) _____ E-mail _____

APPLICANT: _____

Address _____

City _____ State _____ Zip _____

Daytime Phone ( ) _____ Fax # ( ) _____

Mobile Phone ( ) _____ E-mail ( ) _____

RESIDENTIAL

Type of Unit(s): _____

# of building(s): _____

Sq. ft. of building(s) _____

Development Size: _____ acres. Land Disturbing Activity acres: _____

NON–RESIDENTIAL (Commercial, Industrial, Public, etc.)

# of building(s): _____

Sq. ft. of building(s)

Development Size: _____ acres. Land Disturbing Activity acres: _____

Owner / Applicant Must Read and Sign

This site plan as submitted contains all of the information required by City of Bedford Land Development Regulations, policies and standards. I understand that plans, which lack the information required, shall be deemed incomplete and non-approvable by the Development Manager (Building Official).

I hereby authorize the City of Bedford, Virginia to review these drawings, visit the site, contact the appropriate design professional(s) in relation to questions generated as a result of the review.

Print Name Daytime phone number of contact

Signature of Owner or Owners Agent Date

1) Site plans shall be prepared and certified by a qualified professional licensed in the Commonwealth of Virginia. Qualified professionals include Registered Architects, Professional Engineers, Certified Land Surveyors and Certified Landscape Architects.

2) Site plans shall be prepared on minimum 11”x 17” sheets and a maximum 30”x 42” sheets. The site plan is required to be prepared to the scale of 1” = 30’. (Upon written request, the Development Manager (Building Official) may approve a variance to sheet size and scale requirements when such variances or alterations are warranted)

3) Site Plans shall contain all the information required by the minimum contents listed in the following section.

EROSION AND SEDIMENT CONTROL PLAN CHECKLIST

*This Checklist must be completed and part of the Land Disturbing Permit submittal for review.

_____ Minimum Standards – All applicable Minimum Standards must be addressed.

- All Minimum Standards must be adhered to during the entire project, regardless of the phasing.
- Request for a Variance should be addressed.

NARRATIVE

_____ Project Description – Briefly describes the nature and purpose of the land disturbing activity, and the area (acres) to be disturbed.

- What time of year will the project start and finish? (construction sequence)
- How long will it take to complete the project?
- How many acres will be disturbed for the completion of this project?
- How much impervious area will the project have in post developed conditions?
- What will be the ultimate developed conditions of the site?

_____ Existing Site Conditions – A description of the existing topography, vegetation and drainage.

- Should list percentages of slope on the site.
- Types of existing vegetation that can be used as erosion control, or areas to be left undisturbed.
- Discuss marking of areas where existing vegetation is to be preserved.
- Discuss size of drainage areas in predevelopment conditions.
- Discuss any existing drainage or erosion problems and how they are to be corrected.
- Discuss orientation of slopes (north or south facing).
- Discuss how existing site conditions can be used to reduce the potential for erosion and how proposed E&S controls will be designed to "fit" the site.
- State how much area of the existing site is impervious.
- Photographs?

_____ Adjacent Areas – A description of the neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance.

- The potential for off-site damages must be considered and discussed.
- ANY environmentally sensitive areas should be mentioned.
- Other private or public lands adjacent to the site should be described and considered for possible problems during and after construction (traffic problems, dust control, increases in run off, etc.).
- Discuss perimeter controls to be used.

_____ Off-Site Areas – Describe any off-site land disturbing activities that will occur (including borrow sites, waste or surplus areas, etc.). Will any other areas be disturbed.

- Any off-site borrow or spoil areas should have an approved plan to supplement the overall project plan.
- If off-site areas are under other permits, proof of permits should be provided.
- List specific locations of all off-site areas.

_____ Soils – A brief description of the soils on the site giving such information as soil name, mapping unit, erodibility, permeability, depth, texture and soil structure.

- Indicate reference for soil information.
- Provide copy of soil survey map.
- Indicate what sheet of the site plan soils are delineated.
- Check for soils with a high K factor, or poor drainage, low pH, etc.

_____ Critical Areas – A description of areas on the site which have potentially serious erosion problems (e.g., steep slopes, channels, wet areas, streams, underground springs, etc.).

- Discuss any area of the project which may become critical during the project. Some areas of the site may have long or steep slopes during a certain phase of the grading.
- Indicate areas to be left alone until they can be graded and stabilized in favorable conditions.
- Discuss precautions to communicate limits of these areas to contractors and equipment operators.

_____ Erosion and Sediment Control Measures – A description of the methods which will be used to control erosion and sedimentation on the site. (Controls should meet the specifications in Chapter 3.)

- List all controls used, list specification numbers (e.g. 3.02), and list the location of the practice.
- Discuss why it was selected.
- Sequence of installation, maintenance, and removal for each control.
- Discuss temporary seeding as a means of erosion control, list the types used.

_____ Permanent Stabilization – A brief description, including specifications, of how the site will be stabilized after construction is completed.

- Final stabilization needs careful review.
- Is the timing of seeding correct with the construction sequence?
- List soil testing requirements.
- Provide seeding specifications (pure live seed minimums), fertilizer and liming specifications. Seeding tables and rates.
- Discuss all other areas to be stabilized other than vegetation (gravel, paved, etc.).

_____ Storm Water Runoff Considerations – Will the developed site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control storm water runoff.

- Discuss how downstream properties and waterways will be protected (basins, channel improvements, easements).
- Discuss how increased runoff will be managed during construction.
- List or discuss all other references for design of permanent facilities.

_____ Calculations – Detailed calculations for the design of temporary sediment basins, permanent storm water detention basins, diversions, channel, etc.. Include calculations for pre- and post- development runoff.

- All calculations showing pre-development and post-development runoff should be provided. Worksheets, assumptions and engineering decisions should be clearly presented to assist the plan reviewer in his duties.
- Calculation methods should be clearly presented and organized.
- Have the calculations shown that adequate protection of downstream properties and waterways is provided?

_____ Maintenance – A schedule of maintenance for the permanent storm water control measure should be provided.

- Should list who is responsible during construction and who will be responsible once the project is complete.
- Should provide a schedule of inspections to be conducted.
- List maintenance items to check and perform as well as precautions for large storm events.

SITE PLAN

_____ Vicinity Map – A small map locating the site in relation to the surrounding area. Include any landmarks which might assist in locating the site.

- Provide a reproduction of a topo map, road map, etc.

_____ Indicate North – The direction of north in relation to the site

- Useful tool for determining slope orientation.
- Useful for communicating written inspection reports and plan review comments.
- Useful in predicting areas off-site that might be effected by dust drift.

_____ Limits of Clearing and Grading – Areas which are to be cleared and graded.

- Show all areas to be disturbed on the site plan.
- Provide notes on how areas will be marked.
- Provide notes and illustrations to clearly indicate areas NOT to be disturbed.

_____ Existing Contours – The existing contours of the site.

- Should be shown as dashed light lines in intervals from 1 to 5 feet.
- Represent pre-development drainage areas (check these areas for accuracy).
- Show potential critical areas (slopes).
- Helps to determine cut or fill areas, low spots.
- Helps to determine if E&S controls have been designed properly.

_____ Final Contours – Changes to the existing contours, including final drainage patterns.

- Should be shown as heavy solid lines.
- Determines final drainage areas.
- Check to see if pre-developed drainage areas have increased.
- Check final grade of slopes to see if they become critical (may need diversions or flumes).
- Check vegetative specifications for final grade of slopes (low or high maintenance). Are erosion control blankets needed?

_____ Existing Vegetation – The existing tree lines, grassed areas, or unique vegetation.

- Clearly indicate existing tree lines, vegetation areas to remain, etc.
- Provide notes on the plan for areas to be undisturbed.

_____ Soils – The boundaries of different soil types.

- Indicate soil boundaries of all soil types on the site. List K factor and soil survey classifications.
- Provide notes of soil properties (texture, etc.).

_____ Existing Drainage Patterns – The dividing lines and the direction of flow for the different drainage areas. Include the size (acreage) of each drainage area.

- Should indicate by acres and show the direction of flow for all existing drainage areas.
- Indicates the need for basins, traps or other structural measures.
- Helps determine if controls are designed correctly.
- Helps to determine if off-site drainage needs to be diverted.
- Useful in planning to break up drainage areas into smaller more manageable areas during construction.

_____ Critical Erosion Areas – Areas with potentially serious erosion problems.

- All critical, environmentally sensitive or prohibited areas should be denoted on the plan and notes to state reasons for critical nature.
- Stream considerations, temporary crossings, other permits, location of stock piles, trash & debris removal, fuel storage, etc.

_____ Site Development – Show all improvements such as buildings, parking lots, access roads, utility construction, etc.

- All improvements such as buildings, roads, temporary access roads, Right
- Utility improvements on and off

_____ Location of Practices – The locations of erosion and sediment controls and storm water management practices used on the site. Use the standard symbols and abbreviations in Chapter 3 of the VESC handbook.

- The exact location of all practices including vegetation should be clearly shown on the plan.
- A legend denoting the symbols, line uses and other special characters should be provided.

_____ Off-Site Areas – Identify any off-site land disturbing activities (e.g., borrow sites, waste areas, etc.). Show locations of erosion controls. (Is there sufficient information to assure adequate protection and stabilization?)

- Are separate plans required for off-site borrow or disposal areas?
- How will off-site areas be stabilized?
- Are there any temporary easements to be disturbed during construction?
- Who has final responsibility for off-site areas?

_____ Detail Drawings – Any structural practices used that are not referenced to the E&S handbook or local handbooks should be explained and illustrated with detail drawings.

- Details should be provided which are clearly dimensioned and reflect the ability to be "built" in the field according to the proper design criteria.
- Alternative E&S measures must have proper drawings to indicate how and where they are to be constructed.
- All plan drawings, elevations, and cross-section drawings should show scales used to prepare the drawings.
- Outlet Protection schedules should be provided.
- Sizes and materials should be shown for all pipes, flumes, and slope drains.
- All details should list the specification number from the VESC handbook.
- If more than one type of specification is being used (inlet protection) details of all practices shall be provided.
- Details for all structural measures (Silt Fence, Diversion Ditches, Construction Entrance, etc.) shall be on the plans.

_____ Maintenance – A schedule of regular inspections and repair of erosion and sediment control structures should be set forth.

- Indicate who is responsible for maintenance and repair of all E&S measures on the project (RDL).
- Indicate who is the primary contact for emergencies, for notification of problems (owner), etc.
- Provide clean- and maintenance specifications for all major structures such as basins, traps, silt fence, etc...
- Require monitoring reports from the RDL if needed.

STORMWATER MANAGEMENT CHECKLIST

*This checklist must be completed and part of the Land Disturbing Permit submittal for review if the acreage disturbed is one (1) acre or more:

I. SUPPORTING DATA

Narrative describing storm water management strategy including all assumptions made in the design.

A. Drainage Area Map

_____ Site and drainage area boundaries
_____ Off-site drainage areas
_____ Pre- and post-developed land uses with corresponding acreage
_____ Pre- and post-developed time of concentration flow paths
_____ Existing and proposed topographic features
_____ Drainage area appropriate for BMP

B. Soils Investigation

_____ Soils map with site and drainage area outlined
_____ Geotechnical report with recommendations and earthwork specifications
_____ Boring locations
_____ Borrow area
_____ Basin pool area
_____ Embankment area: centerline principal spillway, emergency spillway, abutments
_____ Boring logs with Unified Soils Classifications, soil descriptions, depth to seasonal high groundwater table, depth to bedrock, etc.
_____ Compaction requirements specified
_____ Additional geophysical investigation and recommendations in Karst environment

II. COMPUTATIONS

A. Hydrology

_____ Runoff curve number determinations: pre- and post-developed conditions, with worksheets.
_____ Time of concentration: pre- and post-developed conditions, with worksheets.
_____ Hydrograph generation: pre- and post-developed condition for appropriate design and safety storms (SCS methods or modified rational-critical storm duration method)

B. Hydraulics

_____ Specify assumptions and coefficients used.
_____ Stage-storage table and curve
_____ Riser structure and barrel
_____ Weir/orifice control analysis for riser structure discharge openings
_____ Weir/orifice control analysis for riser crest
_____ Barrel: inlet/outlet control analysis

_____ Riser/Outlet Structure flotation analysis (factor of safety = 1.25 min.).
_____ Anti-seep collar or filter diaphragm design.
_____ Outlet protection per VE&SCH Std.. & Spec. 3.18.
_____ Provisions for use as a temporary sediment basin riser with clean out schedule & instructions for conversion to a permanent facility.
_____ Emergency spillway adequacy/capacity analysis with required embankment freeboard
_____ Stage - discharge table and curve (provide equations & cite references).
_____ Storm drainage & hydraulic grade line calculations.
_____ Reservoir routing of post-development hydrographs for appropriate design storms (2-yr., 10-yr., or as required by watershed conditions) & safety storms (100-yr. or as required).

C. Downstream Impacts

_____ Danger reach study.
_____ 100 year floodplain impacts.
_____ “Adequate channel" calculations for receiving channel
_____ Provide downstream hydrographs at critical study points.
_____ Storm drainage plans for site areas not draining to BMP
_____ Safe conveyance -MS-19
_____ Areas compensated for in water quality performance-based criteria calculations

D. Water Quality

_____ Impervious cover tabulation
_____ Technology-based criteria: proper selection of BMP based on impervious cover
_____ Performance-based criteria: pre- and post-developed pollutant load and pollutant removal requirement calculations (provide worksheets)
_____ Water quality volume for retention basin I, II, or III permanent pool
_____ Water quality volume for ext. detention and ext. detention enhanced with drawdown calculations
_____ Proper surface area/depth allocations for permanent pool/shallow marsh/constructed wetland
_____ Constructed storm water wetland/shallow marsh
_____ Adequate drainage area and/or base flow
_____ Adequate pool volume
_____ Adequate surface area
_____ Allocation of surface area to depth zones
_____ Maximum ponding depth over pool surface specified

III. PLAN REQUIREMENTS

A. General Items

_____ Plan view drawn at 1"=50' or less (40', 30', etc.)
_____ North arrow
_____ Legend
_____ Location plan and vicinity map
_____ Property lines
_____ Existing & proposed contours (2' contour interval min.)
_____ Existing features & proposed improvements (including utilities and protective measures)
_____ Locations of test borings

_____ Earthwork specifications
_____ Construction sequence for SWM basin and E&S controls
_____ Temporary erosion & sediment control measures
_____ Conveyance of base flow during construction
_____ Temporary and permanent stabilization requirements
_____ Emergency spillway
_____ Basin side slopes
_____ Delineation of FEMA 100 year floodplain
_____ Plans sealed by a qualified licensed professional

B. BMP Plan Views

_____ Dimensions of basin features: perm. Pool, sediment forebay, embankment, etc.
_____ Location of all conveyance system outfalls into basin
_____ Proper orientation to avoid short-circuiting
_____ Outlet protection per VE&SCH
_____ Top of bank & basin bottom elevations
_____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
_____ Side slope (H:V) of basin storage area and embankment (upstream and downstream slopes)
_____ Proper length-to-width ratio as specified in BMP design criteria
_____ Pervious low flow channel
_____ Sediment. forebay
_____ Basin bottom slope
_____ Maintenance access to sediment fore bay, riser structure, and one side of the basin ponding area
_____ Peripheral ledge for safety
_____ Aquatic Bench
_____ Shoreline protection
_____ Safety fence
_____ Riser and barrel materials and dimensions labeled
_____ Constructed storm water wetland/shallow marsh
_____ Basin liner specifications
_____ Pool depth zones identified on plan
_____ Pool geometry -wet/dry weather flow path

C. BMP -Section Views & Related Details

1. Embankment (or dam) and Ponding Areas

_____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
_____ Top of dam elevations- constructed height and settled height (10% settlement).
_____ Adequate freeboard
_____ Top width labeled
_____ Elevation of crest of emergency spillway
_____ Emergency spillway w/side slopes labeled.
_____ Emergency spillway inlet, level, and outlet sections labeled
_____ Existing ground and proposed improvements profile along center line of embankment

_____ Existing ground and proposed improvements profile along center line of principal spillway
_____ Typical grading section through pond including typical side slopes with aquatic bench, safety ledge shoreline protection, etc.
_____ Existing ground and proposed improvements along center line of emergency spillway
_____ Dimensions of zones for zoned embankment

2. Seepage Control
_____ Impervious lining
_____ Phreatic line (4: 1 slope measured from the principal spillway design high water).
a. Anti-seep Collar
_____ Anti-seep collar (detail required..).
_____ Size (based upon 15% increase in seepage length).
_____ Spacing & location on barrel (at least 2' from pipe joint).
b. Filter Diaphragm
_____ Design certified by a professional geotechnical engineer.

3. Foundation Cut Off Trench or Key Trench
_____ Materials labeled
_____ Bottom width (4' min. or greater per geotech. report).
_____ Side slopes labeled (1:1 max. steepness).
_____ Depth (4' min. or as specified in geotechnical report)

4. Multi Stage Riser and Barrel System
_____ Materials labeled
_____ Bedding or cradle details provided
_____ Gauge & corrugation size for metal pipes specified
_____ Barrel diameter, inverts, and slope (%) labeled
_____ Outlet protection per VESCH, Std. & Spec. 3.18, 3.19 w/filter cloth underlayment
_____ Crest elevation of riser structure shown
_____ Inverts and dimensions of control release orifices/weirs shown
_____ Structure dimensions shown
_____ Control orifice/weir dimensions shown
_____ Extended detention orifice protection (detail required for construction)
_____ Riser trash rack or screen (detail required for construction).
_____ Riser anti-vortex device (detail required for construction).
_____ Proper riser structure footing.
_____ Access to riser structure interior for maintenance.
_____ Basin drain pipe

D. Landscape Plan
_____ Planting schedule and specifications (transport / storage / installation / maintenance)
_____ Plant selection for planting zones 1 thru 6
_____ Preservation measures for existing vegetation
_____ Top soil/planting soil included in final grading

E. Maintenance Items

_____ Person or organization responsible for maintenance.

_____ Maintenance narrative which describes the long-term maintenance requirements of the facility and all components.

_____ Facility access from public R/W or roadway.

_____ Maintenance easement.

COMMENTS: _____

_____

_____

_____

_____

_____

_____

_____

_____

BY: _____ DATE: _____

III. CERTIFICATIONS

_____ Certification's from manufacturers for materials used

_____ Seeding tickets and specifications

_____ Certification statement and seal by licensed professional indicating the as-built drawing is accurate, complete and constructed per the approved plan

MINIMUM SPECIFICATIONS FOR PLAN LAYOUT

I COVER SHEET

A Title Block

1. Project Name (include Phase- i.e. Preliminary, Revision No., Final, As built,
2. Erosion and Sediment Control Plan or Site Plan).
3. Prepared by: _____; Checked by: _____.
4. Developer Name, Address
5. Date
6. Sheet Description (i.e. Cover Sheet, General Notes, Plan and Profile, Cross Sections, Standards Sheet, and Erosion and Sediment Control Sheet).
7. Vertical and Horizontal Scale (as applicable).
8. Sheet No ___ of ____.

B Location Map

1. 8”x8” map with border.
2. Include a minimum of 2 arterial roads or 2 waterways or 1 arterial road and 1 waterway.
3. Limits of construction shaded.
4. Property Boundary

C Index

1. Sheet No.
2. Sheet description as per “Title Block”.

D Project Title

1. 1” Height
2. Block or Bold
3. All Capitals

E Original P.E. or L.S. stamp and signature.

F Plans in CAD format

G Abridged Summary of Quantities

1. Length of street improvements.
2. Length and size of sanitary sewer mains.
3. Length and size of water mains.
4. Quantity of fire hydrants.

II GENERAL NOTES

A Summary of Quantities

1. List bid items, numbered as in contract.
2. Include Erosion and Sediment Control items (break down: i.e. Silt Fence- LF, Silt Trap- Each, etc.)
3. Include plan quantities with units.

B Typical Cross Section

1. Scale view of a representative cross section, showing ROW, Sidewalk, Curb and Gutter, Pavement, Aggregate, Mains, etc.
2. Dimensions of all above construction (except when a Detail applies).
3. Minimums and maximums of variable dimensions.
4. Show slopes of road, sidewalk, driveways and parkways (include minimums and maximums).
5. Stations where Typical Cross Section is applicable when there are 2 or more Typical Cross Sections.

C Title Block - same as in Section I-A.

D Legend

1. Representative section of line types with explanation of what line types denote
2. Symbols for monuments, new and existing.
3. Symbols for structures, new and existing.
4. Symbols for Erosion and Sediment Control items as per Virginia Erosion and Sediment Control Handbook.

III PLAN AND PROFILE SHEET

A Orientation of Plan View should have north to top or left of sheet.

B North Arrow

C Bench Mark Table

1. List all bench marks in a block.
    a. Bench Mark No.
    b. Description
    c. Station
    d. Elevation

2. Show Bench Mark on Plan View.

D Curve Data

1. Show all vertical and horizontal curves in a Curve Data Block.
2. Show Stations of P.C., P.I. and P.T.
3. Show all other needed data, i.e. R, delta, LC, e, etc.

E Plan View

1. Show R.O.W. and Property lines and easements.
2. Show existing road, structures, utilities, topography, etc.
    a. Use dashed thin lines.
    b. List sizes and types of pipe for existing mains.

3. Show proposed construction
    a. Use solid bold lines (use distinct line types for utilities).
    b. List sizes and types for proposed mains and services.
    c. Give station and offset to all structures and P.C.'s and P.T.'s on curb.
    d. List total lengths for all runs of pipe and curb.
    e. Show all dimensions for R.O.W. and back of curb from centerline.
    f. Show bench marks graphically.
    g. List dimensions for widths of new driveways (at R.O.W.) and sidewalks.
    h. Box out any proposed construction text.
    i. Illustrate grading on all proposed construction.

F Profile

1. Provide a base grid.
    a. 5 foot elevation lines should be solid bold lines.
    b. 1 foot elevation lines should be thin solid or dotted lines.
    c. 5 foot elevation lines should have elevation labeled.
    d. Stations should be solid bold lines.

2. Show all existing water, sanitary and storm mains with structures and centerline.
    a. Use dashed thin lines.
    b. List invert elevations of structures. (Crossing conflicts should have minimum separation defined.
    c. List size and type of pipe.
    d. Show tops and bottoms of pipe.

3. Show proposed centerline and water, sanitary and storm mains with structures.
    a. Use solid bold lines (except centerline, which should be bold centerline line type.
    b. List elevations of pipe inverts and tops of manholes.
    c. List sizes and types of pipe.
    d. List rates on storm and sanitary legs of pipe.
    e. Show stations of P.C., P.I. and P.T. of vertical curves.
    f. Show tops and bottoms of pipes.

4. Title Block - same as in Section I-A.

IV <u>CROSS SECTION SHEET</u>

A Grid

1. Provide scaled 5'x5' grid, dot line type.
2. Label station and cross street, driveway or alley if applicable.
3. Label elevation lines of grid.
4. Show and label R.O.W.
5. List Cut and Fill for each cross section.
6. List proposed top of curb or centerline elevation.

B Existing Cross Section

1. Show cross section of R.O.W. at stations and beyond R.O.W. for cross streets, driveways and alleys.
2. Use thin solid line type.

C Proposed Cross Section

1. Show proposed cross section for limits of construction.
2. Label proposed rates on driveway entrances.
3. Show full cross section views of road, sidewalk, driveways and curb.
4. Use bold solid line type.

D Title Block - as per section I-A.

V EROSION AND SEDIMENT CONTROL SHEET

A Narrative

1. Project Description: Briefly describes the nature and purpose of the land disturbing activity and the area (in acres) to be used.
2. Existing Site Conditions: A description of the existing topography, vegetation and drainage.

3. Adjacent Areas: A description of neighboring areas such as streams, lakes, residential areas, roads, etc.., which might be affected by the land disturbance.
4. Off-site Areas: Describe any off-site land disturbing activities that will occur (including borrow sites, waste or surplus areas, etc..).
5. Soils: A brief description of the soils on the site giving such information as soil name, mapping unit, erodibility, permeability, depth, texture and soil structure.
6. Critical Areas: A description of areas on the site which have potentially serious erosion problems (e.g., steep slopes, wet weather/underground springs, etc.).
7. Erosion and Sediment Control Measures: A description of the methods which will be used to control erosion and sediment on the site.
8. Permanent Stabilization: A brief description, including specifications, of how the site will be stabilized after construction is completed.
9. Stormwater Runoff Considerations: Will the development site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control storm water runoff.
10. Calculations: Detailed calculations for the design of temporary sediment basins, permanent storm water detention basins, diversions, channels, etc.. Include calculations for both predevelopment and post development runoff.

B Site Plan

1. Vicinity Map: A small map locating the site in relation to the surrounding area. Include any landmarks which might assist in locating the site.
2. Indicate North: The direction of north in relation to the site.
3. Limits of Clearing and Grading: Areas which are to be cleared and graded.
4. Existing contours: The existing contours of the site.
5. Final Contours: The changes to the existing contours, including final drainage patterns.
6. Existing Vegetation: The existing tree lines, grassed areas, or unique vegetation.
7. Soils: The boundaries of different soil types.
8. Existing Drainage Patterns: The dividing lines and the direction of flow for the different drainage areas. Include the size (in acres) of each drainage area.
9. Critical Erosion Areas: Areas with potential serious erosion problems.
10. Site Development: Show all improvements such as buildings, parking lots, access roads, utility construction, etc.
11. Location of Practices: The locations of Erosion and Sediment Control and storm water management practices used on the site. Use standard symbols and abbreviations.
    a. Explain phase of construction that each measure is needed.
    b. Explain installation procedure for each measure.

c. Explain purpose of each measure.
d. Give reference to the applicable detail on the Detail Sheet for each measure.

12. Off-Site Areas: Identify any off site land disturbing activities (e.g., borrow sites, waste areas, etc.). Show location of erosion controls. (Is there sufficient information to assure adequate protection and stabilization?)
13. Maintenance: A schedule of regular inspections and repair of erosion and sediment control structures should be set forth.

C Title Block - as per section I-A.

VI DETAIL SHEET

A Show standard details for all structures, services, planting, etc. included in construction.

B Show standard details for all applicable Erosion and Sediment Control measures.

C Show standard details for applicable Traffic Control and Protection measures.

D Title Block - as per section I-A.

SURVEYING / PLAT CHECKLIST

A. RESEARCH PROCEDURE

_____ 1. Search the land records for the proper description of the land to be surveyed.
_____ 2. Obtain the description of adjoining land as it pertains to the common boundaries.
_____ 3. Utilize any other available data pertinent to the survey.
_____ 4. Carefully compare with evidence located and found in the field survey.
_____ 5. Clearly note inconsistencies found in the research of common boundaries.

B. MINIMUM FIELD PROCEDURES

_____ 1. Angular Measurement
   a. Transit type instrument which allows a direct reading to a minimum accuracy of 30 seconds of arc.
   b. Number of angles turned to substantiate the average true angle.

_____ 2. Linear Measurement
   a. Distance made with metal tapes or with properly calibrated electronic distance measuring equipment.
   b. All linear measurements reduced to the horizontal plane and other necessary corrections performed.

_____ 3. Field Traverse and Boundary Closure
   a. The maximum permissible error of closure shall be one part in 20,000 (1/20,000).
   b. The attendant angular closure shall be that which will sustain the one part in 20,000 (1/20,000) maximum error of closure

_____ 4. Monumentation. As a requisite for completion of the work product, each boundary survey of a tract or parcel of land shall be monumented with objects made of permanent material at all:
   a. Corners
   b. Changes of Direction
   c. Monument, when feasible, identified by a temporary witness stake (which may be wooden).
   d. Location of each monument shown on the plat or map of the boundary.

C. OFFICE PROCEDURES

_____ 1. Computations. The computation of field work data shall be
_____ 2. Accomplished by using the mathematical routines that produce closures and mathematical results that can be compared with descriptions and data of record. Such computations shall be used to determine the final boundary of the land involved.

   a. The title of the boundary plat identifying the land surveyed and showing the district and county or City in which the land is located and scale of drawing.
   b. The name of owner of record and deed book reference where the acquisition was recorded.
   c. Names of all adjoining owners of record with deed book references, or subdivision lot designations.

d. Names of highways and roads with route number, and widths of right-of-way, and or distance to the center of the physical pavement and pavement width, name of railroads, streams adjoining or running through the land, and other prominent or well-known objects or areas which are informative as to the location of the boundary survey, including but not limited to a distance to the nearest road intersection, or prominent or well-known object. In cases of remote areas, a scaled position with the latitude and longitude must be provided.
e. Bearings of all property lines and meanders to nearest 10 seconds of arc, or metric equivalent.
f. Distances of all property lines and meanders to the nearest one hundredth (.01) of a foot or metric equivalent.
g. Area to the nearest hundredth (.01) of an acre or metric equivalent for rural located surveys.
h. Area to the nearest square foot or thousandth (0.001) of an acre or metric equivalent for urban located surveys.
i. North arrow and source of meridian used for the survey.
j. On interior surveys, a reference bearing and distance to a property corner of an adjoining owner or other prominent object, including but not limited to intersecting streets or roads.
k. Tax map designation of parcel number if available.
l. Description of each monument found and each monument set by the professional.
m. A statement that the boundary survey shown is based on a current field survey. The application of the land surveyor's seal, signature and date shall constitute compliance with all the current standards of a boundary survey as of the date of the application of signature unless otherwise clearly stated in the title of the plat that the plat is to be construed otherwise.
n. If the land boundaries shown on the plat are the result of a compilation from deed or plats, or both, or based on a survey by others, that fact will be clearly stated and the title of the plat shall clearly depict that the plat does not represent a current boundary survey.
o. Name and address of the land surveyor.

_____ 3. Metes and Bounds Description. The professional shall prepare a metes and bounds description in narrative form, if requested by the client or their agent, for completion of any newly performed boundary survey. The description shall reflect all metes and bounds, the area of the property described, all pertinent monumentation, names of record owners or other appropriate identification of all adjoiners, and any other data or information deemed as warranted to properly describe the property. Customarily, the metes and bounds shall be recited in a clockwise direction around the property. For subdivisions, the professional shall prepare a metes and bounds description in narrative form for only the exterior boundaries of the property.

GUIDELINES FOR A TRAFFIC IMPACT STUDY

A. Purpose

A traffic impact study assesses the impact of a proposed development, zoning change, or special use approval on the transportation system. Its purposes are (1) to ensure that proposed developments or zoning changes do not adversely affect the transportation network, (2) to identify any traffic problems associated with access from the site to the existing transportation network, (3) to delineate solutions to potential problems, and (4) to present improvements to be incorporated into the proposed development.

The traffic Impact study guidelines contained herein are subject to modification by the City as necessary, and as per modifications made by VDOT. These guidelines have been developed in order to provide for the consistent preparation of traffic impact studies. The guidelines will greatly enhance the efficiency of staff review and, at the same time, will provide the applicant with "accepted" technical procedures and methodologies. The City will review each development application on a case-by-case basis and may make recommendations that differ from the guidelines.

B. Responsibilities for Traffic Impact Studies

The primary responsibility for assessing the traffic impacts associated with a proposed development rests with the applicant, with the City serving in a review capacity. This is consistent with the approach followed for other civil engineering aspects of zoning and subdivision applications. The City should specify whether a traffic impact study is required, the extent of the study area, and any specific issues that should be addressed (i.e., safety, accidents, truck traffic). This determination should be made in the rezoning application, preliminary plat submittal, or preliminary site plan stage.

If a traffic impact study is required, the applicant will be responsible for submitting a formal traffic impact report. The applicant will also be responsible for all data collection efforts required in preparing a traffic impact study, including current peak period turning movement counts. Current peak period turning movement counts is defined as those counts that have been collected within one year of the zoning, subdivision, or site development application. The City, at its discretion, may request the applicant to adjust the peak hour turning movement counts in order to account for seasonal variations in traffic or other localized factors. In addition, the applicant will be responsible for ensuring that any submitted site plans meet the minimum state and local standards for geometric design. The study should be conducted only by an individual or firm that could be qualified as an expert in traffic engineering.

Upon submission of a draft traffic impact analysis report, the City will review the study data sources, methods, and findings and provide comments. The applicant will then have the opportunity to incorporate necessary revisions prior to submitting a final report. Accompanying the applicant's submission will be the written comments of the City staff. This information will then be used to reach a decision regarding the zoning, subdivision, or site development.

C. Determining the Need for a Traffic Impact Study

The reviewing City Engineering Division should have the discretion to determine when a traffic impact study is needed. The need for a traffic impact study should be evaluated based on conditions surrounding the individual location being considered for zoning, subdivision, or site development. The site specific conditions that should be considered include:

1. The potential impact upon the local and regional road networks.
2. The minimum site distances at intersections shown on the plans.
3. The capacity and level of service of the existing roadways to be entered.
4. Roadway geometrics.
5. The type and size of the proposed location.
6. Traffic operations of one or more intersections.
7. Issues of safety and/or traffic operation within the public Right-of-Way.

The City should consider requesting that a group of developers jointly sponsor a traffic impact study on a section of road network where multiple independent developments are planned.

D. Traffic Impact Study Contents and Specifications

The contents were primarily adopted from VDOT "Guidelines for Traffic Impact Study – Final Report," prepared by Simpson and Curtin, April 1979, and "Guidelines for Traffic Impact Studies in James City County."

1. Format – A traffic impact study prepared for a specific location and use (i.e. zoning, subdivision, or site development) should follow the chapter format detailed in section D3. Wherever additions or modifications are appropriate for a specific location, they should be made.

2. Capacity and Level of Service Analysis

    a. All capacity analysis shall be conducted utilizing the procedures in the current Highway capacity Manual (Special Report 209). Transportation Research Board.

    For capacity analysis and level of service determinations, the most recent Federal Highway Administration software package should be used for the different types of analysis required (i.e., signalized intersections, freeways, ramps). CARCALC 85 may also be used for analyzing intersections. Regardless of which software package is used, the results should be reviewed for reasonableness. Other software, if approved by the City in advance, may be used.

    Firms may use any number of software packages available for capacity analysis. They should provide the input data as well as the results of the capacity analysis so that the City may check the results with its own analysis. Where a great number of intersections or road sections are analyzed, a sample of those should be checked by performing an independent analysis and comparing results. Where differences occur,

the firm should be required to explain the differences, to the satisfaction of the City, and all intersections and road sections should be reviewed closely.

b. Level of Service – Level of Service C will be the design objective, and under no circumstances will less than Level of Service D for all approaches of an intersection be accepted for on-site and off-site traffic. This criterion, however, may be modified by the City on a case-by-case basis, depending on traffic conditions in the proposed site vicinity.

c. Use of the Results of Level of Service Studies

i. The primary function of a level of service study is the determination of the geometrics required to provide a desired level of service in a design year.
ii. The number of lanes required on either a through road or at an intersection can be determined, and the need for auxiliary lanes, as well as their length, can be established.
iii. The need for signalization can be determined from the projected traffic volumes and the signal warrants in the Manual on Uniform Traffic Control Devices for Street and Highways (MUTCD).
iv. The level of service study can indicate where on-street parking will have to be eliminated or restricted in order to achieve a desired level of service.
v. When a development in a given area is projected to be phased over a long period of time, stage construction should be considered and a level of service study used to determine when the various stages must be completed.

3. Narrative – A brief narrative for each chapter of the traffic impact study follows.

a. Chapter 1 – Introduction

i. Site and Study Area Boundaries – Include a brief description of and a map displaying the size of the land parcel, the general terrain features, and the location within the jurisdiction and region. In addition, identify the roadways that afford access to the site and are included in the study area. The exact limits of the study area should be based on engineering judgment and an understanding of the existing traffic conditions in the site vicinity. In all instances, however, the study area limits will be discussed with the applicant and his traffic engineer, and will be determined by the City staff. The definition of the study area should result, subsequent to the initial staff review of a developer's rezoning application, subdivision preliminary plat application, or preliminary site plan, at which time a traffic impact study will be required. If the project is being completed in phases, describe the total project and the phases. The study should address the appropriate phase.
ii. Existing and Proposed Site Uses – Identify the existing and proposed uses of the site in terms of the various zoning categories. In addition, identify the number and the type of residential units, and type and amount of commercial, industrial, or office uses in accordance with ITE trip generation categories.

iii. Existing and Proposed Nearby Uses – Include a complete description of the existing land uses in the vicinity of the site, as well as their current zoning. Also state the proposed developments of adjacent land using the City's comprehensive land use plan. This is especially important where large tracts of underdeveloped land are in the vicinity of the site and are within a prescribed study area.

iv. Existing and Proposed Roadways and Intersections – Describe and provide diagrams of the existing roadways and intersections (including road geometrics, land usage, traffic control, and intersection condition diagrams) within the study area, as well as improvements contemplated by the City or state. This includes the nature of the improvement project, its extent, the implementation schedule, and the agency or funding source responsible.

b. Chapter 2 – Analysis of Existing Conditions

i. Daily and Peak Hour(s) Traffic Volumes – Present diagrams depicting daily and peak hour traffic volumes for roadways within the study area. Present turning movement and mainline volumes for the three peak hour conditions (a.m., p.m., and site-generated). Present only mainline volumes to reflect daily traffic volumes. Also present the source and/or the method of computation for all traffic volumes.

ii. Capacity Analysis at Critical Points – Utilizing techniques as described in the current Highway Capacity Manual, assess the relative balance between roadway volumes and capacity. Analyze existing conditions (roadway geometrics and traffic signal control) for all peak hours.

iii. Level of Service at Critical Points – Based on the results obtained in the previous section, determine and present levels of service (A through F). Include a description of typical operating conditions at each level of service.

c. Chapter 3 – Analysis of Future Conditions Without Development

Describe the anticipated traffic volumes in future and the ability of the roadway network to accommodate this traffic without the proposed zoning, subdivision, or development. The future year(s) for which projections are made will be specified by the City staff and will depend on the timing of the proposed development.

i. Future Daily and Peak Hour(s) Traffic Volumes – Indicate clearly the method and assumptions used to forecast future traffic volumes, so that the City staff can replicate these calculations.

ii. Capacity Analysis at Critical Locations – Describe the ability of the existing roadway system to accommodate future traffic (without development) for all peak hours, using the current Highway Capacity Manual. If roadway improvements or modifications are committed for implementation, present the capacity analysis for these conditions.

iii. Levels of Service at Critical Points – Based on the results obtained in the previous section, determine the level of service (A through F).

d. Chapter 4 – Trip Generation

Present and diagram the amount of traffic generated by the location (rezoning, subdivision, or development) for daily and three peak hour conditions. Trip generation Rates to be used should be those presented in Trip Generation, 4th edition, Institute of Transportation Engineers. Deviation from these rates must be justified and documented to the satisfaction of the City.

e. Chapter 5 – Trip Distribution

Present and diagram the direction of approach for site-generated traffic for the appropriate time periods. The basic method and assumptions used must be clearly stated so that the City can replicate these results.

f. Chapter 6 Traffic Assignment

Describe the utilization of study area roadways by site-generated traffic. Combine the proposed traffic volumes with the anticipated traffic volumes from Chapter 3 to describe and diagram mainline and turning movement volumes for future conditions with the proposed rezoning, subdivision, or site development. Clearly state the basic method and assumptions used.

g. Chapter 7 - Analysis of Future Conditions with Zoning, Subdivision, or Development

i. Future Daily Peak Hour(s) Traffic Volumes – Present and diagram mainline and turning movement volumes for the highway network in the study area, as well as driveways and internal circulation roadways for all time periods.

ii. Capacity Analysis at Critical Points – Perform a capacity analysis for all peak hours for future conditions with the site developed as proposed using the current Highway Capacity Manual.

iii. Levels of Service at Critical Points – As a result of the capacity analysis, compute and describe the level of service on the study area roadway system.

h. Chapter 8 – Recommended Improvement

In the event the analysis indicates that unsatisfactory levels of service will occur on the study area roadways, describe the improvements proposed to remedy deficiencies. The proposals would identify committed projects by the City and the State that were described in Chapter 1 and reflected in the analysis contained in Chapters 2 and 3, and/or any improvements required of the applicant.

i. Proposed Recommended Improvements – Clearly describe and diagram the location, nature, and extent of the proposed improvements to ensure sufficient roadway capacity. Accompanying this list of improvements should be preliminary cost estimates, source of funding, timing, and likelihood of implementation.

ii. Capacity Analysis at Critical Points – Describe the anticipated results of making these improvements.

iii. Levels of Service at Critical Points – As a result of the revised capacity analysis presented in the previous section, present the levels of service for the roadway system with improvements.

i. Chapter 9 – Conclusion

The last chapter of the report should be a clear concise description of the study findings. This concluding chapter should serve as an executive summary.