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SECTION 2.0 SUBMITTAL REQUIREMENTS

2.1 REVIEW PROCESS

Drainage reports and plans, construction drawings, specifications, and as-built information shall be submitted and approved as required by the City of Greeley Subdivision Regulations, Storm Drainage Design Criteria and Construction Specifications Volume II and the Project Development Process. A pre-application consultation is suggested of all applicants for all processing steps of the Subdivision Regulations. The applicant should consult with the City for general information regarding subdivision regulations, the Project Development Process, required procedures, possible drainage problems, stormwater requirements and issues associated with the pertinent master drainage plan, and specific submittal requirements.

All topographic mapping is to be based on NAVD 88 survey datum. The City Of Greeley will not accept any other datum nor will an adjustment from some other datum to NAVD 88 be acceptable. Old City Of Greeley benchmark datum is not acceptable. All contour mapping and construction details must be on NAVD 88 datum.

All reports shall be typewritten on 8½" x 11" paper and bound. A cover letter shall be included, identifying the project and the type of information submitted (conceptual, preliminary, or final). The report shall be prepared (or supervised), signed and stamped by a Professional Engineer licensed to practice in the State of Colorado, and possessing adequate experience in the fields of hydrology and hydraulics. The report shall contain a certification sheet with the following statement, and appropriate signatures:

"I hereby attest that this report for the (Conceptual, Preliminary or Final) drainage design of (Name of Development) was prepared by me, or under my direct supervision, in accordance with the provisions of the City of Greeley Storm Drainage Design Criteria for the responsible parties thereof. I understand that the City of Greeley does not and shall not assume liability for drainage facilities designed by others.

Registered Professional Engineer

State of Colorado No. _____ (Affix Seal)

The drawings, figures, plats, and tables shall be bound within the report or included in a pocket attached to the report. Photo copies of charts, tables, nomographs, calculations, or any other referenced material shall be legible and contain the origin of the reference. Washed out, blurred, or unreadable portions of the report are unacceptable, as is incomplete or absent information. The information presented in technical appendices shall contain sufficient detail to allow replication of the results presented in the report. Any unacceptable conditions could warrant a requirement for re-submittal of the report, and subsequent delay of the project review.

2.2 CONCEPTUAL DRAINAGE REPORT

The Conceptual Drainage Report is required as a component of the Conceptual Development submittal. This report will review at a conceptual level the feasibility and design characteristics of the proposed development. The Conceptual Drainage Report shall be in accordance with the following outline, and as a minimum, shall contain the applicable information listed below. Two (2) copies of the Conceptual Drainage Report shall be submitted to the City.

2.2.1 CONCEPTUAL REPORT CONTENTS

2.2.1.A GENERAL LOCATION AND DESCRIPTION

1. Location
 - a. City, County, State Highway, and local streets within and adjacent to the site, or the area to be served by the improvements
 - b. Township, range, section, $\frac{1}{4}$ section
 - c. Major drainage ways and facilities
 - d. Names of surrounding developments
2. Description of Property
 - a. Area in acres
 - b. Ground cover (type of ground cover and vegetation)
 - c. Major drainage ways on property
 - d. Existing major irrigation facilities such as ditches and canals
 - e. Proposed land use
 - f. Floodplain status

2.2.1.B DRAINAGE BASINS AND SUB-BASINS

1. Major Basin Description
 - a. Reference to major drainage way planning studies such as the City Comprehensive Drainage Plan, flood hazard delineation reports, flood insurance rate maps.
 - b. Major basin drainage characteristics, existing and planned land uses within the basin as defined by the City.
 - c. Identification of all nearby irrigation facilities within 100 feet of the property boundary, that will influence or be influenced by the local drainage
2. Sub-basin Description
 - a. Discussion of historic drainage patterns of the property
 - b. Discussion of off-site drainage flow patterns and impact on development under existing and fully developed basin conditions as defined by the Planning Department

2.2.1.C DRAINAGE FACILITY DESIGN

1. General Concept
 - a. Discussion of concept and typical drainage patterns
 - b. Discussion of compliance with off-site runoff considerations
 - c. Discussion of anticipated and proposed drainage patterns
 - d. Discussion of the content of tables, charts, figures, plats, or drawings presented in the report
 - e. Discussion of the Stormwater Quality Control concepts for the site
2. Specific Details
 - a. Discussion of drainage problems encountered and solutions at specific design points

- b. Discussion of detention storage and outlet design
- c. Discussion of opportunities for integration of other functions (recreational, natural resource) within drainage facilities
- d. Discussion of maintenance and access aspects of the design
- e. Discussion of impacts of concentrating the flow on the downstream properties

2.2.1.D WETLAND DETERMINATION AND REVIEW (IF APPLICABLE)

2.2.1.E REFERENCES

Provide references to all criteria, master plans, and technical information used in support of the drainage concept for the development.

2.2.2 CONCEPTUAL REPORT: PLAN CONTENTS

2.2.2.A GENERAL LOCATION MAP

All drawings shall be 24" x 36". A map shall be provided in sufficient detail to identify general drainage patterns and drainage flows entering and leaving the development for at least 150' from the project boundaries. The map should be at a scale adequate to show the path of all drainage from the upper end of any off-site basins to a major drainage way. The map shall identify any major facilities from the property (i.e., development, irrigation ditches, existing detention facilities, culverts, storm drains) along the flow path to the nearest major drainage way. Basins and divides shall be identified and labeled. Topographic contours shall be included.

2.2.2.B FLOODPLAIN INFORMATION

The location of any defined floodplains on the property shall be shown.

2.2.2.C DRAINAGE PLAN

Map(s) of the proposed development at a scale of 1" = 20' to 1" = 200' on a 24" x 36" drawing shall be included. The plan shall show the following:

1. Existing topographic contours at 2 feet maximum intervals. The contours shall extend a minimum of 100 feet beyond the property lines and be labeled as to elevation.
2. All existing drainage facilities.
3. Locations of all existing and proposed utilities to assure conflicts with proposed drainage facilities are being addressed.
4. Approximate flooding limits based on available information, such as previously defined floodplains and estimated floodplains.
5. Conceptual major drainage facilities including detention basins, storm drains, swales, riprap, and outlet structures in the detail consistent with the proposed development plan.
6. Location and type of pertinent major drainage facilities identified in the Comprehensive Drainage Plan relevant to the proposed development.
7. Major drainage boundaries and sub-boundaries.
8. Any off-site feature influencing development.
9. Proposed flow directions.
10. Legend to define map symbols.

11. Title block in lower right corner.

2.3 PRELIMINARY DRAINAGE REPORT

The purpose of the Preliminary Drainage Report is to identify and/ or refine the conceptual solutions to any problems occurring on-site or off-site because of the development. Any problems that existed on the site prior to development must also be addressed during the preliminary phase. The Preliminary Drainage Report shall be submitted with the Preliminary Subdivision Plat submittal. Two (2) copies of the Preliminary Drainage Report shall be submitted to the City. Number all pages consecutively in the Preliminary Drainage Report, including the Appendix, for easy reference.

In addition to the information listed below, the requirements for submitting a Preliminary Stormwater Management Plan and a Preliminary Erosion and Sediment Control Plan are detailed in Sections 12 and 13 respectively.

2.3.1 PRELIMINARY REPORT CONTENTS

The report shall be in accordance with the following outline and contain the applicable information listed:

2.3.1.A GENERAL LOCATION AND DESCRIPTION

1. Location

- a. Township, range, section, $\frac{1}{4}$ section
- b. Local streets within and adjacent to the subdivision with ROW width shown
- c. Major drainage ways, facilities, and easements within and adjacent to the site
- d. Locations of other utilities
- e. Names of surrounding developments

2. Description of Property

- a. Area in acres
- b. Ground cover (type of trees, shrubs, vegetation, general soil conditions, topography, and slope)
- c. Major drainage ways
- d. General project description
- e. Irrigation facilities
- f. Proposed land use

2.3.1.B DRAINAGE BASINS AND SUB-BASINS

1. Major Basin Description

- a. Reference to major drainage way planning studies such as the City Comprehensive Drainage Plan, flood hazard delineation reports, flood insurance rate maps
- b. Major basin drainage characteristics, existing and planned land uses
- c. Identification of all irrigation facilities within the basin, which will influence or be influenced by the local drainage

2. Sub-basin Description

- a. Discussion of historic drainage patterns of the property

- b. Discussion of off-site drainage flow patterns and impact on development under existing and fully developed basin conditions as defined by the Planning Department

2.3.1.C DRAINAGE DESIGN CRITERIA

Regulations: Discussion of the optional provisions selected or the deviation from these Criteria, if any, and its justification.

1. Development Criteria Reference and Constraints
 - a. Discussion of previous drainage studies and/or pertinent master plans for the site in question that influence or are influenced by the drainage design and how the plan will affect drainage design for the site
 - b. Discussion of the effects of adjacent drainage studies
 - c. Discussion of the drainage impact of site constraints such as streets and transportation facilities, utilities, existing structures, and the development or site plan
2. Hydrological Criteria
 - a. Identify design rainfall
 - b. Identify runoff calculation method
 - c. Identify detention discharge and storage calculation method
 - d. Identify design storm recurrence interval
 - e. Discussion and justification of other criteria or calculation methods used that are not presented in or referenced by these Criteria
3. Hydraulic Criteria
 - a. Identify various capacity references
 - b. Discussion of other drainage facility design criteria used that are not presented in these Criteria
4. Waiver/Variance from Criteria
 - a. Identify provisions by section number for which a waiver or variance is requested
 - b. Provide justification for each waiver or variance requested
5. Stormwater Quality Considerations
 - a. See Section 12 for submittal requirements associated with the Stormwater Management Plan
 - b. See Section 13 for Erosion Control Plan submittal requirements

2.3.1.D WETLAND PRESERVATION AND MITIGATION (IF APPLICABLE)

2.3.1.E DRAINAGE FACILITY DESIGN

1. General Concept
 - a. Facility design concept and typical drainage patterns
 - b. Compliance with off-site runoff considerations
 - c. Discussion of the content of tables, charts, figures, plats, or drawings presented in the report
 - d. Anticipated and proposed drainage patterns

- e. Water quality considerations
 - f. Opportunities for multi-functional use of drainage facilities.
2. Specific Details
- a. Detail drainage problems encountered and solutions at specific design points
 - b. Detention storage and outlet design
 - c. Provision of stormwater quality facilities
 - d. Maintenance access and aspects of facility design
 - e. Provision of easements and tracts for drainage purposes, including conditions and limitation for use

2.3.1.F CONCLUSIONS

1. Compliance with Standards
- a. City Comprehensive Drainage Plan
 - b. City Criteria
 - c. USDCM
2. Drainage Concept
- a. Effectiveness of drainage design to control damage from storm runoff flooding.
 - b. Influence of proposed development on the Comprehensive Drainage Plan recommendations

2.3.1.F REFERENCES

Reference all criteria and technical information used.

2.3.1.G APPENDICES

1. Hydrologic Computations
- a. Land use assumptions regarding adjacent properties
 - b. Initial and major storm runoff at specific design points
 - c. Historic and fully developed runoff computations at specific design points
 - d. Hydrographs at critical design points
 - e. Time of concentration and runoff coefficients for each basin
 - f. A computer disk or CD of all hydrologic modeling
(CUHP, EPA SWMM, UD SWMM, etc.) necessary to support analyses and conclusions in the report; documentation of modeling efforts will be in sufficient detail to allow replication of results.
2. Hydraulic computations
- a. Open channel design. Check structure and/or channel drop design
 - b. Detention area/volume capacity and outlet capacity calculations; depths of detention basins
 - c. Downstream/outfall system capacity to the Major Drainage way system
3. Hydraulic computations (optional for preliminary)

- a. Culvert capacities
- b. Storm drain capacity, including energy grade line (EGL) and hydraulic grade line (HGL) elevations for 18" or larger
- c. Gutter and street capacity as compared to allowable
- d. Storm inlet capacity including inlet control rating at connection to the storm drain.

2.3.2 PRELIMINARY DRAINAGE REPORT CHECKLIST

Project: _____ Date: _____

Refer to City Of Greeley Storm Drainage Criteria Manual (latest edition) for requirements. Note: include Checklist as part of Preliminary Report.

	<u>YES</u>	<u>NO</u>
1. Is general location and description in accordance with SDDC manual?	_____	_____
2. Are existing contours based on NAVD 88 datum?	_____	_____
3. Do contours extend a minimum of 100 feet outside property boundary and are they labeled as to elevation?	_____	_____
4. Are basin boundaries to centerline of adjacent streets surrounding the development?	_____	_____
5. Are drainage areas close to those determined by designer?	_____	_____
6. Is offsite water safely passed through the site?	_____	_____
7. Are drainage design criteria in accordance with SDDC manual?	_____	_____
8. If over 5 acres, have CUHP and SWMM hydraulic analysis been used to size the detention pond?	_____	_____
9. Are runoff coefficients reasonable? I.E., 5-year historic average = 0.08, 100-year historic = 0.35.	_____	_____
10. Has Water Quality Capture Volume (WQCV) been determined and added to total detention pond volume requirements?	_____	_____
11. Is detention pond release rate equal to 5-year historic flow?	_____	_____
12. Are pond side slopes no greater than 4H:1V?	_____	_____
13. Does volume calculated from pond contours approximately equal designer's volume?	_____	_____
14. Is wetland preservation and mitigation required and if so have provisions been made to address these issues?	_____	_____

Signed – Design Engineer

2.3.3 PRELIMINARY SUBMITTAL: PLAN CONTENTS

2.3.3.A GENERAL LOCATION MAP

All drawings shall be 24" x 36". A map shall be provided with sufficient detail to identify drainage flows entering and leaving the development and general drainage patterns. The map should be at a scale adequate to show the path of all drainage from the upper end of any off-site basins to a major drainage way. The map shall identify any major facilities from the property (i.e., development, irrigation ditches, existing detention facilities, culverts, storm drains) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included.

2.3.3.B FLOODPLAIN INFORMATION:

The location of any defined floodplains on the property shall be shown.

2.3.3.C DRAINAGE PLAN

Map(s) of the proposed development at a scale of 1" = 20' to 1" = 200' on a 24" x 36" drawing shall be included. The plan shall show the following:

1. Existing and (if available) proposed topographic contours at a 2-foot maximum interval. The contours shall extend a minimum of 100 feet beyond the property lines and be labeled as to elevation.
2. Property lines and easements with purposes noted.
3. Streets, indicating ROW width, flow line width, curb type, sidewalk, and approximate street slopes.
4. Existing drainage facilities and structures, including irrigation ditches, roadside ditches, cross-pans, drainage ways, gutter flow directions, and culverts. All pertinent information such as material, size, shape, slope, and location shall also be noted.
5. Location and type of pertinent major drainage facilities identified in the Comprehensive Drainage Plan relevant to the proposed development.
6. Locations of other utilities.
7. Overall drainage area boundary and drainage sub-area boundaries.
8. Proposed type of street flow (i.e., vertical or combination curb and gutter), roadside ditch, gutter, slope and flow directions, and cross-pans.
9. Proposed storm drains and open drainage ways, including inlets, manholes, culverts, and other appurtenances, including riprap protection.
10. Proposed outfall point for runoff from the developed area and facilities to convey flows to the final outfall point without damage to downstream properties.
11. Routing and accumulation of flows at various critical points for the initial storm runoff listed on the drawing using the format shown in Table 2-1.
12. Routing and accumulation of flows at various critical points for the major storm runoff listed on the drawing using the format shown in Table 2-1.
13. Volumes and release rates for detention storage facilities and information on outlet works.
14. Location and elevations of all existing floodplains affecting the property.

15. Location and elevations of all existing and proposed utilities affected by or affecting the drainage design.
16. Routing of off-site drainage flow through the development.
17. Definition of flow path leaving the development through the downstream properties ending at a major drainage way.
18. Legend to define map symbols.
19. Title block in lower right corner.

2.4 FINAL DRAINAGE REPORT

The purpose of the Final Drainage Report is to update the concepts and present the design details for the drainage facilities discussed in the Preliminary or Conceptual Drainage Reports. Also, any changes to the Preliminary Drainage concept must be presented and supported with the same level of information as originally required in the Preliminary Drainage Report. Number all pages of the Final Drainage Report, including the Appendix, for easy reference.

The Final Drainage Report, which shall accompany the Final Subdivision submittal or the final Planned Unit Development (P.U.D.) submittal, must address comments made during the review of the Preliminary or Conceptual submittals. The Final Drainage Report shall be prepared in accordance with the outline for the Preliminary Drainage Report (Section 2.3.1); the Final Drainage Report drawings and plans shall fulfill the requirements for the contents of the Preliminary Drainage Report Checklist (Section 2.3.2). See Section 12 of these Criteria for the Final Stormwater Management Plan submittal requirements, and Section 13 for the Final Erosion Control Plan submittal requirements. Two (2) copies of the Final Drainage Report shall be submitted to the City.

Include in the final drainage report bound 11”X17” copies of the drainage exhibits as well as the full size sheets. If smaller copies of the exhibit are bound into the report, they should not become separated.

In addition to the report format and submittal requirements presented in Section 2.1, the Final Drainage Report shall include a page with the following certification language, and the appropriate signature:

(Name of Developer/Owner) hereby certifies that the drainage facilities for (Name of Project) shall be constructed according to the design presented in this report. I understand that the City of Greeley does not and will not assume liability for drainage facilities designed and/or certified by my Engineer. I also understand that the City of Greeley relies on the representations of others to establish that drainage facilities are designed and constructed in compliance with City guidelines, standards, or specifications. Review by the City of Greeley can therefore in no way limit or diminish any liability, which I or any other party may have with respect to the design or construction of such facilities.

Attest:

(Name of Responsible Party)

Notary Public

Authorized Signature

A reproducible of the approved Final Drainage Plan shall be submitted to the City for signature and retention in their files. A copy of the approved plan shall be returned to the applicant.

2.4.1 FINAL DRAINAGE REPORT CHECKLIST

Project: _____ Date: _____

Refer to City Of Greeley Storm Drainage Design Criteria Manual (latest edition) for requirements.

	<u>YES</u>	<u>NO</u>
1. Is report signed and sealed by a licensed P.E.?	_____	_____
2. Is report certified by owner and notarized?	_____	_____
3. Are all pages of the report numbered consecutively for easier referencing?	_____	_____
4. Are there any infringements on drainage easements?	_____	_____
5. Are sub-basin areas and total area of site close to those of designer?	_____	_____
6. Time of concentration, Check if (L/180) + 10 verified?	_____	_____
7. Are runoff coefficients reasonable, 5 year historic average = 0.08, 100 year historic = 0.35 in Greeley?	_____	_____
8. Do offsite flows pass through pond or route around site?	_____	_____
9. Has Water Quality Capture Volume (WQCV) been determined and added to total detention pond volume requirements?	_____	_____
10. Is detention pond release rate equal to 5 year historic flow?	_____	_____
11. Are drainage channel and pond side slopes no greater than 4H:1V?	_____	_____
12. Have detention pond top of dike elevations (freeboard) been set 1 foot above the elevation of water passing over the spillway during a plugged orifice condition?	_____	_____
13. Does volume calculated from pond contours approximately equal designer's volume.	_____	_____
14. Is the spillway rip rapped or concreted, and does it have sufficient grading to pass the overflow downstream to a suitable and safe conveyance?	_____	_____
15. Orifice calculations - Is head on orifice to center of opening? Is backwater from outlet possible and if so has it been considered?	_____	_____
16. On the WQCV drawing details - are the holes per row and the spacing of holes correctly determined?	_____	_____
17. Has a trash rack and orifice plate been properly designed and detailed?	_____	_____
18. Are outlet metal components minimum 3/8" thick metal hot dipped galvanized?	_____	_____
19. Are bolts a minimum 3/8" diameter, by 1 1/2" minimum length plus 3" for concrete embedment and stainless steel material?	_____	_____
20. Has the street capacity at critical locations for both minor and major storm events been determined?	_____	_____
21. Have inlet capacities using interception ratios been determined, if applicable?	_____	_____
22. Is "A" and "B" lot designation with diagram shown on grading plan?	_____	_____
23. Do grading contours around perimeter of site match existing terrain? Are they labeled for elevation?	_____	_____

(Checklist is continued on the following page.)

(Final Drainage Report Checklist continued)

	<u>YES</u>	<u>NO</u>
24. Do spot elevations match grading contours?	_____	_____
25. Do all areas drain to the detention/retention pond?	_____	_____
26. Are details for detention pond retaining wall construction shown?	_____	_____
27. Are there any "B" lots adjoining other "B" lots along back lot lines? If so, has an Outlot separating them for drainage, or a concrete trickle pan offset to one side of the property line, been provided?	_____	_____
28. Are finished top of foundation, lot corners and each side lot mid point elevations shown on the grading plan?	_____	_____
29. Have hydraulic calculations with energy grade line (EGL) and hydraulic grade line (HGL) been shown for the 100 year storm event on the storm drain profiles in the Drainage Report?	_____	_____
30. Have backwater effects been considered? Do pipe sizes and slopes agree between the drawings and calculations?	_____	_____
31. Have adequate sump depths been provided at sump inlets to accommodate sump design capacity before allowing water to overflow curb?	_____	_____
32. Are storm drains sized so that there is no surcharge during a 2 year storm event?	_____	_____
33. Do the drawings contain standard City of Greeley details for storm pipe bedding, inlets, manholes, inlet protection vehicle tracking control, etc? City standards can be found at greeleygov.com/ Public Works Department/ Drainage-Stormwater / Design Standards .	_____	_____
34. Is there at least 1 foot of cover between the top of all RCP storm pipes and top of pavement?	_____	_____
35. Are storm manholes placed no more than 400 feet apart and are they accessible from the street?	_____	_____
36. On drop structures - has the location of the hydraulic jump and seepage distance been determined, is there adequate distance for protection from short circuiting below and around the ends of the structures?	_____	_____
37. On culverts - has both inlet and outlet control been taken into account?	_____	_____
38. Do all culverts pass the 10-yr Storm event?	_____	_____
39. Is there erosion protection at the discharge of storm pipes?	_____	_____
40. Have toe walls been provided at storm drain outlets?	_____	_____
41. Has an irrigation system been provided?	_____	_____
42. Is riprap placed on geotextile fabric and bedding? Has it been called out as grouted riprap?	_____	_____
43. In any channel designs; is there adequate freeboard (1ft.), velocity (<5 ft/s, Froude Number <0.8)?	_____	_____
44. On sidewalk chases - 2 year storm should pass under and 100 year storm should pass over the sidewalk?	_____	_____

(Checklist continued on the following page.)

(Final Drainage Report Checklist continued)

YES **NO**

45. Is a minimum opening elevation (M.O.) shown on all buildings next to ponds and major drainage swales? The M.O. elevation shall be 1' above the top of the stormwater elevation as it overtops the spillway. This elevation would be the minimum allowed elevation for all windowsill elevations, doorway threshold elevations, top of window well elevations, garage door threshold elevations, and any other building opening water could penetrate. Include an explanation in the key of the drawing for the M.O. elevation designation.

Signed - Design Engineer

2.5 CONSTRUCTION PLANS

Where drainage improvements are to be constructed, the final construction plans (24" x 36") shall be submitted with the Final Drainage Report. Approval of the construction plans by the City is a condition of the City prior to issuing all construction permits, except for the grading permit that may be issued prior to approval of the construction plans.

Should circumstance warrant changes from the approved plans or specifications, a written approval must be obtained from the City. Copies shall be given to the Contractor and the Developer. Project as built record drawings that record changes in construction are the Developer/Owners responsibility. These record drawings shall consist of detailed drawings that have been prepared by the Developer/Owner's Design Engineer, upon completion and at the time of the Certificate of Completion, they shall show actual construction and contain field dimensions, elevations, details, changes made to the construction drawings by modification, details which were not included on the construction drawings, and horizontal and vertical locations of underground utilities which have been affected by the utility installation.

The plans for the drainage improvements shall include:

2.5.1 GENERAL DETAILS

1. Title Block (lower right hand corner preferred)
2. Scale
3. Date and Revisions Block
4. Name of Professional Engineer and Firm
5. Statement: All work must be in accordance with applicable City Of Greeley construction standards. The City's acceptance allows for plan distribution and permit application. The City's acceptance shall not relieve the design engineer's responsibility for errors, omissions, or design deficiencies for which the City is held harmless.

Accepted By: _____

City Engineer

_____ Date

2.5.2 PLAN PORTION

1. North Arrow
2. Property lines
3. Easement Limits with Dimensions and identification
4. Ownership of Subdivision Information
5. Street Names
6. All Existing Utilities
7. All Topographic Features (houses, curbs, water courses, etc.)

2.5.3 PROPOSED FACILITIES

1. Storm drains, inlets, outlets, and manholes with pertinent elevations, dimensions, type, and horizontal control indicated.
2. Culverts, end sections, cutoff walls, and inlet/outlet protection with dimensions, type, elevations, and horizontal control indicated.

3. Channels, ditches, and swales (including side and/ or back yard swales) with lengths, widths, cross-sections, and erosion control (i.e. riprap, concrete, grouted riprap) indicated.
4. Check structures, channel drops, erosion control facilities.
5. Detention pond grading (elevations and horizontal control), trickle channel, and outlets.
6. Other drainage related structures and facilities (including under drains and sump pump lines).
7. Maintenance access considerations.
8. Over lot grading.
9. A & B lot designation for all residential lots and either a written definition or a schematic of A & B lot drainage as per Section 1.2 Principles for Storm Drainage Planning and Design.
10. Lot corner and mid point side lot elevations for all residential lots.
11. Top of foundation (TOF) elevations (which are set two (2) feet higher than the highest curb elevation fronted by the property).

2.5.4 PROFILE INFORMATION

1. Stationing
2. Elevations shall be North American Vertical Datum (NAVD) 88
3. Length between Structures and Connections
4. Slope of Pipe
5. Existing Ground Profile
6. Proposed Ground or Street Profile

The information required for the plans shall be in accordance with sound engineering principles, these Criteria, and the City requirements for sub-structural, foundation, bedding, hydraulic, landscaping, and other details as needed to construct the storm drainage facilities. The approved Final Plan shall be included as part of the construction documents for all facilities affected by the drainage plan. Construction plans shall be signed by a Registered Professional Engineer as being in accordance with the City approved drainage reports/drawings. Construction plans along with the City's Design Criteria and Construction Specifications Manuals shall be provided at the construction site by the Contractor at all times.

2.6 CONSTRUCTION CERTIFICATION & DRAWINGS OF RECORD

Record drawings for all improvements are to be submitted to the City Development Coordinator with the request for Substantial Completion Certificate. Certification of the record drawings is required as follows:

The project responsible Design Engineer and Surveyor shall observe construction as required to be able to certify that the conditions and information recorded on the As-Built Record drawings is true and correct. The owner or responsible party of the General Contractor for the project shall sign each drawing sheet in the "As-Built" plan set with the following statement:

I, _____, hereby state that this project was constructed to City of Greeley approved construction drawings and standards, as designed by the Project Engineer, and as field

staked by the Project Surveyor. All deviations to the approved construction drawings, standards, design, and/or survey were so noted on Field Drawings and these were provided to the Project Engineer for acceptance and inclusion in the As-Built Drawings.

Construction Company

Address

Authorized Representative

Title

Date

A Professional Land Surveyor shall perform or directly supervise all field survey data collection to verify the As-Built conditions and shall stamp and seal each drawing sheet in the As-Built Record plan set with the following statement:

I, _____, hereby state that this project was field staked for construction per City of Greeley approved construction drawings and standards and in accordance with the project design. I certify that the field survey information obtained for the As-Built drawings was obtained in accordance with City criteria and are accurately represented on these drawings.

City of Greeley Design Criteria (latest edition)

A Professional Engineer shall review all the As-Built information for compliance with the original approved design and standards and shall stamp and seal each drawing sheet in the As-Built Record plan set with the following statement:

I, _____, hereby state that I have reviewed the as-built information provided by the project contractor and surveyor. I certify that according to the information provided and periodic field inspections, the As-Built drawings are in compliance with the City of Greeley approved construction drawings and standards and will function as designed.

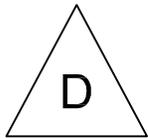
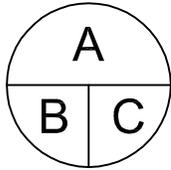
The City shall compare the certified record drawing information with the construction drawings.

A Certificate of Substantial Completion shall be issued only if:

1. The record drawing information demonstrates that the construction complies with the design intent.
2. The record drawings are certified by a Professional Land Surveyor, a Professional Engineer, and the Owner or responsible party of the General Contractor. Both the Professional Land Surveyor and the Professional Engineer shall be registered in the State of Colorado.

A summary of the required certifications and approvals is presented below:

TABLE 2.6 - CERTIFICATIONS & APPROVALS REQUIRED		
Item	Certification Required	City Approval Required
Conceptual Report	Professional Engineer	Yes
Preliminary Report	Professional Engineer	Yes
Final Report	Professional Engineer & Responsible Party	Yes
Construction Drawings	Professional Engineer	Yes
Detention Pond Easement Agreement	Responsible Party & Notary Public	Yes
Subdivision Grading Certificate	Professional Engineer or Professional Land Surveyor	Yes
Record Drawings	Professional Engineer Professional Land Surveyor Owner or Responsible Party of the General Contractor	Yes (Certificate of Substantial Completion)



A = BASIN DESIGNATION

B = AREA IN ACRES

C = COMPOSITE RUNOFF COEFFICIENTS

D = DESIGN POINT DESIGNATION

SUMMARY RUNOFF TABLE
(TO BE PLACED ON DRAINAGE PLAN)

DESIGN POINT	CONTRIBUTING AREA (ACRES)	RUNOFF 5-YR (CFS)	PEAK 100-YR (CFS)
XX	XX.XX	XX.X	XX.X

DRAWING SYMBOL CRITERIA AND HYDROLOGY REVIEW TABLE

TABLE 2-1

