CITY AND COUNTY OF BROOMFIELD
FINAL UTILITY REPORT REQUIREMENTS

Final utility reports will include the following information and data as a minimum:

I. Sanitary Sewer
   - A. Layout and connection to city sewer
   - B. Average and peak flow calculations
   - C. Maximum and minimum slope and velocity
   - D. Available existing downstream capacity

II. Water
   - A. Layout and connection with city water
   - B. Potable water demand (peak and average)
   - C. Fire flow demand
   - D. Peak instantaneous demand and meter sizing
   - E. Available pressure and capacity
   - F. Irrigation water demand
   - G. Network model of system serving development

CITY AND COUNTY OF BROOMFIELD
FINAL TRAFFIC ANALYSIS REPORT REQUIREMENTS

The final traffic analysis report shall include, but not be limited to the following.

- A. Land use, site and study area boundaries.
- B. Existing and proposed site uses.
- C. Existing and proposed roadways and intersections.
- D. Existing and proposed roadways and intersection capacities and volumes.
- E. Trip generation and design hour volumes.
- F. Trip distribution.
- G. Trip assignments.
- H. Existing and projected traffic volumes.
- I. Critical lane capacity analysis, where required.
- J. Traffic signal analysis including warrant analysis and progression analysis with existing and proposed signal locations.
- K. Levels of service of effected intersections for the design hour.
- L. Traffic accident investigations of existing conditions and what effect proposed development will have.
- M. Parking lot analysis, if necessary, in commercial and industrial areas.
- N. Future traffic impact analysis
   1. Short term horizon - one year after occupancy
   2. 20-year planning horizon (DRCOG 20-year planning horizon)
- O. Traffic signage and striping plan.
- P. Compliance/deviations from the City's latest transportation master plan

CITY AND COUNTY OF BROOMFIELD
FINAL GEOTECHNICAL REPORT

Geotechnical and soils investigation studies are required for foundation design and pavement design. These two categories may be combined into one report when the purpose of the investigation includes both facets of design. A subsurface investigation for foundation and/or pavement design shall include the following information and data as a minimum:

I. General Information
   - A. Past and present land uses and features
   - B. Proposed use of the land when developed
   - C. Structure type
   - D. Groundwater
   - E. Surface drainage characteristics
   - F. A general geologic report on the area and a discussion of the soil profiles and subsurface features
   - G. Potential slope instability

II. Investigation Details
   - A. Type of equipment used in obtaining data
   - B. Date of drilling
   - C. Boring logs which show the elevation of the existing ground, the elevation of the top of each soil stratum encountered and the soil classification of each stratum encountered, the water level at the time of boring and the level at a later date and standard penetration test results for each soil stratum. Each hole shall be referenced to a fixed benchmark.
   - D. A sketch of the tested area accurately showing the locations of the borings.

III. Site Conditions/Foundation Design
   - A. Specific information including swell potential of the soil and the effect on foundations.
   - B. A recommendation as to foundation types and any special procedures that may pertain to construction.
   - C. The effect of ground water on construction and methods to deal with any problems which may exist.
   - D. Recommended allowable soil bearing pressures and unconfined shearing strength.
   - E. Methods of prevention of swell and shrinkage of expansive soils and minimizing their effect on structures.
   - F. Natural moisture content of the soil strata.
   - G. Specifications for any unusual or special construction materials required.

IV. Unusual Land Uses/Conditions
   - A. Report which identifies all unusual land uses such as landfills, open dumps, wetlands, leach fields, areas of natural springs, faults, mines, etc. These shall be presented in a written and graphical format of suitable scale.

CITY AND COUNTY OF BROOMFIELD
FINAL DRAINAGE REPORT REQUIREMENTS

Drainage report calculations and supporting data required as set forth herein shall be prepared in accordance wit the UDFCD Urban Storm Drainage Criteria Manual. A final drainage report shall include as a minimum, the following:

I. Introduction
   - A. Site Location (include a map)
     1. City, county, street grid
     2. Adjacent development
   - B. Site Description
     1. Acreage
     2. Existing topography, ground cover, and use
     3. A discussion of how site characteristics (soils, vegetation, erodibility) will influence both wind and water erosion.
   - C. Existing drainage facilities, major channels, flood hazard zones, irrigation ditches, location of wetlands.
   - D. Proposed project description
   - E. Flood hazard and drainage studies relevant to site.

II. Historic Drainage System
   - A. Major Basin
     1. Relationship to major basin channel
     2. Major basin drainage characteristics, topography, runoff.
   - B. Sub-Basin and Site Drainage
     1. Initial and major storm
     2. Offsite flows
     3. Existing drainage patterns: channelized or overland flow, volumes, points of discharge from site, effect of historic flows upon adjacent properties

III. Proposed (Developed) Drainage System
   - A. Criteria
     1. Size of basin and subbasin
     2. Hydrologic method
     3. Design storm frequencies (initial and major)
   - B. Runoff
     1. Developed flow rates and paths
     2. Erosion control methods for both high and low flow conditions.

   - C. Detention
     1. Volumes required and provided
     2. Release rates and method of release
     3. Excess storm water passage
     4. Depths of ponding in parking areas

D. Streets
    1. Depth and velocity of flow for initial and major storms
    2. Storm drainage system
E. Open channel flow
    1. Type of channel (lining)
    2. Maximum depth and velocity
    3. Sediment control
    4. Erosion control methods for both high and low flow conditions.
F. Storm sewers and culverts

IV. Right-of-Way Requirements
A. Boundaries
B. Present and future ownership
C. Access and responsibility for maintenance

V. Analysis of Upstream and Downstream Effect
A. Changes in flow depth, stream velocity, or erosion rates to the next parcel of property under separate ownership upstream and downstream to all parcel between the property and a recognized channel capable of handling the flow from the site being analyzed.

VI. Conclusions
A. Discuss impact of improvement - benefits and adverse impacts with solutions to mitigate impacts.
B. Compliance with F.E.M.A. regulations for areas in flood hazard zone.

VII. Detailed Calculations (Appendices)
A. Runoff (historic and developed)
    1. Separate time of concentration (Tc) for each design point (Rational Method)
    2. Runoff coefficient or permeability coefficient from Table 400-2
    3. Existing drainage facilities carrying flows-must include flow for entire tributary area for each design point.
    4. Irrigation ditch flows.
B. Detention
    1. Storage Volumes required and provided
    2. Peak inflow to detention ponds for initial and major storms.
    3. Peak discharge from detention pond based on outlet structure design for initial and major storms
    4. Outlet structure type/design
    5. Head at entrance
    6. Emergency overflow release design.
C. Streets (refer to Section 6 of the Streets Chapter of the Drainage Criteria Manual)
    1. Depths and velocity of flow for initial and major storm
    2. Inlet capacities and depths at inlet

D. Open Channel Flow
    1. Roughness coefficient
    2. Trickle channel
    3. Depth and velocity for initial and major storms
    4. Channel protection
    5. Minimum freeboard
    6. Hydraulic grade line

E. Hydraulic Structures- pipes, culverts, inlets, etc.
    1. Culvert capacity using standard nomographs
    2. Storm sewer capacity at each design section
    3. Inlet capacity
    4. Flow depth or headwater depth at inlet
    5. Drops
    6. Weirs
    7. Streets, gutters, and crosspans

Construction Traffic Routing Plan

Construction traffic within the City shall proceed over a truck route or on such routes as are designated by the City Council at the time the development is approved. A construction traffic routing plan must be provided to the City along with the Final Engineering Reports at the time approval for the development is sought.