State of Utah

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Department of Administrative Services
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Executive Director

Division of Facilities Construction and Management
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Director

ADDENDUM #2

Date: January 12, 2009

To: Consultants

From: Vic Middleton, Project Manager, DFCM

Reference: Bingham Entrepreneurship & Energy Research Center
Utah State University, Uintah Regional Campus – Vernal, Utah
DFCM Project No. 08273770

Subject: **Addendum No. 2**

Pages	Addendum	1	page
	Revised Schedule	1	page
	Revised Drawings	25	pages
	Total	27	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

1.1 **SCHEDULE CHANGES – There are changes to the project schedule.**

Mandatory Pre-Proposal Meeting	**Tuesday, January 20, 2009 at 9:00 AM**
Work Session 1	**Tuesday, February 10, 2009 at 7:30 to 5:00**
Work Session 2	**Tuesday, February 24, 2009 at 7:30 to 5:00**
Last Day to Submit Questions	**Tuesday, March 3, 2009 at 3:00 PM**
Addendum Issued	**Thursday, March 5, 2009 at 3:00 PM**
Cost Proposals and Design Statements Due	**Wednesday, March 18, 2009 at 12:00 PM**
Subcontractor List Due	**Thursday, March 19, 2009 at 12:00 PM**
Interviews	**Tuesday, March 24, 2009**
Announcement	**Wednesday, March 25, 2009**

2.1 **GENERAL** – Harris & Associates - Civil Drawings of the 2000 West Road. UBATC Site Plan.
Please see attached drawings.

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	STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES **Division of Facilities Construction and Management**	**DFCM**

REVISED PROJECT SCHEDULE
AS PER ADDENDUM No. 2 – dated January 12, 2009

PROJECT NAME: BINGHAM ENTREPRENEURSHIP & ENGINEERING CENTER
UTAH STATE UNIVERSITY – UINTAH REGIONAL CAMPUS, VERNAL, UTAH
DFCM PROJECT NO. : 08273770

Event	Day	Date	Time	Place
Request for proposals Available	Wednesday	December 31, 2008	12:00 PM	DFCM 4110 State Office Building SLC, UT and DFCM web site*
Mandatory Pre-Proposal Meeting and Energy Modeling Discussion 9:00 AM to 11:00 AM Team Breakout Sessions: Gramol Oakland Jacobson	**Tuesday**	**January 20, 2009**	**9:00 AM** **To** **11:30 AM** **12:30 PM to 2:00 PM** **2:00 PM to 3:30 PM** **3:30 PM to 5:00 PM**	Little America 6 South West Temple Rm: Flagstaff
Work Session 1 with DFCM/Agencies	**Tuesday**	**February 10, 2009**	**7:30 AM** **To** **5:00 PM**	Little America 6 South West Temple Rm:
Work Session 2 with DFCM/Agencies	**Tuesday**	**February 24, 2009**	**7:30 AM** **To** **5:00 PM**	Little America 6 South West Temple Rm:
Last Day to Submit Questions	**Tuesday**	**March 3, 2009**	**3:00 PM**	Vic Middleton - DFCM e-mail: vmiddlet@utah.gov
Addendum Issued (exception for bid delay)	**Thursday**	**March 5, 2009**	**3:00 PM**	DFCM web site*
Prime Contractors Turn in Cost Proposals and Designs Statements of Qualifications and Management Plans Due	**Wednesday**	**March 18, 2009**	**12:00 PM**	DFCM 4110 State Office BLDG Salt Lake City, UT
Subcontractor List Due	**Thursday**	**March 19, 2009**	**12:00 PM**	DFCM 4110 State Office Building SLC, UT FAX (801) -538-3677
Interviews	**Tuesday**	**March 24, 2009**	**TBA**	TBA
Announcement	**Wednesday**	**March 25, 2009**		DFCM web site*

*** DFCM's web site address is http://dfcm.utah.gov**

7.00 Design Criteria - Special Criteria

Design and construction of the new Bingham Entrepreneurship and Energy Research Center will be under the design-build contractual delivery method, as managed by the State of Utah Division of Facilities Construction and Management (DFCM). Under this delivery method, a design team is contracted directly with a general contractor. Engineering consultants may or may not be a sub-consultant of the architect, dependent on the general contractor's contract with the design team. For this project it is required that professional engineers are retained by the design-builder to design the mechanical, electrical, plumbing, structural, and civil design. Additionally, a licensed landscape architect shall be retained for the landscape system design. These professional services shall not be delegated to a traditional construction subcontractor for a "design build" effort. For example, a subcontractor who builds and supplies mechanical systems cannot design the mechanical system. The design-builder must instead retain a registered professional mechanical engineer who is not an employee or consultant of the mechanical subcontractor. This applies to all professional disciplines.

Special Off-Shore Production and Design Restrictions: Because of the nature of this project as a center for "Utah" Entrepreneurship, it will be a requirement of this proposal that all design and drawing production be done in the State of Utah. Off-shore resources will not be allowed on this project.

The project shall comply with additional requirements, including requirements contained in the RFP, DFCM's "Design Manual" (current edition), and USU's "Design Criteria" (current edition), please see Appendix D. The following additional criteria will also be required:

1. This will be a LEED® "Silver" project. The project shall also comply with the DFCM "High-Performance Building Rating System", as defined in the DFCM Design Manual.

2. The Design/Builder will be responsible for a complete LEED® Certification of the Project through the Leadership in Energy and Environmental Design (LEED®) rating system of the U.S. Green Building Council (USGBC), and includes registration, design, construction and post construction phase services; certification; and all registration and certification costs and fees. The Project shall comply with the USGBC LEED® prerequisites and credits needed for the Project to obtain a minimum LEED® "Silver" certification based on LEED-NC, Version 2.2, or newer version if available and required by Owner prior to submittal of GMP. The final list of credits proposed by the Design/Builder is to be approved by the Owner prior to submittal of the GMP. Refer to Technical Requirements Section "Sustainable Design Requirements (LEED®)" for additional requirements.

3. Construction materials and colors will be as per the Master Plan criteria listed in Section 4.11.

4. All mechanical equipment shall be located internal to the facility. Roof top mechanical equipment is not allowed. Vents and exterior mechanical and electrical systems shall be integrated into the architecture and/or architecturally screened from view.

5. This program contains an ALTA survey (Appendix A) and a geotechnical survey (Appendix B) of the site for reference only. It is the responsibility of the Design-Builder to verify all geotechnical conditions and final surveys, and to coordinate with local entities for all utilities, easements, rights-of-ways, road conditions (current and future), and other requirements. The cost of permits, hook-up fees, coordination, and any additional surveys needed for this project will be the responsibility of the Design-Builder, and must be included in the GMP.

6. In case of conflicts between the RFP, design manuals, design criteria, program, and technical requirements, the Design-Builder shall obtain written clarification from the Owner prior to submitting the GMP. Where discrepancies or multiple interpretations occur, the most stringent (which is generally recognized as the most costly) shall be enforced.

8. All wiring shall be in minimum 3/4-inch conduit, and all conductors shall be copper. Design and provide cable tray systems so that station cable raceways do not extend more than 50 feet max to cable tray. Conduits shall stub to the cable tray. Include pull strings in all empty conduits. Include raceway for all technology systems, whether furnished as part of the construction contract or furnished by

the Owner. Where indicated, provide empty raceway for security systems. The Owner will provide and install security systems, intercom systems, telephone/ voice systems/equipment, AV control systems/ equipment, data communication wires, and computer file servers. Provide file server rooms that have service runs not exceeding 80 feet.

10. Locate the main electrical room close to the medium voltage transformer for building. Design with 480/277 3-phase services to interior main switchboards. Include 208/120 VAC 3-phase K-rated dry transformer(s) at new buildings, and distribution and panel boards for convenience outlets, control power, etc. Each main switchboard shall be provided with "Powerlogic" type digital metering, unless campus standards require a different type of meter. Provide capabilities to interface meter with the building management system. To the greatest extent possible, separate different types of loads onto different feeders and load centers, such as motors, lighting, convenience power, and "clean" computer power. In general, large motors and equipment shall be served at 480V, 3 phase; lighting at 277V; and outlets and small equipment at 120V. Verify voltage requirements with each specific equipment item.

11. Fire Protection Systems: Provide fire sprinkler protection systems suitable for building type, construction, hazard, and occupancy. Comply with applicable fire protection system requirements including DFCM, NFPA, State Building Official, and State Fire Marshal requirements.

12. Air Handling: Coordinate fan systems, and areas served, to allow shut down of fan systems when areas are not is use. Locate central fan systems in equipment rooms to facilitate service and maintenance and to control noise. Do not put sensitive spaces next to equipment rooms. All mechanical systems must be located inside the new facility. No roof top equipment is allowed. Consider heat recovery for exhaust systems where feasible, especially where a high percentage of the system volume is exhausted. Provide outside air ventilation to comply with ASHRAE 62-1989 "Ventilation for Acceptable Indoor Air Quality." Utilize minimum outside air settings based on CO2 sensing. If mechanical penthouses are used, they must be part of the facilities massing and form and not just a fixture on the roof. Cooling towers and other mechanical equipment must be sensitively placed to reduce noise and visual clutter. Cooling towers and electrical equipment shall be completely screened with architecturally designed screen walls. All equipment will be sound and vibration isolated from other building components.

13. All windows shall include interior window treatment, such as mini blinds.

14. The facility shall be a two-story facility to match the scale and massing of the existing facilities on the campus.

15. Provide an emergency generator for this project with a 24-hour fuel capacity. The generator shall be sized for all emergency egress lighting, the security system, and fire alarm system.

16. All laboratories shall have air, natural gas, vacuum, cold water, and hot water located at each workstation and fume hood. Distilled water, deionized water, and specialized gases will be provided by the facility user and are not in the contract.

17. This project will include a "1% for Arts" installation that will be funded by DFCM at 1% of the construction cost for the facility. The Design-Builder team shall assist in coordination and location of the artwork and provide power and special footings, if needed, as part of the Design-Builder's work. Please include a $25,000 allowance for Artwork Installation in the bid.

18. All doorways into teaching and research labs will be 4-'0" wide; this includes all doorways into lab storage rooms, prep rooms, instrument rooms, and stock rooms.

19. The RFP, design manuals, design criteria, program, and technical requirements, are considered minimum standards. It is the responsibility of the Design-Builder to provide a complete and fully functioning facility. Omissions in the RFP, design manuals, design criteria, program, or technical requirements do not relieve the Design-Builder from providing a complete and fully functioning facility for the intended use. The Design-Builder is responsible to develop and submit full construction documents, including specifications, for this project.

20. Energy Incentive Programs:

The Design/Builder shall assist, as necessary, in the process to obtain incentives from utilities for energy efficiency. Specifically Rocky Mountain Power and Questar Gas have programs that require energy modeling to achieve incentives. DFCM will engage Rocky Mountain Power, and they will provide an energy consultant through the FinAnswer Design assistance program. In addition, that consultant may be hired by DFCM to identify gas side savings and, if deemed worthwhile, prepare documentation for the Questar Custom Business Rebates Incentive program. As the LEED Certification will also require energy modeling, teams may opt to hire that same energy consultant to complete the LEED calculations as well.

Roles for participating in the Rocky Mountain Power FinAnswer Design Assistance program are defined as follows:

Design/Builder Responsibilities:

- Sign design team reimbursement agreement.
- Provide schedule guidance.
- Provide tentative milestone dates and deliverables to help align the assistance provided by Rocky Mountain Power.
- Participate in design assistance process.
- Attend meetings.
- Provide building design documentation when it is available.
- Evaluate suggestions provided during the process.
- Provide required inputs for the energy savings and economic analysis.
- Communicate changes to design to ensure model accuracy in the energy model.
- Communicate basis of design to energy consultant.
- Discuss the goals of the team and owner to minimize energy use and what energized systems and controls are acceptable to the owner.
- Guidance with EEM selection.
- Provide EEM Incremental Costs—incremental costs are the difference between the installed cost of a code compliant measure and the installed cost of the proposed measure that exceeds code.
- Provide final construction documents.

Building Owner Responsibilities:

- Guidance with EEM selection.
- Support the design team with EEM selection and budget.
- Provide EEM Incremental Costs—incremental costs are the difference between the installed cost of a code compliant measure and the installed cost of the proposed measure that exceeds code.
- Sign incentive agreement.
- Commissioning (i.e., fine tune the systems and verify installed savings of EEMs).

Rocky Mountain Power (account manager, project manager, and/or energy consultant hired by Rocky Mountain Power) Responsibilities:

- Facilitate the Design Assistance or Certification process.
- Provide design reviews and subsequent report of the CD drawings to insure EEMs have been implemented in the design.
- Provide funding for the building owner incentives, design team honorarium and reimbursement, design assistance, and report efforts.

(please refer to table on the following page)

The following table is a Roles and Responsibility matrix for the Rocky Mountain Power FinAnswer Design Assistance program .

Roles and Responsibilities Table

Item	Owner	Architect	Engineers	Rocky Mountain Power
Complete Project Application/Agreement	✓	✓	✓	
Attend Three Meetings	✓	✓	✓	✓
Provide Basis of Design	✓	✓	✓	
Provide Cost Documentation	✓	✓	✓	
Guide the EEM Selection	✓	✓	✓	✓
Sign incentive agreement	✓			✓
Sign design team reimbursement agreement		✓	✓	
Conduct Commissioning	✓			
Conduct energy simulation analysis				✓
Provide final construction documents	✓	✓	✓	
Conduct CD Review				✓
Provide Owner & Design Team Incentives				✓

LANDSCAPE CONSIDERATIONS

Site Utilization Concepts

The proposed site is approximately 500 ft. x 500 ft. and is part of a larger 138 acres designated as Utah State University, Uintah Basin Campus. The proposed building has an approximate hardscape to softscape ratio of 3:1 and is largely on the interior of the site with parking toward the West facing the street. The street side has a parking strip with city side walks and curb and gutter. There is a landscape buffer between the street and parking lot which should be used to incorporate street trees as with the parking area. This will help soften the hardscape and allow for reduction in the ambient heat that may dissipate from the asphalt parking area.

Site Design

There is no existing landscape as the site was previously and historically used in agriculture. There are some inherent ground water issues and the overall site has been proposed to have retention/detention basins to help de-water the site. The potential for native landscaping and xeric concepts utilizing hydrozones as defined in the DFCM Landscape Design standards section 4.0 through 4.13.

New Landscaping

Automatic Irrigation system shall be designed to incorporate the latest in water management and conservation technology. Clocks, valves, filters, vacuum breakers, pipes, heads, emitters, nozzles, fittings, boxes and drains shall all be state of the art commercial grade durable high quality products readily available on the commercial / industrial supply market. Installation methods and warrantees shall all be in compliance with generally accepted industry standards and are subject to any DFCM/User Agency guidelines, codes and or supplemental standards. Water conservation with accommodations for appropriate flexibility in application rate(s) is (are) vital.

The design shall consider 'window' of available watering time during drought condition regulations and restrictions. Clocks shall be hung in a convenient interior maintenance room or closet supplied with appropriate outlets, power and conduit access to exterior landscaped spaces. Appropriate testing, observation and monitoring of trenching compaction, fitting welds other installation methods shall be addressed and called for.

Planting shall be consistent with the local neighborhood in terms of scale (height x width), texture, genus, species and hardiness. Trees, both coniferous and deciduous, shall be appropriate to the space it is intended for a s it relates to mature branch canopy and root zones. Shrubs, both evergreen and deciduous, shall be chosen for hardiness in the solar aspects orientation in which it is used and after due consideration to mature height and width. Spacing shall be correct to the anticipated mature growth, form, shape and character of the species to minimize any need for ongoing pruning or attention. This applies especially to plantings under windows and adjacent to walks and drives.

Ground Cover and Perennials shall be chosen for hardiness, exposure and rate of in-fill. Spacing shall be appropriate to the species, solar orientation, soils and slope conditions. All lawns shall be of Kentucky Bluegrass Sod; cut, delivered and installed according to rigid industry standard. All trees and shrubs shall be designed and planned to provide attractive, multi-seasonal interest, attractiveness and where possible seasonal color including fall foliage, seasons blossoms and flowers and structural form. Special consideration shall be taken regarding limited ongoing maintenance resources.

STRUCTURAL CONSIDERATIONS

The purpose of this project is to provide a new Research and Education Building to be constructed at the Utah State Extention Campus in Vernal, Utah. High standards of architecture and structural design are required to be compatible with the user and owner's requirements. Selection of the building structural systems must balance concerns for safety, cost and function.

The facility will consist of a two-story, 72,000 gsf academic building to include research and teaching labs, meeting rooms, and computer and general support space.

The design of the new facility must address local conditions and shall be in conformance with applicable local/state ordinances, building codes, regulations, DFCM Design Standards and referenced criteria herein. The structural design of the floors should anticipate loadings for future remodels and reassignment of the use of the space. The design will be governed by the current version of the International Building Code.

The structural system shall conform to the functional layout of the architectural floor plan. The structural system shall balance factors of structural integrity, performance, economy, flexibility of future use, and local availability of materials.

Foundations/Geotechnical

A geotechnical report shall be provided by a geotechnical firm, signed and stamped by an engineer licensed in the state of Utah. The geotechnical report is of special concern as the soil in this area exhibits poor engineering qualities. The geotechnical report shall specifically address or provide the following items:

1. Provide subsurface testing sufficient to determine subsurface conditions to acceptable degree of reliability. The report should provide a description of the sub-surface conditions including a discussion of the water table.
2. Recommendations for foundation systems. (Concrete spread footings, piles, drilled piers, etc.) The report should also address the reliability and the performance of different systems.
3. Discussion of expected and acceptable settlements of the foundation systems over the life of the structure.
4. The soils shall be tested for moisture sensitive soils and the report shall discuss recommendations for managing moisture sensitive soils where they are discovered. The design team will be expected to specifically address their means of managing this concern.
5. Design parameters required by other design professionals.

    a. Soil type and soil site seismic classification.
    b. Soil bearing pressure including the allowable increase for temporary loading conditions. Pile capacities where piles are proposed.
    c. Frost depth.
    d. Lateral earth pressures. Active, at-rest, passive pressures shall be provided including the values for seismic load conditions.
    e. Sliding coefficient of friction.

6. Excavation requirements including cut and fill slopes including recommendations for excavation shoring and stabilization.
7. Compaction requirements including recommendations for stabilization of slopes or soft soils encountered.
8. Recommendations for the remediation of moisture sensitive soils, either expansive or collapsible, shall be provided if present on the site.
9. Structural fill requirements in fill areas and below footing, slabs, and pavements. The report should define the gradation and other significant properties of the structural fill. It shall also discuss the possibility of using the native soil to meet the structural fill requirements.
10. Requirements for support of concrete slabs on grade and pavement. This should include subgrade moduli for designing slabs on grade where applicable.
11. The soils shall be tested for water soluble sulfate content and the report shall discuss recommendations for managing the level of sulfates and mitigating their effect on the structure and its elements.
12. Liquefaction potential at the site shall be discussed.

Structural Framing Systems

The suggested framing systems include:

1. Steel frame building consisting of:

    - open web steel roof joists and joist girders with galvanized metal roof deck.
    - steel wide flange composite beams or open web steel joist with composite steel floor deck and concrete topping slab at suspended floors.

2. Masonry or concrete bearing wall system consisting of:

    - open web steel roof joists and joist girders with galvanized metal roof deck.
    - steel wide flange composite beams or open web steel joist with composite steel floor deck and concrete topping slab at suspended floors.

Lateral Force Resisting System

Lateral wind and seismic forces will be resisted by a system of steel frames (special concentric braced frames, eccentric braced frames, buckling-restrained braced frames, or special moment frames) and steel deck diaphragms according to the current International Building Code. Special reinforced concrete or masonry shear walls may also be used if compatible with the architectural plan. The design team shall show how they plan on managing the inter-story drift with relation to exterior building enclosure.

Structural Design Criteria

The structure is designed to support actual dead loads plus live loads and combinations according to the 2006 International Building Code and DFCM Design Standards. These loads are as follows:

Live Load

Office/Classroom	= 80 psf + 20 psf partition loading and a 2000 lb load over a 2 ½ ft square footprint.
Corridor	= 100 psf
Light storage	= 125 psf
Roof	= 20 psf minimum

Snow Load (also include drift and unbalanced conditions)

Exposure Category	= C
Ground Snow Load (P_g)	= 43 psf
Importance Factor (I_S)	= 1.1
Thermal Factor (C_t)	= 1.0

Seismic Loads

Occupancy Category III

Importance Factor (I_E) = 1.25

Spectral Response Coefficients are to be determined in accordance with current United States Geological Survey Maps.

Wind Loads

Exposure Category	= C
Basic Wind Velocity (V)	= 90 mph (3 second gust)
Importance Factor (I_W)	= 1.15

MECHANICAL, PLUMBING, AND FIRE SUPPRESSION CONSIDERATIONS

Heating, Ventilating and Cooling (HVAC) Systems

A. Codes and Standards

1. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers Standards 55, 62, and 90.1,
2. ASTM - American Society for Testing and Materials
3. AWWA - American Water Works Association
4. CISPI - Cast Iron Soil Pipe Institute
5. NEC - National Electrical Code
6. NEMA - National Electrical Manufacturer's Association
7. NFPA - National Fire Protection Association Section 13, 14, 24, & 96
8. OSHA - Occupational Safety and Health Administration
9. SMACNA - Sheet Metal and Air Conditioning Contractor's National Association
10. UL - Underwriters Laboratories, Inc
11. ANSI - American National Standards Institute
12. AABC - Associated Air Balance Council Association
13. IPC - International Plumbing Code
14. EPA - Environmental Protection Agency
15. IBC - International Building Code
16. IMC - International Mechanical Code
17. IFC - International Fire Code
18. IECC - International Energy Conservation Code
19. SFM - State Fire Marshal
20. DFCM, Division of Facilities Construction and Management, Design Criteria

B. Design Criteria

1. Climatic Design Parameters

   a. This project is located in Vernal, Utah with a summer design temperature of 93°F / 66°F dry bulb / wet bulb and winter design temperature of -6°F.
   b. Indoor design temperatures shall be 75 º F for summer and 72 º F for winter.

2. Controllability of Systems

   a. The zoning for control of the space temperature shall be such that; corner spaces having multiple exposures, office spaces for directors, managers, or other such individuals, and conference rooms larger than 200 square feet, shall have individual space control.
   b. Other spaces shall be zoned with spaces of like size, occupancy, and exposures as one zone. Do not exceed more than four spaces per zone.
   c. Open spaces, such as open offices, shall not exceed one zone per every 750 square feet.
   d. Individual classroom spaces may be zoned as a single zone even if the space exceeds 750 square feet with consideration for noise and air distribution (some large classroom spaces may need more than one zone for temperature control).
   e. Laboratory space zoning will be matched to the exhaust requirements for the labs and size of the laboratory space.

3. Ventilation Requirements:

   a. Comply with ASHRAE 62.1-2004 and all approved addenda for Indoor Air Quality performance.
   b. Comply with the carbon dioxide differentials for all types of occupancy are in accordance with ASHRAE 62-2001, Appendix D.

4. Noise Criteria

   a. Locate central fan systems in equipment rooms to facilitate service and maintenance and to control noise.
   b. Cooling towers and other mechanical equipment must be sensitively placed to reduce noise.
   c. All equipment will be sound and vibration isolated from other building components.
   d. Do not put chiller / boiler equipment rooms next to sensitive spaces.
   e. Mechanical equipment to be sound and vibration isolated from other building components.

C. Systems Description

1. Major HVAC Components:

a. Variable air volume (VAV) indoor custom air handling units with supply air fan, chilled water cooling coil, hot water heating coil, pre-filter / final filter sections, return air fan, outside air economizer, outside air, return and relief dampers and vibration isolators.
b. VAV terminal devices with reheat hot water coils (or cooling only as required)
c. Water cooled chillers (with appropriate ARI Standards and certification), cooling towers (certification by the Cooling Technology Institute), primary / secondary pumping systems, and associated chilled water specialties.
d. Natural gas fired hot water boilers, primary / secondary pumping systems, and associated heating water specialties.
e. Hot water converter for domestic hot water with associated specialties. Provide side inlets and side outlets for all converters. Provide pressure gauges with snubbers on the primary and secondary side of each converter. Install thermometers on the inlet and outlet of the secondary side of each converter.
f. General exhaust systems for toilet rooms, janitor closets, etc.
g. Laboratory fume hoods with associated exhaust systems / specialties.
h. Heat recovery for exhaust systems to be utilized where feasible, especially where a high percentage of the system volume is exhausted.
i. Perimeter hot water radiant systems in areas with large glass areas.
j. DDC control devices connected to a building management system.

2. General HVAC Criteria

a. All mechanical systems must be located inside the new facility. No roof top units are allowed.
b. If mechanical penthouses are used, they must be part of the facilities massing and form and not just a fixture on the roof.
c. Locate mechanical rooms to take advantage of ductwork and piping proximities to major loads.
d. Cooling towers shall be completely screened with architecturally designed screen walls.
e. Carefully coordinate the location of any exhaust or relief air with mechanical air intake systems to avoid short cycling.

3. HVAC Redundancy

a. Provide for continuous operation through redundancy and/or modularization for areas which have critical functions. The loss of one half or less of the design cooling or heating system for the entire facility shall be tolerated temporarily in the event of equipment failure for boilers and refrigeration machinery (excluding cooling towers).

Air Filtration:

a. Air handling equipment shall be fitted with filters in the medium efficiency category having an average efficiency of 25% to 35% based on MERV rating criteria.
b. Contractor to replace all filters prior to building occupancy and provide one replacement set of filters for the entire facility.
c. Provide pressure differential instrumentation across filter banks to facilitate maintenance.

5. Water Treatment

a. Provide water treatment for heating water systems, chilled water systems, condenser water systems, and steam systems.
b. Provide for one year on site service by water treatment company including supply of chemicals.
c. Provide treated water in the heating system until facility is accepted by DFCM.

6. Insulation

a. Supply air ductwork, return ductwork exposed to unconditioned spaces, chilled water supply and return piping, heating water supply and return piping and equipment shall be insulated. The insulation thickness as a minimum shall be as listed in ASHRAE 90.1.

7. Pumps

a. Heating water pumps, main and standby, will provide distribution of heating hot water to reheat coils, and heating coils through out the building.
b. Chilled water pumps, main and standby, will be required for distribution of water to air handling unit & fan coil unit cooling coils throughout the building.
c. Provide pressure gauge with gauge cocks as close to pump suction and discharge as possible and avoid pressure drops across valves, strainer, flexible connectors, etc.
d. Provide suitable throttling valves on discharge side of all pumps, such as globe valves, or balancing cocks.
e. Throttling valves shall have set point position indicator and shall not be used for shutoff valve.

8. Piping

a. Exposed pipe: comply with ASTM 53.
b. Underground pipe: comply with ASTM A106.
c. Piping system shall be provided with manual air vent valves at system high points and drain valves at system low points.
d. Access panels, shall be furnished in building construction to permit full access to these valves.
e. Manual air vents shall be 3/8″ globe valves with ¼″ copper tubing to near floor or to locations where water may be caught in bucket.
f. Drain valves shall be threaded for ¾″ hose connections.
g. Provide water-tight sleeve and caulking around pipe for all piping passing through floors.
h. Provide suitable air vents for all heat producing equipment (converters, unit heaters, coils, etc.).
i. Provide valves near the main with a union for all branch lines of water or steam which supply more than one outlet or unit so areas of the building may be shut down for repair without having to shut down large areas. For valves 2″ and larger on systems greater than 200 degrees F use flanged or grooved.

9. Ductwork System

a. Provide rectangular and round ductwork from galvanized steel, stainless steel or aluminum as required.
b. Leakage requirements shall meet or exceed SMACNA standards.
c. Duct systems shall be designed to obtain lowest cost-beneficial pressure loss by limiting certain duct velocities, avoiding dynamic loss components where possible and utilization of low dynamic loss components. High-loss fittings, such as mitered elbows, abrupt transitions, and takeoffs and internal obstructions must be avoided.
d. Distribution system pressure losses shall be determined by total pressure. The use of the "static regain" is encouraged as a design method.
e. Horizontal duct distribution shall be routed to maximize long, straight runs without multiple penetrations through fire and/or smoke partitions. Multiple horizontal mains shall be of comparable length and configuration to equalize pressure losses. The overall object is to route ducts that will avoid or minimize architecturally and/or structurally induced dynamic losses.
f. Sheet metal construction / gages shall be in accordance with SMACNA, and meet the appropriate duct pressure classification. Provide variations in duct size, and additional duct fittings as required to clear obstructions and maintain clearances.
g. Return air system shall be ducted in shafts and non-conditioned spaces. Return air plenum may be used above conditioned spaces.

10. Ductwork Accessories

a. A manual volume damper in the upstream ductwork from a terminal unit or air valve will be provided to reduce pressure entering the VAV box or air valve, which will provide a lower sound level for the unit. This is extremely important for terminal units closer to the AHU and sensing a higher duct system pressure.

11. Terminal Units

a. Terminal units with reheat coils shall be provided with an access door.
b. Internal liner shall be covered with suitable material to avoid degradation of the liner.
c. Provide continuous cooling for telecommunication and main telecommunication rooms.

12. Hot Water Unit Heaters

a. If a hot water unit heater is installed higher than 10′ AFF, a centrifugal blower shall be provided and not a propeller fan.
b. Provide all gas unit heaters with a 2-stage thermostat. On call for heat, the stage cycles the fan. The second stage fires the burner.

13. Grilles, Registers and Diffusers

a. Use a 2′x2′ module aerodynamically formed face panel or modular core diffusers. Diffuser shall not include volume dampers.
b. Return grilles shall be 2′x2′ to lay-in T-bar ceilings. Provide with 45 angled blades or perforated face. Exhaust grilles shall be 45-angle blade type.

14. Integrated Automation

a. Direct Digital Control: Provide direct digital control with digital metering of electrical, hot water, and chilled water systems. Provide flow metering devices for hot water heating systems. Provide straightforward DDC control systems. Avoid locating thermostats on outside walls or on partitions between offices. For perimeter radiant systems, provide hydronic piping subcircuits to match the cooling zones.
b. Control valves: Provide visual position indicators. Provide control valves with stem in the vertical position. If possible, provide packless valves. Do not provide "self-contained" valves.
c. Dampers: Provide low leakage design of felt or neoprene edges for fresh air and exhaust air dampers. Provide opposed blade type modulating dampers with maximum blade width of eight inches. Provide fresh air dampers that close in fan shutdown or power failure. Provide steel trunnions mounted in bronze sleeve bearing or ball bearings for damper blades. Do not exceed 48 inches in length between damper bearings. Provide dampers that close substantially tight and provide substantially the full area of the opening when open. Provide substantial bar or channel frames for dampers. For rectangular dampers larger than four square feet in area, provide additional corner bracing.
d. Provide solid state thermostats. Thermostats in corridors, halls, restrooms and other similar unsupervised areas shall be flush mounted aspirating type with stainless steel cover. Thermostats in public, but supervised areas shall have locking covers with concealed adjustment. Thermostats in private offices may have exposed adjustments.
e. Panels: Provide control devices, relays, piping, wiring and terminals in cabinets, except the switches, pilot lights, and push buttons mounted on the door. Provide minimum 14 gauge steel or 12 gauge aluminum. Equip doors with hinges, latches, and locks. Secure panels to walls, columns or floors with clearances required by NEC. Provide two (2) keys for each panel.
f. Wall Mounted Control Diagrams: Provide plastic laminated copies of all applicable controls diagrams mounted on the wall in each equipment room.

15. Sound, Vibration and Seismic Control

a. HVAC equipment and systems can generate vibration. Ductwork shall be designed to minimize vibration, conducted noise, and transmitted airborne noise. Supply, return and/ or exhaust air fans, pumps and the like should be located away from sensitive areas, and housed in mechanical rooms with walls designed to attenuate noise from the equipment.
b. Specific areas of concern that require attention to control noise and vibration include:

    1. Fan noise, transmitted either through the structure or through the duct system.
    2. Noise generated by air flowing past dampers, turning vanes and terminal device and louvers.

3. Noise caused by excitation of duct wall resonance, produced by fan noise; by pressure fluctuations caused by fan instability; and by turbulence caused by discontinuance in the duct systems.
4. Noise from the water circulation system, generally transmitted through the structural connections.
5. Noise and vibration from out of balance forces from fans, pumps, Compressors, etc.
6. Air handling units may have built in sound attenuators in lieu of duct silencers.
7. Duct silencers shall be considered when duct distance is not sufficient to provide adequate acoustical separation between rooms.

c. Vibrations generated by HVAC systems must be minimized: judicious equipment selection; limitation of fluid flow velocities; and isolation of key mechanical, piping and ducting systems is required.

1. Vibration isolation systems shall be provided on rotating mechanical equipment greater than ½ hp located within the critical area, greater than 5 hp elsewhere in the building, and greater than 10 hp outside the building within 200 feet of the building. Reciprocating equipment (other than emergency equipment) will not be used.
2. Concrete inertia bases shall be used with rotating mechanical equipment handling liquids (e.g., pumps) and with compressors. Steel frames shall be used for air handling equipment. Flexible pipe connectors (e.g., twin sphere connectors) shall be used on piping connecting to isolated equipment and where piping and ducting exit the mechanical room. Flexible duct connectors shall be used in a similar manner.
3. Special design consideration shall be given to the duct layout reducing noise transfer between rooms, especially noise generated by loud equipment or discussions in adjacent rooms.
4. Ducts of diameter less than 24 inches do not require isolation provided flow velocities do not exceed 1,200 feet per minute. (In the case of rectangular ducting, the effective diameter is defined as the square foot of the product of the two duct dimensions.)

16. System Start-Up, Testing, Adjusting & Balancing - The work includes system start-up, testing, adjusting, and balancing (TAB) of HVAC air and water distribution systems including equipment, HVAC equipment.

PLUMBING CONSIDERATIONS

A. General Requirements

1. The design shall allow for future expansion of plumbing fixtures and equipment and create flexible piping services that shall be easily adapted to changing research requirements.
2. Insulation: Completely insulate the following systems: all domestic cold water piping above ceiling; all domestic hot water piping and recirculation lines; roof drain and overflow piping including horizontal piping above ceilings, vertical piping below roof drain bowl, and roof drain bowls. Provide protective covering for exposed insulation in areas subjected to damage.
3. Exterior piping insulation: Cover all insulation with aluminum jackets secured with aluminum bands 12 inches on center. Seal joints watertight.
4. Main plumbing connections: Locate main water, and sewer connections and mechanical rooms on the same side of site as service, preferably close to maximum demand points such as core toilet stack, boiler room, and fire protection systems.
5. Install piping overhead wherever possible. Avoid installing piping below or in concrete slab floors. Install piping on warm side of building insulation. Provide water-tight sleeve and caulking around pipe for all piping passing through floors.
6. Exposed pipe: comply with ASTM 53.
7. Underground pipe: comply with ASTM A106.
8. Roof drains: provide minimum 3 inch roof drains.
9. Equipment Pads: Provide minimum 4" high concrete bases for all pumps, air / vacuum compressors, and other related equipment.

10. Valves: Install valves with bonnets at least 45 degrees above the horizontal to ensure debris does not collect in bonnet.
11. Domestic Water Pressure shall be maintained at a reasonable operating pressure, i.e., 50 – 80 psig.
12. Valves: Provide valves near the main with a union for all branch lines of water which supply more than one outlet or unit so areas of the building may be shut down for repair without having to shut down large areas. Provide isolation valves as necessary and provide, as a minimum, valves for each toilet group outside of the toilet room, each floor, and each branch line that is 2″ or greater Provide a shutoff valve on all water supply lines on the room side of the fixture. Valves shall have a gasket seat, not a ground joint. Supply lines from the valve shall be 3/8″ brass, chrome plated. Provide chases or access panels to access valves. In lieu of oversized globe valves, ball valves with full opening ports and adequate pressure and temperature rating may be provided up to two inches in size. For valves greater than two inches in size, butterfly valves with wheel and gear operator may be used.
13. Water relief valves: Connect water relief valve exhaust or discharge to nearby floor drain.
14. Provide floor drains in toilet and utility rooms. Provide deep seal P-traps on all floor drains.
15. Faucets and hose bibs: Provide non-freeze type hose bibs with shut-off valves for the lines serving the hose bib located inside facility. Provide faucet with hose attachment and vacuum breaker in each restroom so floor can be washed with clean water. Provide hose bib with vacuum breaker in mechanical rooms and chiller rooms. Provide non-freeze hose bib with vacuum breaker near cooling tower. Provide hose bibs outside building for window washing, walk and area way wash down (generally not more than 150′ on center).
16. Inaccessible Water Piping: Provide Duiron cast iron pipe, PVC "Blue Brute", or copper up to 2 inches in size, for water lines under building slab or other inaccessible locations.
17. Equipment Room Floor Drains: Trenches with grating covers with bottoms sloped to drain are preferred over multi-floor drains in mechanical equipment rooms and some laboratories.

B. Specialty Plumbing Equipment

1. Provide central vacuum air system and piping to provide vacuum to the laboratory spaces designed to meet the current edition of NFPA 99. Laboratory vacuum equipment to be sized for all connected equipment.
2. Provide central compressed air system and piping to provide air to the laboratory spaces designed to meet the current edition of NFPA 99. Laboratory compressed air equipment to be sized for all connected equipment.
3. Provide central distilled water system and piping to provide water to the laboratory spaces as required.
4. Chemical waste / vent piping and associated piping specialties to be provided for laboratory fixtures connected to an acid neutralization system complete with sampling / mixing / limestone tanks, chemical feed pumps, and auto sensing / dosing control system.

C. Plumbing Fixtures

1. Toilet Room Fixtures: Provide exposed type flush valves with lever operator (no push buttons or floor operators), diaphragm type only. If space allows, flush valves may be concealed in other applications. Hands free sensor actuated valves are acceptable, if acceptable to the owner. Provide similar fixtures manufactured by one manufacturer.
2. Drinking Fountains: Provide refrigerated type, wall hung drinking fountains with stainless basins. Provide removable grid strainer to enable cable-style cleaning without having to dismantle the fountain.

D. Water Systems

1. Domestic water service shall be brought to the building as detailed under the civil section, and have a compound water meter installed in the water line serving the facility in accordance with local water authority.
2. The domestic water service shall be provided with a water meter, pressure reducing valve (PRV) assembly, and reduced pressure backflow prevention device assembly.
3. PRV shall limit water pressure inside the building to 80 psi.

4. Hot water converters shall produce the domestic hot water. The distribution piping system shall be provided with a circulating pump return system, designed to insure hot water at point of use within maximum four seconds, at full flow.
5. The residual pressure at most remote water closet shall be 35 psi.
6. Water velocity will not exceed 6 ft/sec.
7. Minimum pipe size shall be 1/2-inch for one plumbing fixture with a maximum flow of 0.5 gpm and ¾"-inch for one plumbing fixture with flow above 0.5 gpm.
8. As a minimum a Reduced Pressure Backflow Preventer shall be provided for:

   a. Domestic water service to the building
   b. Fire system
   c. HVAC make-up water.

E. Sanitary Drainage and Vent Systems

1. Plumbing fixtures will be drained by gravity through soil, waste and vent stacks, house drains and house sewers to Site sewers 5-feet outside building.

F. Roof and Storm Drainage System

1. The roof drainage system shall be designed with connections to the on-site storm drainage system. The overflow drains will terminate at 12" maximum above grade outside building on a concrete splash block. Do not terminate overflow drains in an area that would affect occupants or lead to water entering the building. The storm system shall be designed for 3-inch rainfall.

G. Natural Gas Systems

1. Natural gas piping to be provided to the laboratory spaces, and shall be designed to meet the current edition of NFPA 99.
2. Provide seismic gas shut off valve: Provide a seismic gas shut off valve installed per manufacturer's instructions for each natural gas system.
3. Weld all concealed natural gas piping if larger than 4". Where feasible install flexible connections and tie-down straps to accommodate movement during seismic events.
4. Provide natural gas piping systems to all required laboratory equipment.

FIRE SUPPRESSION SYSTEM CONSIDERATIONS

A. Provide a complete hydraulically designed fire sprinkler and standpipe system for the Building. Meeting NFPA-13, 14, 24 criteria.

B. Use the flow data at 90% of available pressure for the basis of bid documents. The final design of the suppression system shall include the underground piping and the riser piping based on new flow readings witnessed and approved by the State Fire Marshal.

C. Branches to individual sprinkler systems will be provided with monitored control valves and water flow switches as well as a system drain/test connection. All control valves and water flow switches shall be annunciated at the fire control panel.

D. The system shall have a fire control panel with digital read-out and an emergency power source. The system should be installed so that it may be connected to a campus-wide automation system. A remote graphic or digital annunciation panel should be located at the firefighters' entrance. The location of the panel shall be reviewed and coordinated with the University security personnel, and State Fire Marshal.

E. The system components shall include the following:

1. A double detector check backflow preventer with a listed indicating control valves, check valve and fire department pumper connection shall be provided outside the building.
2. Valve and water-flow switch monitoring.
3. Audible sprinkler flow alarms on the exterior and interior of the building.
4. Hand-held fire extinguishers shall also be provided to comply with NFPA 10.

F. Water Supply

1. A fire main will be connected to the existing underground potable water system, and sized appropriately. Refer to Civil Section for details.
2. Provide water supply analysis to appropriate authority having jurisdiction.

G. Design Criteria

1. Piping shall be concealed above ceilings and within walls except for non-public equipment rooms without ceilings.
2. Sprinkler heads shall be spaced for symmetry with ceiling features. This will require additional heads that shall be provided in base bid. Basis of head location shall be:

   a. Equal distance between lights
   b. Equal distance between lights and wall
   c. Equal distance between lights and air inlets and outlets
   d. Equal distance between wall, lights, and air inlets and outlets
   e. Locate in center of ceiling tiles

3. Provide coverage for rooms void spaces, overhangs and as required by code.
4. Sprinkler heads in ceilings shall be completely recessed pendant type with white or chrome finish cover plate flush with ceiling.
5. Piping shall be schedule 40 black steel only
6. Provide high temperature sprinkler heads in electric and elevator machine rooms. Provide OS&Y gate or butterfly valves with tamper switches to isolate heads at these rooms.

ELECTRICAL CONSIDERATIONS

Codes and Standards

Codes which are applicable to the design of the electrical systems are listed below. Comply with each of the latest adopted publications.

- ASHRAE 90.1 Energy Code
- DFCM, Division of Facilities Construction and Management Design Criteria
- EIA/TIA, Electronics Industries Association/ Telecommunications Industry Association
- IBC, International Building Code
- IESNA, Illuminating Engineering Society of North America
- NFPA, National Fire Protection Association (applicable sections including but not limited to):
  - -NFPA 70, National Electrical Code
  - -NFPA 72, National Fire Alarm Code
  - -NFPA 780, Standard for the Installation of Lightning Protection Systems
- UL, Underwriter's Laboratories
- Utah State Fire Marshal Laws, Rules and Regulations

Electrical Design Objective

The electrical systems design shall concentrate on the following objectives: energy efficiency, comply with all applicable codes and standards, fulfill the electrical functional requirements of the project, allow for future expansion and provide systems that will be easily maintainable.

Electrical Site Utility Systems

The serving electrical utility company shall be Rocky Mountain Power (RMP). Service to the site shall be underground. The routing of the utility primary and pad mounted transformer shall be coordinate with RMP during the design development phase of the project. Primary conduit and trenching shall be provided under this contract. Metering enclosure, secondary conduit, conductors, trenching and concrete transformer pad vault shall be provided under this contract. Meter, primary feeder conductors and pad mounted transformer will be provided by RMP.

The site telecommunications infrastructure shall include conduits to and for service from telecommunications service providers. Four 4" conduits shall be provided from the MDF to a location coordinated with telecommunications provider.

Exact routes and requirements of each serving utility shall be coordinated with the utilities.

Normal Power Distribution

Power shall be distributed throughout the facility from a 277/480V -3Ph-4W service entrance. In general lighting, HVAC equipment, miscellaneous motors and heating loads shall be served at 277/480V. General purpose receptacles and lab equipment shall be served from 120/208V-3Ph-4W panelboards via dry type transformers.

Metering shall be installed in all 277/480V and 120/208V distribution switchboards and distribution panelboards. Metering shall be digital type with demand and energy functions. Provide capability for interfacing the meters with the building management system.

Distribution panels and power panels shall be circuit breaker-type and shall be sized to accommodate the actual load as well as a projected additional 25% spare capacity. Lighting and power branch panels shall be commercial-type with bolt-on circuit breakers. Branch panels shall have a master-keyed flush tumbler latch and hinged trim to allow entire front cover to swing open for easy maintenance. Overcurrent protection devices shall be selectively coordinated with supply side overcurrent protective devices. Circuit breakers shall be fully rated except that series rated devices may be used for branch breakers and an upstream main within the same panel or switchboard. Bussing shall be copper. Distribution and branch panels shall be located in stacked electrical closets. Branch panels serving specific labs shall be located recessed in the walls of the lab space.

Transformers shall be standard high efficiency, NEMA STP TP1 dry-type rated for 115° C rise. Windings shall be copper. K-rated transformers shall be utilized in areas where loads predominately consist of "non-linear" loads. Transformers rated 75 kVA or smaller

may be wall or floor-mounted. Transformers rated 112.5 kVA or greater shall be floor-mounted. Transformers shall be located to keep maximum feeder length from the transformer to the 120-volt panels from exceeding 200 feet in order to keep the neutral to ground voltage differential at workstations and equipment within acceptable limits.

Transient voltage surge suppression (TVSS) shall be provided at service equipment and on the load side of each step-down transformer in the facility. TVSS units may be integral to the panelboard or switchboard, or individually mounted stand-alone units. However, if individual units are used, they shall be placed immediately adjacent to the panelboard or switchboard to minimize the effects of increasing clamping voltages due to excessive lead lengths.

Wiring devices shall be 20-ampere minimum. Device plates shall be stainless-steel plates in finished areas. Each office shall have at a minimum a single duplex receptacle on each wall, coordinated with office furniture locations. Corridor receptacles shall be placed every forty feet on center. Restrooms shall each have a single GFCI receptacle. Storage rooms shall have at a minimum a single duplex receptacle placed near the door. Lab counter tops shall have at a minimum one duplex receptacle mounted every eighteen inches with a maximum of three receptacles per circuit.

Each lab shall be served by a dedicated panel with an isolated ground bus for normal power and shall be sized to accommodate the actual load as well as a projected additional 25% spare capacity.

Disconnect switches shall be heavy-duty type. Exterior switches shall be rain-tight. Disconnect switches for packaged HVAC equipment shall be fusible.

HVAC equipment shall be controlled by VFD's, individual motor starters and motor starters mounted in motor control centers per the mechanical program. VFD's shall include factory-mounted harmonic filtering within the enclosure to limit the total input current harmonic distortion to 15% or less. Motor starters shall be NEMA rated. Each magnetic motor starter shall include a hand-off-auto (H-O-A) switch, auxiliary contacts, a control power transformer, and a motor running pilot light. Each starter shall have a minimum inrush rating of 140% of that for a standard motor to meet the NEC requirement for use with energy efficient motors.

For groups of 3 or more motors, motor control centers shall be provided. Motor control centers shall be provided for each major mechanical space. Motor control centers shall be Class 1, Type B with motor circuit protectors. Bussing shall be copper. Components shall be rated for AIC. Starters shall incorporate the features described above.

All equipment and furniture identified during design, whether it is furnished in this contract or a separate contract, shall be provided with power and raceway rough-in for complete operation. Coordinate furniture connections with furniture systems suppliers.

Branch circuits shall be loaded to no more than 80% of what is allowed by NFPA 70. Where outlets are intended for a specific piece of equipment, the load of the outlet shall be based on the equipment nameplate. Otherwise, allow no more than 6 convenience outlets per circuit or 3 outlets per circuit serving workstation computer terminals and lab equipment. Outlets with dedicated branch circuits (one outlet per circuit) are required for vending machines, copy machines, break room counters, A/V cabinets, lab equipment and other locations likely to have equipment requiring dedicated circuits. Each branch circuit homerun shall have no more than 3 circuits per raceway. All 120V branch circuits serving harmonic producing equipment shall be provided with an oversized neutral.

The electrical power distribution system shall be grounded in accordance with the NEC. The ground bus at the main service equipment shall be connected to the water service, a concrete-encased electrode, and building steel. The grounding system shall be installed in strict accordance with NEC article 250. All transformers shall have the neutral of the derived system bonded to building steel, the nearest metal water pipe, and the transformer case. An insulated equipment grounding conductor shall be installed with feeders and branch circuits. Metal raceways, boxes, equipment, receptacles, and light fixtures shall be bonded to the equipment grounding system. Provide a grounding riser system throughout the telecommunications closets, with grounding bus bars mounted accessible in each closet. All grounding

systems shall be bonded together per NEC requirements.

All conductors shall be copper. Conductors for branch circuits shall be minimum size of # 12 and sized to prevent voltage drop exceeding 3% at the farthest load. The total voltage drop on both feeders and branch circuits shall not exceed 5%. When calculating the voltage drop, the load shall be assumed to be 80% of the ampacity of the branch circuit and feeder conductors. Insulation shall be THWN-2 or XHHW rated for 90° C; however, design shall be based on the 60°C rating for conductors #1 AWG and smaller and the 75°C rating for #0 AWG and larger. Four-wire feeders, where neutral is considered a current-carrying conductor, shall have an additional 80% derating. All conductors, including neutrals and grounding conductors, shall be color-coded.

All wiring shall be in raceways, minimum 3/4" conduit for power and minimum 1" conduit for communications. Galvanized rigid steel conduit (GRC) or intermediate metal conduit (IMC) shall be used for exposed exterior work where subject to damage. Type MC or AC cable is strictly prohibited. A cable tray system shall be provided such that communications station cable raceways do not extend more than 50' max to cable tray. Conduits shall stub all the way to the cable tray. Include pull strings in all empty conduits. Include raceway for all audio/visual and technology systems whether furnished as part of the construction contract or furnished by the Owner.

A fault current and coordination study shall be performed by a licensed electrical engineer to indicate available fault current at all points in the building distribution systems. Equipment shall be adequately rated for the amount of available fault current. System coordination shall be studied, and fuses or breakers selected to ensure minimum system outage due to overloads or fault currents. Breakers with adjustable long time, short time, instantaneous and/or ground fault settings shall be set at levels for optimum system coordination.

Emergency Power Distribution

An outdoor diesel-driven generator shall be provided to accommodate emergency power for egress and exit lighting. It shall be sized to include standby power for selected areas and equipment as directed by the owner to include but not limited to: computer systems, telephone equipment, selected refrigeration equipment, selected lab equipment and any other items directed by owner. Separate automatic transfer switches shall be provided for Emergency Standby and Optional Standby loads.

The generator shall be 277/480, 3phase, 4 wire and shall be located outside in a sound attenuated, weatherproof enclosure with a critical silencer. The fuel tank shall be skid-mounted, dual-wall in accordance with EPA guidelines and sized for a capacity of 24 hours of fuel consumption at 100% load. Generator exhaust shall meet current EPA exhaust requirements for non-road engines.

The emergency systems shall be designed in accordance with the NEC. The emergency system shall be divided into at least two branches: Emergency and Optional Standby branches both on generator back up.

The Emergency Branch shall consist of loads including egress lighting and exit signs, fire alarm, and automatic doors required for egress.

The Optional Standby Branch shall serve additional owner requested systems and equipment desired to be on generator back up. Wiring devices on generator supplied circuits shall be red in color.

Uninterruptible Power Supplies, where needed, shall be provided by the Owner or end users for a particular space or piece of equipment.

Lighting

Energy efficient luminaires shall be provided throughout the facility. Closed and open office and like areas shall be provided with high efficient, low glare fixtures. Classroom and lab areas shall be provided with pendant mounted direct/indirect lighting fixtures.

Storage and unfinished areas shall be provided with 2' x 4' standard lensed troffers or industrial type fixtures.

Specialty luminaires shall be provided for aesthetics in areas such as lobbies, entries and conference rooms.

Lighting in corridors and common areas shall be controlled via a low-voltage networked lighting control system. Occupancy sensors shall be used in all enclosed areas, including but not limited to: offices, classrooms, conference rooms, storage, mechanical/ electrical and restrooms. Perimeter lighting with dimming ballasts in day lit areas shall be controlled by photo sensors.

All required egress and exit lighting shall be connected to the emergency generator. LED exit signs shall be used for exit signage.

The lighting system design shall consider occupant needs, visual tasks to be performed, the desired appearance of the respective space, infection control and energy/economic constraints. The lighting design shall comply with the Recommended Practices of the IES North America and energy codes.

Design illumination levels to meet IES recommendations for interior illumination levels. Lighting fixture selection shall consider visual comfort, appearance and energy efficient lamp and ballast sources.

Energy efficient luminaires shall be provided throughout the majority of the facility. In general, T8 and T5 fluorescent lamp sources with electronic low THD ballasts shall be used.

Adjustable dimmed downlights shall be used in rooms where additional light function is required.

HID pole mounted site lighting fixtures (maximum of 30′ tall) and building mounted luminaires at entrances and other appropriate locations along the building shall be selected with attention given to dark sky sensitivity. Any areas/features that require high lighting shall utilize metal halide directional fixtures. Exterior lighting shall be photocell/time clock controlled.

Lightning Protection

A lighting risk assessment in compliance with NFPA 780 shall be completed and if recommended, a complete concealed lightning protection system shall be provided. The system shall have master label approval. Down conductors shall be run in raceways concealed in the building structure.

Fire Alarm System

The facility shall be provided with an intelligent microprocessor-based, addressable fire alarm system complete with addressable control relays. The system shall have sensitivity monitoring and adjustment of all smoke detectors.

Addressable manual stations shall be provided at each exit from the building. Smoke detectors shall be provided for elevator capture, HVAC system control, paths of egress, and other areas required by code.

Audible/visual evacuation signals shall be visible in the evacuation path. Signals shall be located no more than 15 feet from exit doors and no more than 80 feet on center in corridors. Signals shall also be installed in toilets and common use areas. An additional signal shall be located on the exterior of the building.

HVAC systems shall be provided with duct detectors as required by code. Relays shall be provided to shut down each air handling unit in response to an alarm generated by its associated detector. Smoke dampers shall be wired to dedicated 120-volt circuits from emergency panels. Circuits shall be controlled by the fire alarm panel so damper close upon smoke detection at the serving air handling unit or in the space served.

Fire sprinkler system shall be monitored for flow and valve position. The fire pump controller shall be monitored for power availability, pump run status, and trouble conditions. All fire alarm wiring shall be installed in raceways.

Security/Access Control System

Security and access control systems will be designed and installed under the direction of the Owner. Empty raceway shall be provided in this contract for security and access control systems.

Voice/Data and Communications System

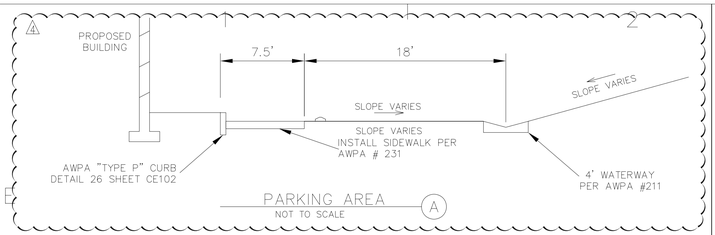
Voice/data systems will be designed and installed under the direction of the Owner. Empty raceway shall be provided in this contract for security and access control systems.

Stacked telecommunications closets shall be provided to serve each floor of the building. Coordinate equipment layout and wall space with Owner.

Closets shall be located such that when cabling is routed through the raceway system provided, the distance will not exceed 290 feet to the furthest outlet. Provide a minimum of four 4" conduits from the MDF to the stacked IDF locations and four 4" sleeves between floors. If possible, stack the MDF below the IDF's. Provide both normal and standby generator circuits to each IDF, 3 each, with one fourplex per circuit. Twenty-four hour HVAC is required in each closet and shall be supplied with standby generator power.

Horizontal Distribution: Provide a cable tray distribution network throughout each floor and into the IDF closets. Extend the cable tray around inside of the IDF closet to allow cables to be routed within the room. Consider ease of access to the tray system when the building is in full operation. Limit cable tray routing to be above corridors, common and similar areas. Where ceilings are exposed or inaccessible, provide a bridge of equivalent conduit connecting the cable trays in the accessible ceiling areas. Do not load the cable tray and raceway system to more than 50% of what is allowed by cable fill requirements of NFPA 70.

Voice/Data Drops: Each voice/data outlet location shall consist of a 4" square box with mud ring and one 1″ conduit stubbed to the nearest cable tray. Locations shall be coordinated with the users during design. As a minimum, provide one voice/data drop for each workstation, fax machine, copy machine, desk, computer terminal and lab bench. Where wireless networks are being considered, still allow sufficient empty raceways for future hardwired connections should the wireless system have insufficient bandwidth for evolving applications.



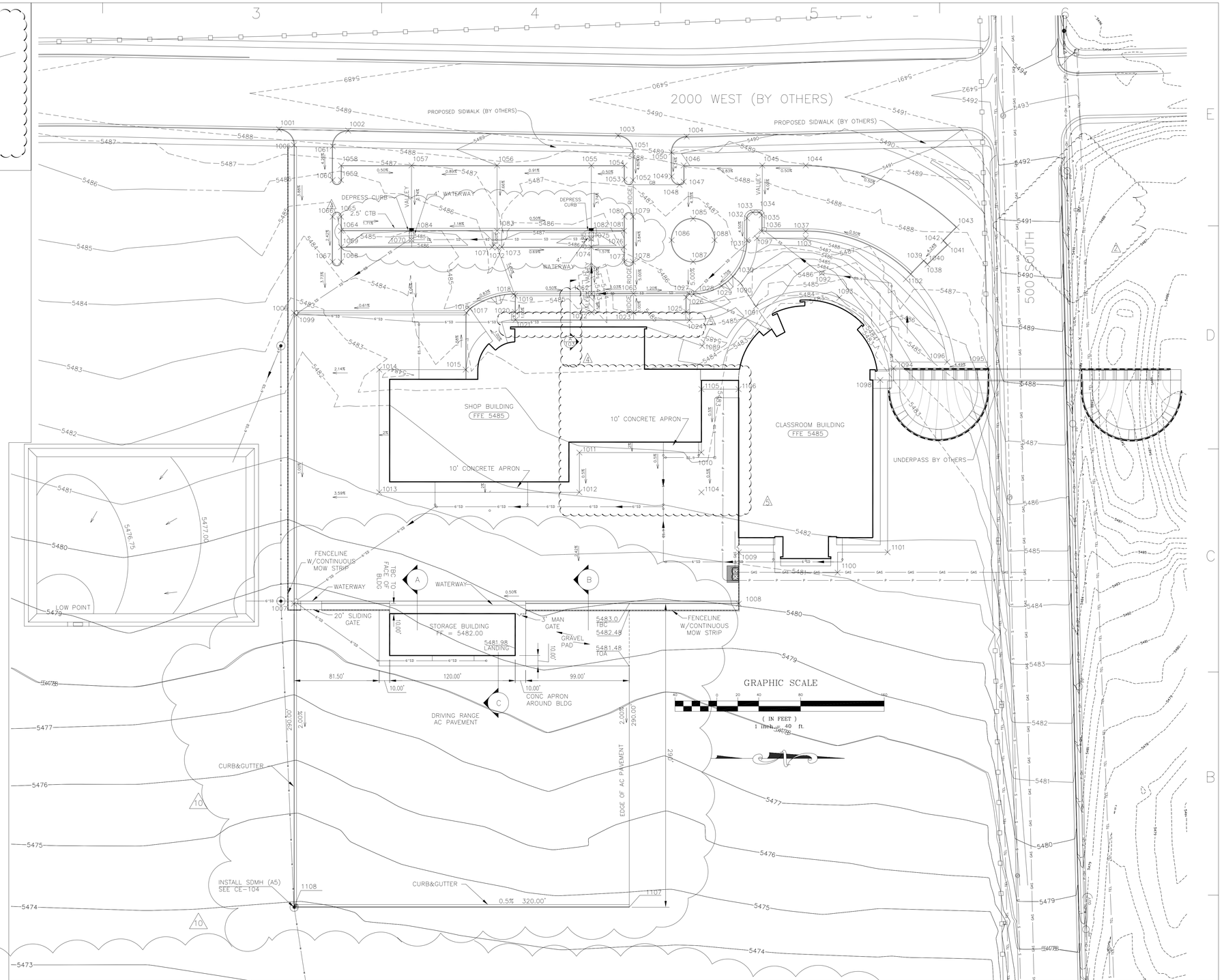
PARKING AREA (A)
NOT TO SCALE

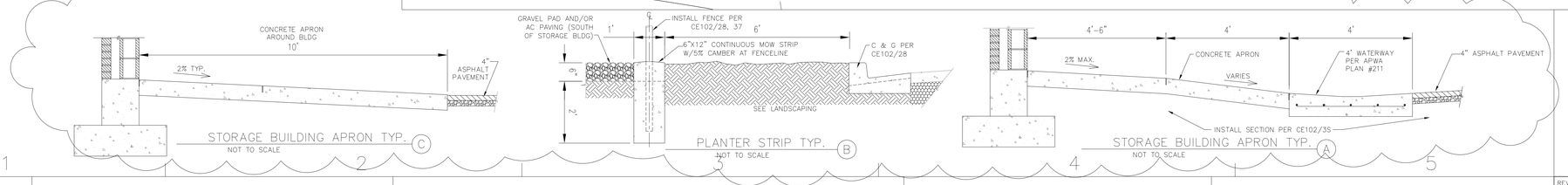
GRADING POINT TABLE				
POINT NO	NORTHING	EASTING	ELEVATION	DESCRIPTION
1001	780686.98	2538118.63	5488.24	EX FL
1002	780753.04	2538119.86	5488.45	EX FL
1003	781010.99	2538124.66	5489.24	EX FL
1004	781076.62	2538125.55	5489.44	EX FL
1005	780701.20	2538133.62	5489.09	TBC
1006	780701.21	2538294.00	5483.45	TBC
1007	780701.21	2538571.96	5481.38	TBC
1008	781126.41	2538571.96	5483.51	TBC
1009	781126.41	2538522.75	5484.22	SW
1010	781090.70	2538427.48	5484.70	EP
1011	780974.03	2538427.48	5484.80	EP
1012	780974.03	2538465.48	5484.60	EP
1013	780782.70	2538465.48	5484.80	EP
1014	780782.70	2538348.26	5484.80	EP
1015	780865.36	2538348.26	5484.80	EP
1016	780866.15	2538293.96	5483.94	FL
1017	780869.78	2538290.18	5484.47	TBC
1018	780911.09	2538276.16	5484.84	TBC
1019	780912.62	2538277.68	5484.37	EP
1020	780912.45	2538293.14	5484.52	EP
1021	780912.95	2538300.64	5484.60	SW
1022	780985.77	2538293.64	5484.33	EP
1023	781025.83	2538293.64	5484.60	EP
1024	781079.38	2538301.14	5484.03	SW
1025	781076.22	2538293.14	5483.93	EP
1026	781076.22	2538279.14	5483.78	EP
1027	781079.22	2538276.14	5484.22	TBC
1028	781083.22	2538276.14	5484.42	TBC
1029	781109.85	2538268.44	5485.81	TBC
1030	781120.89	2538259.27	5486.06	TBC
1031	781134.33	2538224.54	5487.76	TBC
1032	781134.33	2538203.64	5488.70	TBC
1033	781139.83	2538198.14	5489.12	TBC
1034	781145.80	2538198.14	5488.84	TBC
1035	781148.50	2538200.64	5488.62	TBC
1036	781148.30	2538216.14	5488.11	TBC
1037	781190.36	2538216.14	5488.32	TBC
1038	781290.63	2538257.20	5488.87	TBC
1039	781303.21	2538244.33	5489.63	TBC
1040	781306.71	2538247.88	5489.71	TBC
1041	781326.17	2538229.16	5490.80	TBC
1042	781322.08	2538225.02	5490.74	TBC
1043	781334.66	2538212.14	5491.50	TBC
1044	781190.36	2538153.14	5490.71	TBC
1045	781148.85	2538153.14	5490.50	TBC
1046	781073.72	2538153.14	5489.88	TBC
1047	781073.72	2538168.64	5489.13	TBC
1048	781069.72	2538171.64	5488.82	TBC
1049	781062.22	2538163.64	5489.30	TBC
1050	781062.22	2538140.55	5490.28	TBC
1051	781025.21	2538139.66	5490.09	TBC
1052	781025.21	2538167.14	5488.77	TBC

GRADING POINT TABLE				
POINT NO	NORTHING	EASTING	ELEVATION	DESCRIPTION
1053	781017.21	2538166.64	5489.09	TBC
1054	781017.21	2538153.14	5489.50	TBC
1055	780985.47	2538153.14	5489.34	TBC
1056	780895.34	2538153.14	5489.00	TBC
1057	780813.57	2538153.14	5488.27	TBC
1058	780746.21	2538153.14	5488.61	TBC
1059	780746.21	2538167.14	5487.95	TBC
1060	780738.21	2538167.11	5487.95	TBC
1061	780738.26	2538134.83	5489.31	TBC
1062	780985.72	2538275.65	5483.98	FL
1063	781025.78	2538275.65	5484.36	FL
1064	780746.21	2538215.64	5487.21	TBC
1065	780746.21	2538202.14	5487.18	TBC
1066	780738.21	2538202.14	5486.48	TBC
1067	780738.21	2538245.12	5485.44	TBC
1068	780746.21	2538245.12	5486.11	TBC
1069	780746.21	2538231.14	5486.61	TBC
1070	780813.57	2538224.11	5484.50	TG
1071	780890.71	2538231.14	5487.17	TBC
1072	780895.59	2538231.64	5486.67	EP
1073	780899.71	2538231.14	5487.17	TBC
1074	780985.47	2538231.14	5486.58	TBC
1075	780985.43	2538223.40	5485.60	TG
1076	781016.71	2538231.14	5486.63	TBC
1077	781017.21	2538245.14	5486.11	TBC
1078	781025.21	2538245.14	5486.39	TBC
1079	781025.21	2538202.16	5488.04	TBC
1080	781017.21	2538202.16	5488.17	TBC
1081	781016.71	2538215.64	5487.64	TBC
1082	780985.47	2538215.64	5487.02	EP
1083	780895.34	2538215.64	5487.47	EP
1084	780813.57	2538215.64	5486.07	EP
1085	781082.72	2538204.04	5487.43	TBC
1086	781062.22	2538224.54	5486.83	TBC
1087	781082.72	2538245.04	5485.74	TBC
1088	781103.22	2538224.54	5486.83	TBC
1089	781091.55	2538325.62	5484.66	SW
1090	781127.93	2538265.65	5485.69	SW
1091	781142.76	2538287.84	5484.65	SW
1092	781205.82	2538255.96	5483.19	TG
1093	781222.47	2538279.64	5483.72	SW
1094	781274.32	2538346.92	5484.55	SW
1095	781364.44	2538347.09	5488.60	SW
1096	781325.61	2538341.02	5486.86	SW
1097	781143.80	2538222.64	5487.95	SW
1098	781261.65	2538358.15	5484.80	SW
1099	780703.71	2538296.00	5482.95	FL
1100	781220.86	2538542.26	5484.70	SW
1101	781268.65	2538522.76	5484.60	SW
1102	781286.08	2538261.84	5489.00	SW
1103	781190.36	2538222.64	5488.19	SW
1104	781190.70	2538465.48	5484.48	SW
1105	781190.70	2538366.89	5485.00	SW
1106	781126.20	2538921.46	5485.00	SW
1107	780701.21	2538801.96	5477.00	TBC
1108	780701.21	2538861.96	5475.60	TBC

GENERAL NOTES

1. CONTRACTOR TO EXPECT SATURATED CONDITIONS ESPECIALLY FOR SEWER CONSTRUCTION. IT IS EXPECTED THAT DEWATERING WILL REQUIRE A SYSTEM OF SUMP BASINS AND SUBMERSIBLE PUMPS SHOULD BE EXPECTED, DESIGNED, AND MANAGED BY THE CONTRACTOR (SEE SPECIFICATION 312319 – DEWATERING).
2. CONTRACTOR MUST COMPLY WITH UDOT TRAFFIC CONTROL STANDARDS FOR CONSTRUCTION ACROSS SR–121. REPLACEMENT OF MATERIALS, (P.G. ASPHALT, SUBGRADE MATERIALS, CURB AND GUTTER ETC.) WILL BE REPLACED AND TESTED TO UDOT STANDARDS AND PROCEDURES. MATERIALS TESTING MUST BE PERFORMED BY A UDOT QUALIFIED TESTING AGENCY.
3. UTILITIES SHOWN ARE FOR INFORMATION PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE TO CONTACT BLUE STAKES, APPLICABLE PUBLIC UTILITIES AND OTHER UTILITY OWNERS AS APPLICABLE TO LOCATE EXISTING UTILITIES PRIOR TO EXCAVATION. POT–HOLE UTILITIES WHERE NECESSARY PRIOR TO EXCAVATION.
4. CONTRACTOR SHALL VERIFY ALL DIMENSIONS SHOWN HEREON. ANY DISCREPANCIES SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION.
5. CONTRACTOR SHALL PROVIDE APPROPRIATE SIGNING AND BARRICADING. THE CONTRACTOR SHALL PROVIDE FLAGGING, SINAGE, AND BARRICADES AND ALL TRAFFIC CONTROL REQUIRED PER THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND UDOT STANDARDS WHEN OPERATING WITHIN THE ROADWAY.
6. DUST SHALL BE CONTROLLED BY WATERING THE CONSTRUCTION AREA.
7. ALL PUBLIC/PRIVATE ROADWAYS MUST BE CLEANED DAILY OF ALL LOOSE DIRT, MUD, AND DEBRIS DEPOSITED ON THEM AS A RESULT OF THE CONSTRUCTION WORK. ALL CLEANING IS TO BE PERFORMED TO THE SATISFACTION OF VERNAL CITY OR MAESER CITY STANDARDS (WHERE APPLICABLE).
8. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION FOR THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
9. APPROVED PROTECTED MEASURES AND TEMPORARY DRAINAGE PROVISIONS MUST BE USED TO PROTECT ADJOINING PROPERTIES DURING THE PROJECT.
10. EROSION CONTROL: PROTECT ALL INLET BOXES, CATCH BASINS, ETC. DURING CONSTRUCTION. PROTECT SURROUNDING PROPERTIES AND STREETS FROM SITE RUNOFF.
11. ALL SITE CONSTRUCTION TO COMPLY WITH VERNAL CITY OR MAESER CITY STANDARDS (WHERE APPLICABLE).





STORAGE BUILDING APRON TYP. (C)
NOT TO SCALE

PLANTER STRIP TYP. (B)
NOT TO SCALE

STORAGE BUILDING APRON TYP. (A)
NOT TO SCALE

ABBREVIATIONS

TBC	TOP BACK OF CURB
GB	GRADE BREAK
FL	FLOWLINE
TG	TOP OF GRATE
SW	SIDEWALK
EP	EDGE OF PAVEMENT
TOA	TOP OF AC PAVEMENT

NOTE:

ELEVATION CALLOUTS REFER TO TBC ELEVATION UNLESS NOTED OTHERWISE.

PREPARED BY:
HARRIS & ASSOCIATES
265 East 100 South Suite 350
Salt Lake City, Utah 84111-1604
(801) 521-8564 FAX (801) 355-2938
ENGINEER, R.C.E. NO. XXXXX DATE

THE GREAT SEAL OF THE STATE OF UTAH 1896

State of Utah–Department of Administrative Services
DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
4110 State Office Building/Salt Lake City, Utah 84114/538–3018

CONSULTANTS

LICENSED PROFESSIONAL ENGINEER No. 156496-2202 GREG M. PUTNAM STATE OF UTAH

UBATC–USU VERNAL FACILITY NEW CLASSROOM AND INDUSTRIAL TECHNOLOGY FACILITY

1919 WEST 500 SOUTH
VERNAL, UTAH

SHEET TITLE

GRADING PLAN

REVISIONS	DATE	BY	DESCRIPTION
2	09/11/08		ASI #15
1	10/27/08	GP/NM	DRIVING RANGE GUTTER & CURB

REVISIONS	DATE	BY	DESCRIPTION
1	5–8–08	GMP	REGRADE EAST PARKING
2	6–9–08	MAC	REVISE GRADING ELEVATIONS
3	7–1–08	MAC	RE–SCALE DRAWING
5	7–3–08	MAC	ADDED GRADING POINT TABLE
4	7–17–08	MAC	ADDED CURB AND GUTTER
3	8–13–08	MAC	REVISE GRADING
6	09/11/08		ASI #15

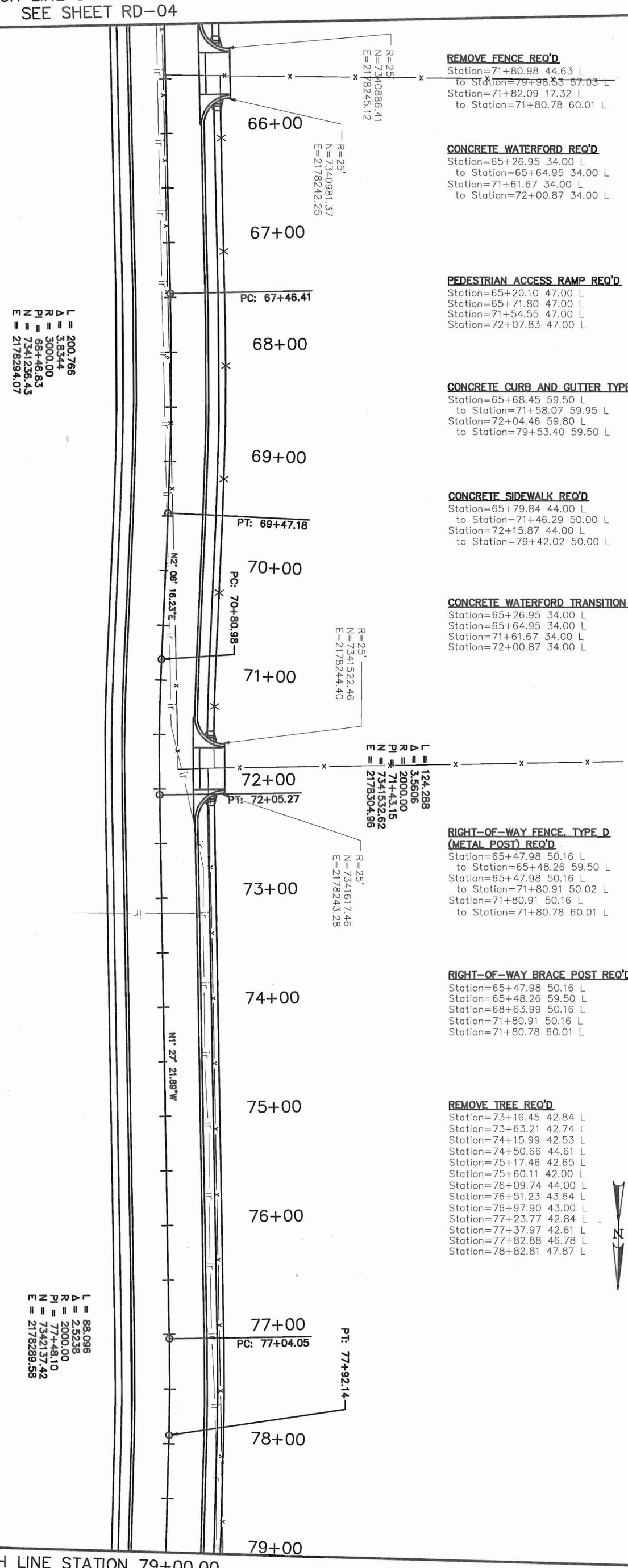
DRAWN BY	CHECKED BY
PROJECT NO. 05174250	DATE 07 MAY 2008

CE103

SHEET 3 OF 3

MATCH LINE STATION 65+00.00
SEE SHEET RD-04

REMOVE FENCE REQ'D
Station=65+46.41 1.86 R
to Station=65+48.26 59.50 L
Station=65+46.41 1.86 R
to Station=71+82.09 17.32 L



REMOVE FENCE REQ'D
Station=71+80.98 44.63 L
~~to Station=79+98.53 57.03 L~~
Station=71+82.09 17.32 L
to Station=71+80.78 60.01 L

CONCRETE WATERFORD REQ'D
Station=65+26.95 34.00 L
to Station=65+64.95 34.00 L
Station=71+61.67 34.00 L
to Station=72+00.87 34.00 L

PEDESTRIAN ACCESS RAMP REQ'D
Station=65+20.10 47.00 L
Station=65+71.80 47.00 L
Station=71+54.55 47.00 L
Station=72+07.83 47.00 L

CONCRETE CURB AND GUTTER TYPE B1 REQ'D
Station=65+68.45 59.50 L
to Station=71+58.07 59.95 L
Station=72+04.46 59.80 L
to Station=79+53.40 59.50 L

CONCRETE SIDEWALK REQ'D
Station=65+79.84 44.00 L
to Station=71+46.29 50.00 L
Station=72+15.87 44.00 L
to Station=79+42.02 50.00 L

CONCRETE WATERFORD TRANSITION REQ'D
Station=65+26.95 34.00 L
Station=65+64.95 34.00 L
Station=71+61.67 34.00 L
Station=72+00.87 34.00 L

RIGHT-OF-WAY FENCE, TYPE D (METAL POST) REQ'D
Station=65+47.98 50.16 L
to Station=65+48.26 59.50 L
Station=65+47.98 50.16 L
to Station=71+80.91 50.02 L
Station=71+80.91 50.16 L
to Station=71+80.78 60.01 L

RIGHT-OF-WAY BRACE POST REQ'D
Station=65+47.98 50.16 L
Station=65+48.26 59.50 L
Station=68+63.99 50.16 L
Station=71+80.91 50.16 L
Station=71+80.78 60.01 L

REMOVE TREE REQ'D
Station=73+16.45 42.84 L
Station=73+63.21 42.74 L
Station=74+15.99 42.53 L
Station=74+50.66 44.61 L
Station=75+17.46 42.65 L
Station=75+60.11 42.00 L
Station=76+09.74 44.00 L
Station=76+51.23 43.64 L
Station=76+97.90 43.00 L
Station=77+23.77 42.84 L
Station=77+37.97 42.61 L
Station=77+82.88 46.78 L
Station=78+82.81 47.87 L

N

MATCH LINE STATION 79+00.00
SEE SHEET RD-06

SHEET No. RD-05	PROJECT	MAIN STREET AND 2000 WEST STREET	CIVCO Engineering, Inc. 1256 W. 400 S. STE. 1, P.O. Box 1758, Vernal, Utah 84078 Telephone: (435) 789-5448 Fax: (435) 789-4485
		ROADWAY PLAN	
	PROJECT NUMBER	----	APPROVED Floyd Oatten 11-25-08 PROFESSIONAL ENGINEER DATE
			DRAWN BY MDK
			QC CHECKED BY BAR

No.	DATE	BY	REMARKS

REVISIONS

MATCH LINE STATION 79+00.00
SEE SHEET RD-05

CONCRETE WATERFORD TRANSITION REQ'D
Station=79+56.90 34.00 R
Station=79+94.90 34.00 R

CONCRETE WATERFORD REQ'D
Station=79+56.90 34.00 R
to Station=79+94.90 34.00 R

PEDESTRIAN ACCESS RAMP REQ'D
Station=80+01.75 47.00 R
Station=86+18.65 34.50 R
Station=86+46.63 62.68 R

CONCRETE CURB AND GUTTER TYPE B1 REQ'D
Station=79+98.40 59.50 R
to Station=86+46.60 68.18 R

CONCRETE SIDEWALK REQ'D
Station=80+09.79 44.00 R
to Station=86+40.62 65.64 R

RECONSTRUCT MANHOLE REQ'D
Station=86+33.34 54.65 R

REMOVE FENCE REQ'D
Station=86+34.04 65.61 R
to Station=86+34.42 50.83 L

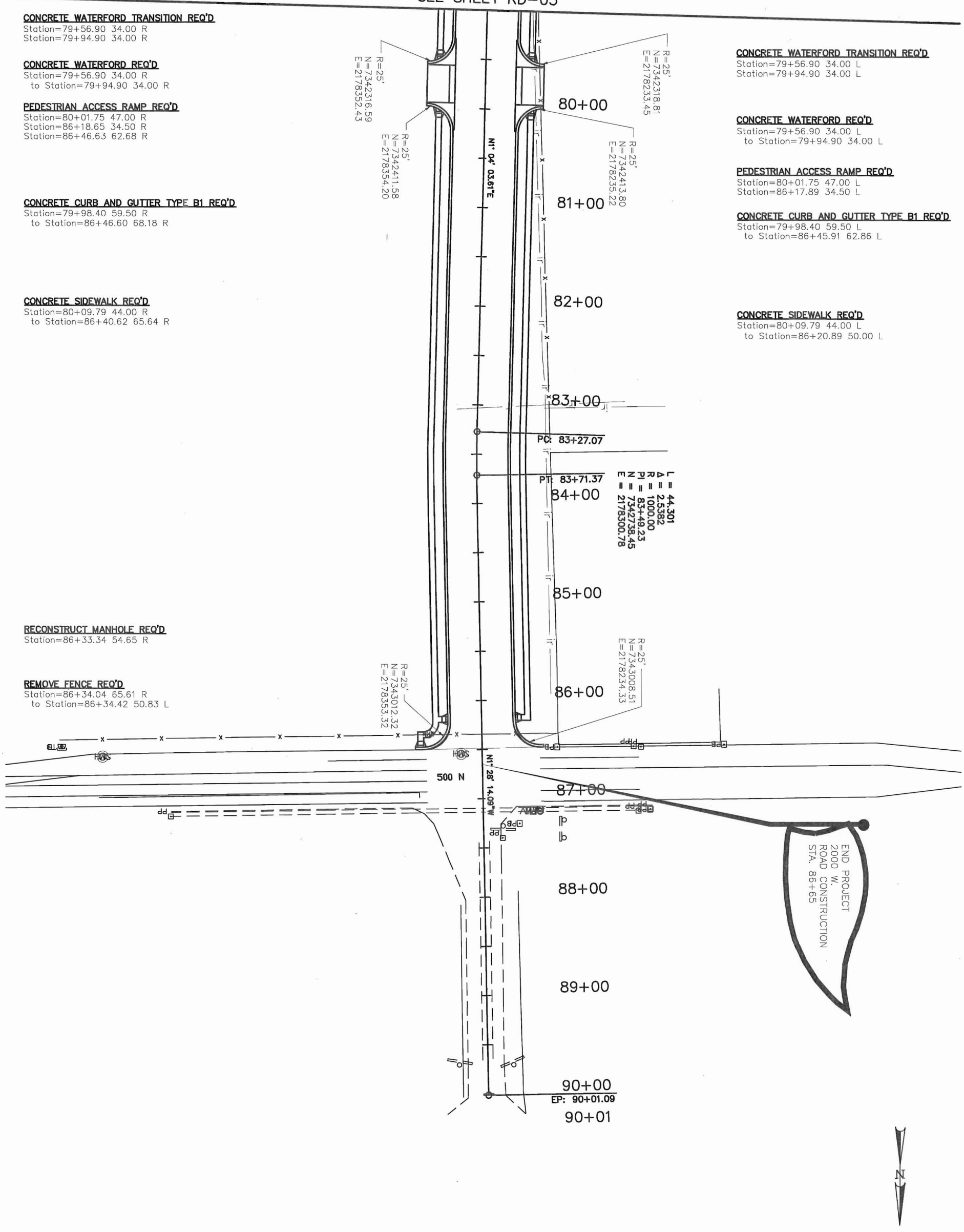
CONCRETE WATERFORD TRANSITION REQ'D
Station=79+56.90 34.00 L
Station=79+94.90 34.00 L

CONCRETE WATERFORD REQ'D
Station=79+56.90 34.00 L
to Station=79+94.90 34.00 L

PEDESTRIAN ACCESS RAMP REQ'D
Station=80+01.75 47.00 L
Station=86+17.89 34.50 L

CONCRETE CURB AND GUTTER TYPE B1 REQ'D
Station=79+98.40 59.50 L
to Station=86+45.91 62.86 L

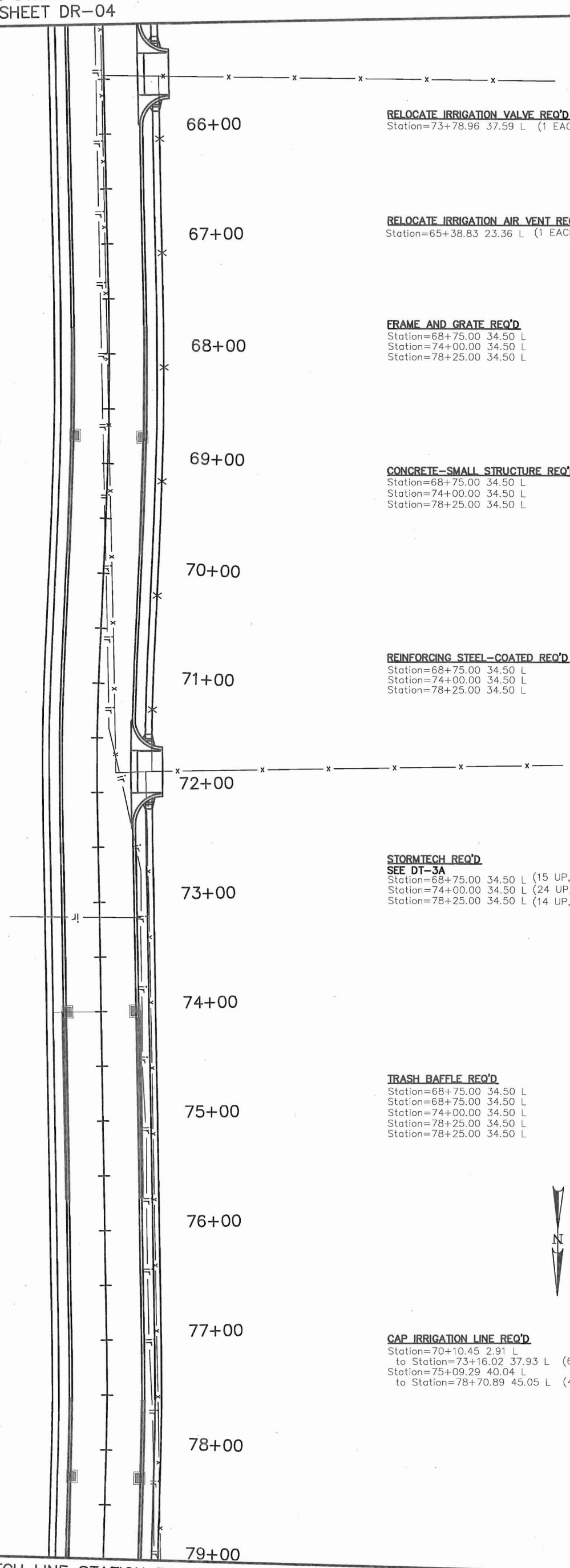
CONCRETE SIDEWALK REQ'D
Station=80+09.79 44.00 L
to Station=86+20.89 50.00 L



SHEET No. RD-06	PROJECT	MAIN STREET AND 2000 WEST STREET	CIVCO Engineering, Inc.		
		ROADWAY PLAN	1256 W. 400 S. STE. 1, P.O. Box 1758, Vernal, Utah 84078		
	PROJECT NUMBER	----	Telephone: (435) 789-5448 Fax: (435) 789-4485		
			APPROVED	DRAWN BY	MDK
			PROFESSIONAL ENGINEER — DATE 11·25·08	QC CHECKED BY	BAR

No.	DATE	BY	REMARKS
			REVISIONS

MATCH LINE STATION 65+00.00
SEE SHEET DR-04



FRAME AND GRATE REQ'D
Station=68+75.00 34.50 R
Station=74+00.00 34.50 R
Station=78+25.00 34.50 R

CONCRETE-SMALL STRUCTURE REQ'D
Station=68+75.00 34.50 R
Station=74+00.00 34.50 R
Station=78+25.00 34.50 R

REINFORCING STEEL-COATED REQ'D
Station=68+75.00 34.50 R
Station=74+00.00 34.50 R
Station=78+25.00 34.50 R

STORMTECH REQ'D
SEE DT-3A
Station=68+75.00 34.50 R (15 UP, 14 DOWN)
Station=74+00.00 34.50 R (24 UP, 0 DOWN)
Station=78+25.00 34.50 R (14 UP, 10 DOWN)

TRASH BAFFLE REQ'D
Station=68+75.00 34.50 R
Station=68+75.00 34.50 R
Station=74+00.00 34.50 R
Station=78+25.00 34.50 R
Station=78+25.00 34.50 R

CAP IRRIGATION LINE REQ'D
Station=65+20.91 2.12 R
to Station=69+38.51 1.42 R (8 EACH)

RELOCATE IRRIGATION VALVE REQ'D
Station=73+78.96 37.59 L (1 EACH)

RELOCATE IRRIGATION AIR VENT REQ'D
Station=65+38.83 23.36 L (1 EACH)

FRAME AND GRATE REQ'D
Station=68+75.00 34.50 L
Station=74+00.00 34.50 L
Station=78+25.00 34.50 L

CONCRETE-SMALL STRUCTURE REQ'D
Station=68+75.00 34.50 L
Station=74+00.00 34.50 L
Station=78+25.00 34.50 L

REINFORCING STEEL-COATED REQ'D
Station=68+75.00 34.50 L
Station=74+00.00 34.50 L
Station=78+25.00 34.50 L

STORMTECH REQ'D
SEE DT-3A
Station=68+75.00 34.50 L (15 UP, 14 DOWN)
Station=74+00.00 34.50 L (24 UP, 0 DOWN)
Station=78+25.00 34.50 L (14 UP, 10 DOWN)

TRASH BAFFLE REQ'D
Station=68+75.00 34.50 L
Station=68+75.00 34.50 L
Station=74+00.00 34.50 L
Station=78+25.00 34.50 L
Station=78+25.00 34.50 L

N

CAP IRRIGATION LINE REQ'D
Station=70+10.45 2.91 L
to Station=73+16.02 37.93 L (6 EACH)
Station=75+09.29 40.04 L
to Station=78+70.89 45.05 L (4 EACH)

MATCH LINE STATION 79+00.00
SEE SHEET DR-06

SHEET No. DR-05	PROJECT	MAIN STREET AND 2000 WEST STREET	CIVCO Engineering, Inc. 1256 W. 400 S. STE. 1, P.O. Box 1758, Vernal, Utah 84078 Telephone: (435) 789-5448 Fax: (435) 789-4485					
		DRAINAGE PLAN						
	PROJECT NUMBER	----	APPROVED	DRAWN BY	MDK			
			PROFESSIONAL ENGINEER 11-25-08 DATE	QC CHECKED BY	BAR	No.	DATE	BY	REMARKS
						REVISIONS		

MATCH LINE STATION 79+00.00
SEE SHEET DR-05

FRAME AND GRATE REQ'D
Station=82+50.00 34.50 R

CONCRETE-SMALL STRUCTURE REQ'D
Station=82+50.00 34.50 R

REINFORCING STEEL-COATED REQ'D
Station=82+50.00 34.50 R

STORMTECH REQ'D
SEE DT-3A
Station=82+50.00 34.50 R (24 UP, 0 DOWN)

TRASH BAFFLE REQ'D
Station=82+50.00 34.50 R

FRAME AND GRATE REQ'D
Station=82+50.00 34.50 L

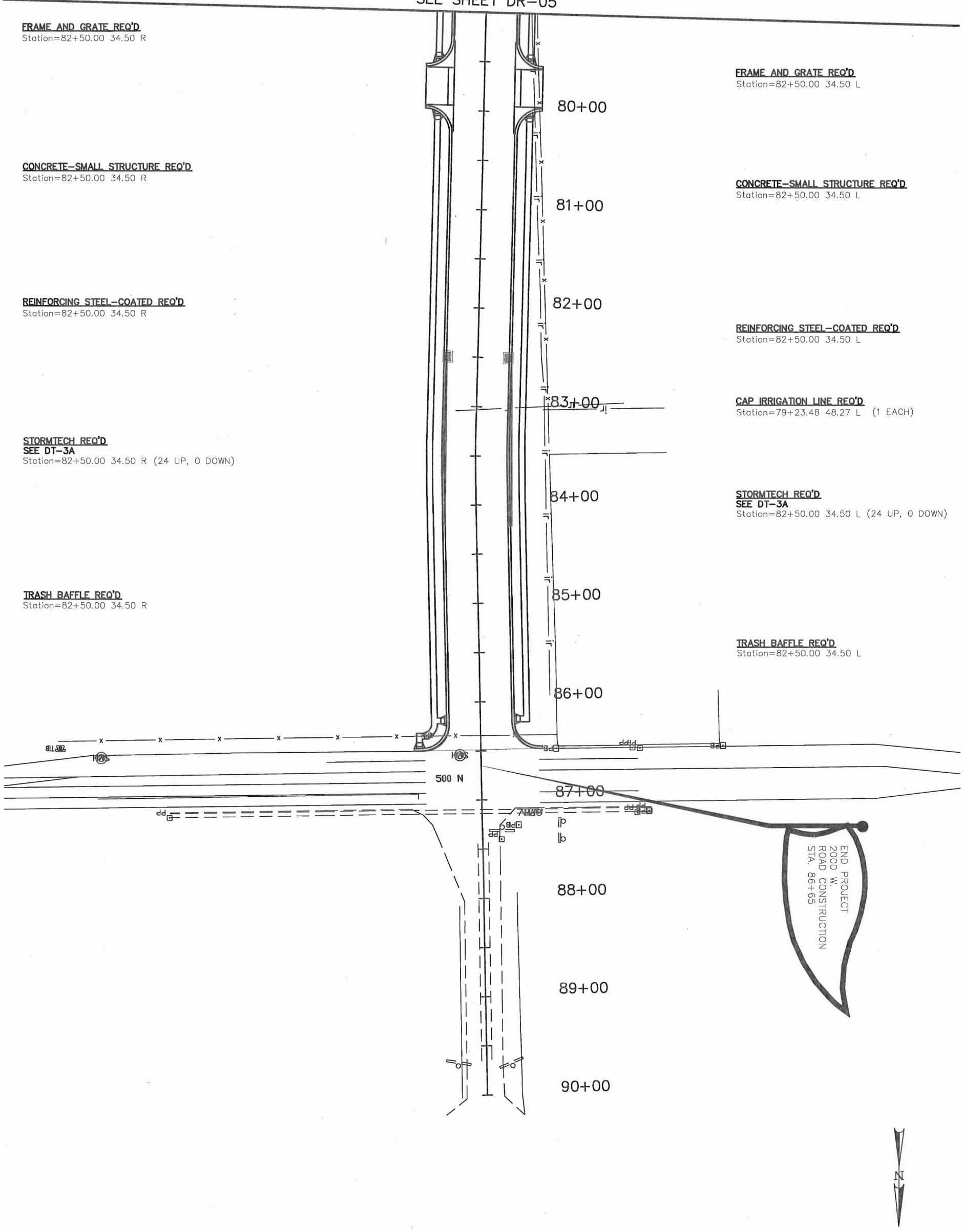
CONCRETE-SMALL STRUCTURE REQ'D
Station=82+50.00 34.50 L

REINFORCING STEEL-COATED REQ'D
Station=82+50.00 34.50 L

CAP IRRIGATION LINE REQ'D
Station=79+23.48 48.27 L (1 EACH)

STORMTECH REQ'D
SEE DT-3A
Station=82+50.00 34.50 L (24 UP, 0 DOWN)

TRASH BAFFLE REQ'D
Station=82+50.00 34.50 L



PROJECT	MAIN STREET AND 2000 WEST STREET	CIVCO Engineering, Inc. 1256 W. 400 S. STE. 1, P.O. Box 1758, Vernal, Utah 84078 Telephone: (435) 789-5448 Fax: (435) 789-4485			
	DRAINAGE PLAN				
PROJECT NUMBER	----	APPROVED PROFESSIONAL ENGINEER 11-25-08 DATE	DRAWN BY MDK		
			QC CHECKED BY BAR	No. / DATE / BY	REMARKS
					REVISIONS

SHEET No. DR-06